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Participation, satisfaction, perceived benefits, and maintenance of behavioral self-management strategies in a self-directed exercise program for adults with arthritis

PA Sharpe[1], **S Wilcox**[2], **DE Schoffman**[3], and **M Baruth**[4]

[1]Prevention Research Center, Arnold School of Public Health, 921 Assembly Street, University of South Carolina, Columbia, SC 29208, United States. sharpep@mailbox.sc.edu.

[2]Prevention Research Center, Arnold School of Public Health, 921 Assembly Street, University of South Carolina, Columbia, SC 29208, United States; Department of Exercise, Arnold School of Public Health, 921 Assembly Street, University of South Carolina, Columbia, SC 29208, United States. wilcoxs@mailbox.sc.edu.

[3]Prevention Research Center, Arnold School of Public Health, 921 Assembly Street, University of South Carolina, Columbia, SC 29208, United States; Department of Health Promotion, Education and Behavior, Arnold School of Public Health, 915 Greene Street, University of South Carolina, Columbia, SC 29208, United States. schoffmd@email.sc.edu.

[4]Prevention Research Center, Arnold School of Public Health, 921 Assembly Street, University of South Carolina, Columbia, SC 29208, United States. mbaruth@svsu.edu.

Abstract

A process evaluation was conducted in conjunction with a controlled trial of a self-directed exercise program among people with arthritis to describe the program's reach; self-management behaviors, exposure to materials, program perceptions, satisfaction, and perceived benefits; compatibility with targeted participants' needs; and maintenance. Participants (n=197) were predominantly white, middle-aged, college-educated women. At 12 weeks, 73.2% had read ≥90% of the program materials (at nine months >70% had "occasionally" or "often" looked back over each of the five parts of the materials); 63.3% had set goals (52.5% at nine months), and 83.9% had "some" or "a lot" of success following their plan (64.2% at nine months), while 90.4% rated the program "good" or "excellent" (87.5% at nine months). At 12 weeks, the majority (89.3%) used written logs to self-monitor (mean=9.3 logs); by nine months, >70% never kept logs. Most (>80%) rated twelve of thirteen program components as helpful, and 98.6% would recommend the program. From 38% to 62.4% endorsed each of eight program benefits, with small declines of ≤9% at nine months. Qualitative response identified ways the program met and did not meet expectations. The main program compatibility issue was targeting all adults with arthritis, while featuring older adults in materials.

Keywords

arthritis; exercise; process evaluation

1. Introduction

Arthritis is the leading cause of disability among adults in the United States (Brault, Hootman, Helmick, Theis & Armour, 2009). Exercise reduces arthritis pain and enhances mobility (Conn, Hafdahl, Minor, & Nielsen, 2008; Hochberg, Altman, April, Benkhalti, Guyatt et al., 2012; Physical Activity Guidelines Advisory Committee, 2008), but most adults with arthritis do not participate in adequate amounts (Dunlop, Song, Semanik, Chang, Sharma, Bathono, J.M. et al., 2011; Fontaine, Heo, Bathon, 2004; Shih, Hootman, Kruger & Helmick, 2006) and are less active than adults without arthritis (Hootman, Macera, Ham, Helmick & Sniezek, 2003). Community-based service providers need evidence-based interventions that are feasible to implement and appealing to adults with arthritis to make exercise a widely accessible, priority approach for improving arthritis-related symptoms and limitations (Arthritis Foundation & Centers for Disease Control and Prevention, 2010; Boutaugh, 2003).

While evidence-based exercise programs for people with arthritis delivered in group-based formats exist (Callahan, 2009; Kelley, Kelley, Hootman & Jones, 2011), participation in such programs has been low (Boutaugh, 2003). To meet the needs of those who do not prefer group-based interventions and service providers' needs for low-cost programs with minimal staffing requirements, evidence-based programs with alternative delivery modes, such as self-directed, behavioral interventions, are needed (Arthritis Foundation, Centers for Disease Control and Prevention, 2010; Boutaugh, 2003).

First Step to Active Health™ (FSAH), The Hygenic Corporation, <http://www.FirstStepToActiveHealth.com/> is a self-directed, progressively implemented physical activity program designed to respond to recommendations from the National Blueprint: Increasing Physical Activity Among Adults Age 50 and Older (The Robert Wood Johnson Foundation, 2001). The program applies evidence-based strategies for successful physical activity promotion among older adults, including behavioral behavioral self-management strategies such as goal-setting and self-monitoring (Cress, Buchner, Prohaska, Rimmer, Brown, Macera et al., 2004). Through a cooperative agreement with the Centers for Disease Control and Prevention, we conducted an external evaluation (i.e., the evaluation team did not develop the intervention) of the program's efficacy among adults aged 18 years and older with arthritis using an experimental design - a randomized controlled trial (RCT). The recruitment strategies, inclusion and exclusion criteria, intervention components, methods and efficacy have been described in detail (Author et al., 2015). Briefly, the RCT found that exercise group participants had significantly greater increases in physical activity than the control group, as measured by the 42-item Community Health Activities Model Program for Seniors (CHAMPS), which yields total hours per week of moderate- to vigorous-intensity leisure-time physical activity (household activities excluded) (Harada, Chiu, King & Stewart, 2001; Stewart, Mills, King, Haskell, Gillis & Ritter, 2001). Both intervention and control groups saw significant improvements in three performance measures of physical function, three symptom severity items, and in self-efficacy for managing arthritis (Author et al., 2015).

The study funder's ultimate goal was inclusion of the FSAH program in a list of evidence-based interventions to be recommended for widespread dissemination in community-based settings, assuming evidence of efficacy in people with arthritis. We concurrently conducted a process evaluation among the exercise intervention participants, which is the focus here. In assessing process-level concepts, we wanted to address the fact that program evaluation is most often focused exclusively on assessing outcomes, with less attention to program processes and participants use of recommended strategies for attaining the targeted outcomes. Qualitative and quantitative process evaluation data help evaluators understand why impacts and outcomes were or were not achieved (Bartholomew, Parcel, Kok & Gottlieb, 2001; Saunders, Evans & Joshi, 2005).

Our process evaluation (Linnan & Steckler, 2002) goal was to assess the intervention's reach in terms of comparability to a population-based sample of adults with arthritis; participation in behavioral self-management behaviors; exposure to program materials; participants' program perceptions, satisfaction, and perceived benefits; program compatibility with the targeted participants' needs (adults with arthritis); and participants' behavioral maintenance beyond the initial 12-week intervention period. The purpose is to report the findings from a process evaluation conducted concurrently with FSAH RCT, with a focus on those participants assigned to the exercise intervention group.

2. Methods

Participants were recruited through multiple venues from March 2010 to October 2011 in central South Carolina. Each participant in the exercise intervention (n=197) received a FSAH Kit and 12 weekly self-monitoring logs in duplicate; stamped, addressed return envelopes for the logs; a one-page safety sheet that outlined arthritis-specific recommendations; and a study calendar outlining upcoming data collection dates. Each kit contained a brief manual, resistance band (Thera-Band®), illustrations and instructions for the exercises, and exercise log to self-monitor time spent in cardio, flexibility, strength and balance exercises each day. The instructions showed exercises to be implemented in four progressive steps, self-paced over 12 weeks: Cardiovascular fitness, Flexibility, Upper and lower body strength, and Balance. Instructions advised participants to begin with Step 1 and add subsequent steps when they felt ready. Behavioral behavioral self-management strategies addressed included self-assessment and planning, goal setting, and self-monitoring, implemented within an individualized approach, all consistent with increasing self-efficacy (Bandura, 1997) and achieving behavior change. These behavioral self-management strategies, derived from Social Cognitive Theory (Bandura, 1977), have been shown to play an essential role in successful behavior change, including exercise (Artinian et al., 2010; Michie, Abraham, Whittington, McAteer & Gupta, 2009).

The focus, therefore, was on participants' self-reported use of behavioral behavioral self-management, participants' satisfaction with and perceived benefits from the program, and behavioral maintenance rather than the intervention outcomes of exercise level, perceived symptoms, and physical functional status. Quantitative and qualitative data were collected at 12 weeks (n=153, response rate of 77.7%) and nine months (n=143) from self-administered

questionnaires and, throughout the project period, from participants' weekly exercise logs and a participant tracking database.

2.1. Reach: Participant characteristics compared to a population-based sample

Reach may be defined as the proportion of eligible participants who are "willing to participate in a given initiative" as well as the "similarity or differences between those who participate and those who are eligible but do not" (College of Agricultural and Life Sciences, Virginia Polytechnic Institute and State University, 2016). Because this evaluation was conducted in conjunction with a randomized controlled trial of intervention efficacy, maximizing reach as a proportion of eligible participants was not a goal as it would be in a program dissemination initiative. However, reach defined as the similarity of participants to the general population of adults with arthritis was relevant to the study in terms of generalizing research findings to the target population of adults with arthritis.

For inclusion, participants had to meet the validated case definition of arthritis used in population-based national surveys, such as the Behavioral Risk Factor Surveillance Survey (BRFSS) and public health interventions (Hootman, Helmick & Brady, 2012). Arthritis was defined as an affirmative reply to the question "Have you ever been told by a doctor or other health care professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia?" To assess similarity to a population-based sample of adults with arthritis, we compared the exercise intervention participants on age, gender, race, Hispanic ethnicity, and education to people with arthritis interviewed in the 2010 BRFSS in South Carolina, a disproportionate stratified survey sample of household telephone numbers, (South Carolina Department of Health and Environmental Control, 2010).

2.2. Participation in self-management behaviors

We defined program participation as the extent to which participants engaged in or perceived that they had succeeded at performing the recommended behavioral self-management strategies during the first 12 weeks. Participants responded to items rating their success in following their plan (4-point scale of "no success" to "a lot of success"), putting forth effort to implement the program (4-point scale of "poor" to "excellent") and setting and achieving goals (5-point response of "strongly disagree" to "strongly agree"), i.e., behavioral strategies to support the ultimate program outcome of exercise performance. Self-administered questionnaires at 12 weeks assessed participation in these self-management behaviors.

Exercise logs provided documentation of participants' self-monitoring behavior. Participants completed exercise logs each day and mailed their logs in once a week over the 12-week intervention period. Questions included "Which STEP are you on this week?" and "Did you do cardio, flexibility, strength: upper body, strength: lower body, balance? (yes, no)," along with details regarding performance of each exercise. For assessing self-monitoring behavior as a process, our interest was in the completion of the log itself rather than the overall outcome of exercise performance.

2.3. Exposure to program materials

Exposure, defined as the extent to which participants' read the program materials (Baranowski & Stables, 2000) was assessed at 12 weeks with the following item: About what percentage of the program materials did you read? 0 to 20%, 30 to 50%, 60 to 80%, or 90 to 100%.

2.4. Program perceptions, satisfaction, and perceived benefits

At 12 weeks, participants rated the program overall on a 4-point scale from "poor" to "excellent" and rated the usefulness of 13 specific components as "did not use, not at all helpful, somewhat helpful, or very helpful." The overall program rating was repeated at nine months' follow-up.

At 12 weeks, participants also rated the relative ease or difficulty ("too easy, just right, too difficult") of performing five types of recommended exercises illustrated in the program manual and responded "yes" or "no" as to whether or not they would recommend the program to others with arthritis. Perceptions of recommended behaviors as too difficult or too easy may not support development of a sense of mastery or an increase in self-efficacy, attitudes that increase the likelihood of successful behavior change and maintenance.

To assess perceived program benefits, participants rated their level of agreement from "strongly disagree" to "strongly agree" regarding eight "positive changes" from the exercise program. These eight items were repeated at nine months. The perceptions of positive changes attributed to program participation provide reinforcement for behavior change and maintenance efforts. Thus we measured perceptions of positive changes as part of the process evaluation, in addition to the objective outcome measures of physical functional performance that were part of the main RCT study.

In addition to the quantitative items, the 12-week questionnaire included the following open-ended, qualitative questions to further assess participant satisfaction and program perceptions: To what extent was the *FSAH* program what you expected it to be? What was the best thing about the *FSAH* program?, and What about the *FSAH* program could be improved? At nine months' follow-up, the following qualitative question was included in the questionnaire: Please tell us anything else about the program or study that you would like to share.

2.5 Program compatibility with the targeted participant needs

Because the CDC funders' ultimate goal was widespread dissemination to adults with arthritis, we evaluated the materials' potential appropriateness for with diverse users by assessing the materials' reading level and potential appeal across age, gender and race groups. We computed reading level scores of the text in the FSAH manual and the exercise illustration sheets. Because reading level estimation formulas differ by method, we computed reading grade level by four methods (Flesch-Kincaid Grade Level, SMOG Index, Automated Readability Index, and the Fry Reading Level) through an online tool <www.readabilityformulas.com> and report below the range of results. We tallied the apparent age group, race and gender of the FSAH photo illustrations and reviewed the

materials' contents for text that might limit the program's focus to a particular population group.

2.6 Maintenance

Maintenance refers to keeping participants involved in the program (Baranowski & Stables, 2000). Maintenance of self-management behaviors beyond the initial program period is important for maintaining early behavior changes and building upon success to advance accomplishments. At the nine-month follow-up, participants completed three questions they had answered at twelve weeks, but this time in reference to the past six months, since the 12-week data collection visit. These were the items concerning success at following their plan and setting and meeting goals. To describe the frequency of their continued self-monitoring behavior (keeping a log) for the five types of recommended exercises during the past six months, participants used a 3-point scale of "never, occasionally, or often." To determine continued exposure to program materials, participants indicated how often they had looked back at five sections of the program materials since the 12-week data collection visit, using a 3-point scale of "never, occasionally, or often."

2.7. Data analysis

We computed descriptive statistics (n and % or mean, SD, minimum, and maximum) for participant characteristics, self-reported behaviors and program satisfaction questions, using the Statistical Analysis System (Cary, NC), version 9.3. To compare the participant characteristics to the BRFSS sample of persons with arthritis, we conducted Chi-squared analyses of categorical data.

For the open-ended questions in the participants' self-administered questionnaires, two research team members independently coded verbatim responses and organized them into thematic categories. They compared their independent coding results and reached consensus for any areas of disagreement in their initial coding. The categorization of responses under meaningful themes was not mutually exclusive. Rather, the coders assigned all conceptual codes that were applicable to the written responses for each open-ended question; therefore, percentages may not add to 100% and are reported below provide an indication of the relative rank of the themes identified in responses to each question.

3. Results

3.1. *Reach*: *Participant characteristics compared to a population-based sample*

Table 1 shows that, compared to the 2010 BRFSS sample of persons with arthritis in South Carolina, the exercise intervention participants were significantly different by age group, race, gender, and education, but not Hispanic ethnicity. The study sample included proportionally more women and college-educated participants, and fewer people aged 65 and older. While the racial composition was significantly different between the study sample and the state survey sample, the magnitude of the difference was not large (a 7% difference in African American participants favoring the FSAH study sample, which was mainly recruited in a county with a larger African American population than the state overall).

3.2. Participation in self-management behaviors during the 12-week program period

At 12 weeks, 153 of the original 197 exercise intervention participants (77.7% retention in data collection) responded to one or more of the questions about behavioral self-management behaviors. The majority (65%) of those who responded reported “some” success following their exercise plan, while an additional 18.9% reported “a lot of success.” Half of participants (49.7%) reported their level of effort in doing the exercises had been “excellent” or “good,” while the other half (50.3%) reported “ok” or “poor” effort. The majority (63.3%) “agreed” or “strongly agreed” they had regularly met exercise goals, while 47% “agreed” or “strongly agreed” they had regularly met those goals. See Table 2.

Participants’ exercise logs provided an estimate of the level of participation in self-monitoring behavior and the extent of their program implementation. Of the 197 exercise participants, 176 (89.3%) returned any weekly exercise logs, with an overall mean of 9.3 logs returned, or 77.5% of the possible 12 weekly logs. Among the 176 participants who returned one or more logs, the mean returned was 10.4±3.2. Based on the self-reported log data, 100% of these participants implemented Step 1-Cardio at some point over the 12 weeks; 86.4% implemented Step 2-Flexibility; 71.0% implemented Step 3-Strength; and 55.7% implemented Step 4-Balance. Among participants who returned the final, week 12 log (n=135), the following percentages were working on each step (sequence of recommended exercises): Step 1-Cardio, 13.3%; Step 2-Flexibility, 11.9%; Step 3-Strength, 13.3%; and Step 4-Balance, 61.5%. The logs suggest that the majority of participants had participated in self-monitoring and on average, they had completed their logs most of the time. Further, among those who were still self-monitoring at the end of 12 weeks, the majority had made their way to the fourth and final step in the program.

3.3 Exposure to program materials

The majority of respondents at 12 weeks (73.2%) had read 90% to 100% of the program materials. See Table 2.

3.4. Program perceptions, satisfaction, and perceived benefits

As shown in Table 3, satisfaction with the program at 12 weeks was high; over 90% rated the program as “good” or “excellent,” and the majority of participants rated all five sections of the kit as “very helpful.” At nine months, 87.5% of participants gave the program an overall rating of “good” or “excellent.”

At 12 weeks, the great majority (>80%) had found twelve of thirteen program aspects to be “somewhat helpful” or “very helpful.” The exception was the balance stability pad, which the majority did not use. In rating the ease or difficulty in doing each type of recommended exercise, the greatest proportion of “just right” responses were for cardio (80.7%) and flexibility (66.9%). Few participants found any of the exercises to be “too hard; however, 36.1% did not do the balance exercises, 23.2% did not do the lower body strength exercises, and 20.6% did not do the upper body strength exercises. For each of the five types of exercises, between 10.0% and 17.7% found the exercises “too easy.” Almost all (98.6%) would recommend the program to other people with arthritis.

Perceived program benefits from participation in FSAH at 12 weeks for eight types of improvements varied from 38% who endorsed “agree” or “strongly agree” for reduced fatigue to 62.4% who endorsed “agree” or “strongly agree” for improved fitness or endurance. For each potential area of improvement, between 8.1% and 30% were “not sure” about a connection between the program and the eight potential types of improvement. Perceived benefits in the same eight areas of improvement at nine months showed generally small declines of 1.1% to 9.2% in endorsement of “agree” or “strongly agree” six months later. See Table 3, for responses at 12 weeks and at nine months.

Among the 153 exercise participants who completed the process evaluation questions at 12 weeks, 55 people responded to the open-ended question “To what extent was the *First Step to Active Health* program what you expected it to be?” Some respondents commented on ways the program met, and ways it did not meet, their expectations, therefore the percentages that follow are not mutually exclusive. Of the 55 respondents, 60% gave affirmative statements that indicated the program had met or exceeded expectations; 34.5% expressed specific ways that the program had not met expectations; and 38% reported they had no prior expectations. Additionally, 38% volunteered positive comments about the program. Positive comments from participants whose expectations were met or exceeded included “Yes it was, but I failed to follow through on all the exercise all the time,” “Pleasantly surprised- appeared to be well thought-out and methodical,” and “Everything was as I expected it to be.” Comments from those whose expectations were not met included: “I expected the program to be much more difficult,” “I thought we would do more hands-on activities,” “It did not specifically address my gout problems in my toe and arthritis in my fingers,” and “Thought exercises too simple- all sitting- felt like [the exercises were] for older/people in poorer shape than I am.” Examples of general positive comments included: “Helped me set a regular time for exercise,” “It helped me become more motivated to get up and help do something positive for my condition,” and “The program is more comprehensive than I thought it would be.”

Fifty-nine participants responded to the question “What was the best thing about the *First Step to Active Health* program?” Responses from 10% or more of these respondents represented seven themes, as follows: a) provided good content and/or learning exercises (33.9%), e.g., “Printed material very good - pictures of exercises very helpful”; b) generally helped the participant focus and be accountable for exercise (32.2%), e.g., “Made me feel accountable to complete some daily activity”; c) program resulted in increased activity (e.g., exercise, chores, ‘getting out’) (30.5%), e.g., “Got me moving more”; d) enhanced motivation (20.3%), e.g., “Getting me back into exercise. I needed the nudge”; e) increased awareness or reinforced the importance of exercise (16.9%), e.g., “Reinforcing the fact that routine exercise promotes good quality of life”; f) specific mention of the need to return exercise logs (11.8%), e.g., “Keeping a log forced me to do the exercises- especially knowing it had to be mailed in”; and g) and ease/convenience/self-paced format (10.2%), e.g., “The ability to choose the type of exercises and set our own personal goals.”

In response to the question “What about the *First Step to Active Health* program could be improved?” (n=47), the top two themes were “No changes or not sure” (61.7%) and “more contact with staff, e.g., help getting started, feedback, oversight (12.8%). There were forty-

three specific issues that four or fewer people mentioned, including changes to the self-guided format (e.g., “add a buddy system,” “add a weekly group exercise class”), changes to the printed materials (e.g., improve images of the exercise - “outdated, all older people”), specific changes to the exercises (e.g., more strength exercises, more variety) or accessories (e.g. “provide the stability pad” or an alternative).

At nine-months, there were 87 responses to the open-ended statement “Please tell us anything else about the program that you would like to share.” Positive responses (67%) stated a specific benefit from participation or a positive aspect to the intervention. Benefits included behavior change (e.g., increased exercise, n=2); health outcomes (e.g., less pain, n=4); motivational or reinforcing factors (e.g., reminder calls, logs, n=10); and increased awareness, knowledge or skills regarding arthritis and exercise (n=14). Six comments praised the research staff, and there were 22 positive comments about the program overall or its components.

There were 13 statements regarding barriers to participation from health or physical functional problems (e.g., an injury or other illness); six statements regarding competing demands that interfered with participation (e.g., family illness, no time); and 17 statements about a lack of motivation or willingness to commit to the program (e.g., “change is hard,” “you have to desire to get a better life,” “hard to make exercise a habit”). There were 14 statements that recommended changes to the program, including for example, providing more structure, guidance, instruction and follow-up and the addition of classes, time in a gym, or a buddy system.

3.5. Program compatibility with the targeted participant needs

Reading grade level scores across the four readability formulas for each component of the original FSAH kit were as follows: program manual (*mean*=12.9, *SD*=1.6, *range*=11.1,15.0); cardio exercise (*mean*=11.4, *SD*=.68, *range*=10.6,12.0); flexibility exercise (*mean*=7.1, *SD*=.95, *range*=6.0,8.0); strength exercise (*mean*=8.1, *SD*=1.3, *range*=7.0,10.0); balance exercise (*mean*=7.0, *SD*=.78, *range*=6.1,8.0). The manual and cardio sections therefore require a high school reading level, while the remaining sections averaged grade levels of seven to eight. The grand mean across all readability formulas for all five components in the kit was a grade level of 9.3 (i.e., ninth grade).

Actual ages, races and genders for photo models in the FSAH materials could not be verified, therefore the following numbers are based on the study team’s best judgement of the photo models’ appearance. There was an oblique mention of age on the kit’s cover, “The First Step to Active Health program provides you with the tools you need to stay fit-at any age”; however, 100% of the photos shown on the program kit’s cover, manual, and exercise illustrations depicted older adults, shown solo or in pairs. The manual also stated, “The following are the recommended components for a physical activity program for adults over 50 years of age...” (p. 5). During the in-person orientation to the intervention, research staff persons provided an overview of the FSAH and stated the following: “Each STEP card is set up in a similar fashion. For each card, you will find text followed by some pictures. The types of exercise that fit into these different categories are listed or shown. The first thing you may notice is that the photographs in the program materials show mid-life and older

adults. The program was originally designed for this population. However, the exercises and advice apply to people of all ages, and we believe they may be particularly useful for people with arthritis." Models were African American/Black men (n=3), African American/Black women (n=8), white men (n=3) and white women (n=8). Duplicate photos of the same model counted once in the count of race.

3.6. Maintenance of self-management behaviors

The program duration was 12 weeks for this study, with an additional follow-up measurement session at nine months. Twelve weeks was deemed long enough for most people to gradually implement the four steps and to accrue measurable benefits, assuming adequate levels of adherence. The FSAH materials did not specify program duration, recommend when to progress to next step, or provide recommendations for behavioral maintenance over time.

At nine months (n=143), 64.2% of participants reported that in the previous six months since week 12, they had experienced "some" or "a lot" of success in following the exercise plan. Slightly more than half of respondents said they regularly set exercise goals (52.5%) during the past six months, while less than a third (28.1%) of them "agreed" or "strongly agreed" to regularly meeting their exercise goals during the past six months. During this time period, the majority of participants (>70%) had "occasionally" or "often" looked back over each of the five parts of the program," but the majority (>70%) had "never" kept daily exercise logs for each of the recommended types of exercises in the last six months. See Table 4.

4. Discussion and Conclusions

In terms of reach, the participants were different from the state survey sample of people with arthritis. From a research perspective, this is a limitation to the generalizability of the findings; however, the population pool available for efficacy studies conducted in a university setting is constrained by participants' proximity to the University as multiple data collection sessions in a standardized setting are needed. Programs offered in the context of research may attract a more highly educated and affluent participant than programs offered through a familiar community organization during the dissemination phaseal of an intervention.

Participation in self-monitoring as measured by participants' completion of exercise logs was high at 77.5% of all possible logs over initial 12 weeks. We have no objective measurement of exercise performance at home over the program period. Exercise logs as a measure of behavioral self-monitoring are subject to over- and under-reporting and to social desirability bias that apply to all behavioral self-reports; nevertheless, self-reports are typically the most sophisticated evaluation method within the reach of community-based service organizations.

The majority of participants reported implementing three of the four types of exercise; however, fewer (55.7%) implemented the balance exercises (Step 4). This may be related to the need to purchase a stability pad to fully implement those exercises, even though a staff person told the participants that a firm pillow was an acceptable substitute. However, the pad

was needed for only two of ten exercises, so an alternate explanation is that these participants simply did not yet make it to the last step (Balance) before the 12-week self-directed program ended.

Although the program was presented as self-directed from the start, some participants wanted contact with project staff or peers. This suggests that the program will have lower appeal among those who prefer to exercise with a “buddy” or an instructor. While there were some specific areas of dissatisfaction, overall program satisfaction was high at both 12 weeks and nine months. While there were some specific areas in which the program did not meet participant expectations, overall program satisfaction was high at both 12 weeks and nine months

Regarding compatibility, the program materials’ perceived relevance would play a pivotal role in reach, participation, and satisfaction during dissemination to a broad user population of adults with arthritis. The materials’ readability and perceived applicability to a range of individuals (e.g., appropriate to participants’ age, gender and cultural or race) would be expected to affect the program’s ultimate effectiveness. For the manual and the cardio sections of the FSAH kit, the reading level may be too high for some participants of relatively lower literacy. Further, we informed participants that, while the materials pictured older adults, the recommendations were applicable beyond this age group; nevertheless, some participants noted the apparent focus on older adults. Broad dissemination among all adults with arthritis indicates a need for matching of visuals to the targeted participants for broadened appeal.

Maintaining self-management behaviors increases the chances of the long-term maintenance of the targeted behavior (in this case, regular performance of four types of exercises). Consistent behavioral self-monitoring aids successful self-regulation (Bandura, 1998) and provides the means for evaluating progress as well as self-reinforcement (Kanfer, 1991). The majority of FSAH participants had not self-monitored by keeping written exercise logs during this maintenance phase, and less than a third reported regularly meeting their exercise goals. Nevertheless, the RCT results showed that the participant’s self-reported mean time spent in moderate and vigorous activity increased significantly, with moderate effect sizes at 12 weeks and 9 months compared to baseline (Author, 2015). This seems to indicate that as a group, the participants did increase their level of exercise and were successful in maintaining it to some degree, while at the same time the majority felt they were not regularly meeting their goals but were experiencing some success in following the FSAH exercise plan.

5. Lessons learned

Process evaluation informs the strengths and limitation of program at hand, it also suggests factors that could affect the program’s potential for successful dissemination. The FSAH program consists of a small paper packet of materials and a resistance band. This low-cost, evidence-based program appears to meet the needs of a sizeable proportion of adults with arthritis, but its impact might be enhanced with additional, low-cost resources. Originally designed for older adult users, FSAH was then evaluated among adults of all ages with

arthritis. While there was high satisfaction with the program overall, some participants remarked on the material's focus of older adults, noting the contrast with their own characteristics. Formative assessment with the intended audience, and any subgroups, is the logical next step to identify their specific needs and preferences prior to wider program dissemination.

Our results indicated that by six months after the initial program period, self-monitoring was waning. The program materials do not include recommendations for maintaining motivation or increasing levels of exercise. Long-term maintenance might be enhanced by additional contact to encourage self-management behaviors, such as mail or e-mail, a website, social media, or in-person support. While the FSAH program was designed to be self-administered, and therefore a low-cost program for community-based organizations to offer, contact with participants could acknowledge and reinforce successful behavior without adding significant cost. Responses to qualitative questions revealed that some participants wanted peer support and the opportunity for group exercise. For these participants, FSAH materials may be an adjunct to group exercise programs in the community. Opportunities for social support and positive reinforcement may lead to longer-term adherence and greater health benefits.

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Highlights

- Participants in a self-directed exercise program reported high exposure to program materials and participation in the behavioral self-management strategies of setting goals, following a plan, and self-monitoring.
- Self-monitoring declined over nine months, but the majority still reported at least some success in following their plan.
- Adults with arthritis perceived a variety of benefits from a self-directed exercise program.
- The majority of participants rated the program as good or excellent during both the initial period and the maintenance phase.

Table 1

First Step to Active Health [TM] study participants' and a population sample's characteristics

Characteristic	SC BRFSS 2010 sample (arthritis) *n*=4,099		Exercise intervention participants *n*=197		χ^2, *df*
	n	%	*n*	%	*P*
Age group					77.99, 2
					<.001
18–44 years	287	7.0	25	12.7	
45–64 years	1662	40.6	132	67.0	
≥65 years	2150	52.5	40	20.3	
Gender					29.84,1
					<.05
Women	2755	67.2	169	85.8	
Men	1344	32.8	28	14.2	
Race[1]					10.42,2
					<.01
White	2715	69.2	130	66.0	
African American	1038	26.5	66	33.5	
All others	171	4.4	1	0.5	
Ethnicity					.03,1
					0.85
Hispanic/Latino	36	0.9	2	1.0	
Education					150.82,3
					<.001
<HS	745	18.2	1	0.5	
HS or GED	1308	31.9	22	11.2	
Some post-HS	1003	24.5	53	26.9	
College graduate	1039	25.4	121	61.4	

Notes. Missing data within characteristics are not included in the Chi-squared analysis.

Abbreviations. SC=South Carolina, BRFSS=Behavioral Risk Factor Surveillance Survey (arthritis module), df=degrees of freedom, P=probability value, HS=high school

Table 2

Program participation and exposure among exercise participants in First Step to Active Health™ at 12 weeks (n=153)

Participation in self-management behaviors		**% endorsing each option**				
Over the past 12 weeks, how much of success have you had in following the exercise plan in	***n***	**No success**	**Not much success**	**Some success**	**A lot of success**	
First Step to Active Health?	143	3.5	12.6	65.0	18.9	
How would you rate yourself regarding how much effort you put into doing the *First Step to*		**Poor**	**Ok**	**Good**	**Excellent**	
Active Health exercises?	147	10.2	40.1	31.3	18.4	
During the *First Step to Active Health* program, I regularly set exercise goals.	***n***	**Strongly disagree**	**Disagree**	**Not Sure**	**Agree**	**Strongly agree**
	150	6.0	18.0	12.7	49.3	14.0
During the *First Step to Active Health* program, I regularly met my exercise goals.	149	6.7	27.5	18.8	40.3	6.7
Exposure to program materials						
About what percentage of the program materials did you read?	***n***	**0 to 20%**	**30 to 50%**	**60 to 80%**	**90 to 100%**	
	153	2.6	6.5	17.6	73.2	

Table 3

Program perception at 12 weeks and satisfaction and perceived benefits at 12 weeks (n=153) and nine months (n=143) among participants in the First Step to Active Health™

Satisfaction	**% endorsing each option at twelve weeks (n=153)**				
Overall, how would you rate the First Step to Active Health program?	***n***	**Poor**	**Ok**	**Good**	**Excellent**
	152	0.7	8.9	47.4	43.0
How would you rate each of the following aspects of the First Step to Active Health program or materials?	***n***	**Did not use**	**Not at all helpful**	**Somewhat helpful**	**Very helpful**
The information in the Program Manual	151	0.7	0.0	27.2	72.2
The information about cardio exercises	153	4.6	0.0	28.8	66.7
The pictures showing cardio exercises	145	4.8	2.8	25.5	66.9
The information about flexibility exercises	153	3.8	0.7	27.5	68.6
	n	**Did not use**	**Not at all helpful**	**Somewhat helpful**	**Very helpful**
The pictures showing flexibility exercises	144	4.2	2.1	21.5	72.2
The information about strength exercises	153	7.2	0.0	30.1	62.8
The pictures showing strength exercises	150	8.7	2.0	20.7	68.7
The stretchy band used in strength exercises	150	14.7	3.3	20.0	62.0
The information about balance exercises	150	15.3	0.0	25.3	59.3
The pictures showing balance exercises	150	16.0	0.7	22.0	61.3
The stability pad used in balance exercises	150	60.0	0.0	14.7	25.3
Keeping a daily activity log	150	3.3	3.3	29.3	64.0
Having to mail in the activity logs	150	4.0	6.7	35.3	54.0
How easy or difficult for you were each of the types of exercises in *First Step to Active Health?*	***n***	**Too Easy**	**Just Right**	**Too difficult**	**Did not do these exercises**
Cardio exercises (Step 1)	150	10.0	80.7	4.0	5.3
Flexibility exercises (Step 2)	148	21.6	66.9	1.6	10.1
Upper Strength exercises (Step 3)	146	16.4	57.5	5.5	20.6
Lower Strength exercises (Step 3)	147	17.7	48.3	10.9	23.1
Balance exercises (Step 4)	147	13.6	45.6	4.8	36.1
Would you recommend	***n***	**Yes**			
First Step to Active Health to other people with arthritis?	146	98.6			
Perceived program benefits					

	n	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
Because of the *First Step to Active Health* program, I have seen positive changes in my:						
Fitness or endurance	149	4.7	9.4	23.5	51.0	11.4
	n	**Strongly disagree**	**Disagree**	**Not sure**	**Agree**	**Strongly agree**
Flexibility	148	4.1	8.1	29.7	46.6	11.5
Strength	149	5.4	9.4	36.9	39.6	8.7
Balance	145	4.1	12.4	45.5	28.3	9.7
Pain (reduction)	148	8.1	30.0	33.8	27.7	9.5
Stiffness (reduction)	149	6.7	17.5	34.9	32.9	8.1
Fatigue (reduction)	150	8.0	14.0	40.0	29.3	8.7
Overall quality of life	148	5.4	8.8	25.7	46.0	14.2
Satisfaction		**% endorsing each option at nine months (n=143)**				
Overall, how would you rate the First Step to Active	***n***	**Poor**	**Ok**	**Good**	**Excellent**	
Health program?	140	0.7	10.7	42.1	46.4	
Perceived program benefits						
Because of the *First Step to Active Health* program, I have seen positive changes in my:						
	n	**Strongly disagree**	**Disagree**	**Not sure**	**Agree**	**Strongly agree**
Fitness or endurance	141	5.0	17.0	24.8	44.0	9.2
Flexibility	141	5.0	13.0	29.5	47.5	5.0
	n	**Strongly disagree**	**Disagree**	**Not sure**	**Agree**	**Strongly agree**
Strength	139	6.5	18.0	31.7	37.4	6.5
Balance	141	5.7	17.0	40.4	30.5	6.4
Pain (reduction)	141	6.4	24.8	36.2	24.8	7.8
Stiffness (reduction)	140	5.7	21.4	27.1	39.3	6.4
Fatigue (reduction)	140	5.7	26.4	32.9	28.6	6.4
Overall quality of life	141	5.0	14.2	25.5	47.5	7.8

Table 4

Behavioral maintenance among participants in the First Step to Active Health™ intervention at nine months (n=143)

Maintenance of self-management behaviors		**% endorsing each option**				
Over the past 6 months (since the 12-week study visit), how much success have you had in continuing to follow the exercise plan in *First Step*	***n***	**No success**	**Not much success**	**Some success**	**A lot of success**	
to Active Health?	123	10.6	25.2	52.0	12.2	
	n	**Strongly disagree**	**Disagree**	**Not sure**	**Agree**	**Strongly agree**
During the past six months, since the 12-week study visit, I regularly set exercise goals.	141	4.3	37.6	5.7	43.3	9.2
During the past six months since the 12-week study visit, I regularly met my exercise goals.	142	13.4	43.0	15.5	23.9	4.2
Over the past 6 months, since the 12-week study visit, how often have you looked back at these *First Step to Active Health* materials?	***n***	**Never**	**Occasionally**	**Often**		
The Program Manual	134	31.3	61.2	7.5		
Step 1: Cardio	141	31.9	56.0	12.1		
Step 2: Flexibility	143	23.8	61.5	14.7		
Step 3: Strength	143	30.8	55.9	13.3		
Step 4: Balance	142	36.6	53.5	9.9		
Over the past 6 months, since the 12-week study visit, how often have you kept a written daily log of each of these activities?	***n***	**Never**	**Occasionally**	**Often**		
Cardio exercises	143	72.7	18.2	9.1		
Flexibility exercises	143	71.3	21.0	7.7		
Upper body strength exercises	143	73.4	18.9	7.7		
Lower body strength exercises	143	74.8	16.8	8.4		
Balance exercises	143	76.9	18.2	4.9		