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Original Research Article

Effects of Sequential Participation in Evidence-Based Health and Wellness Programs Among Older Adults

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Abstract

Background and Objectives: Evidence suggests participation in evidence-based programs by older adults is effective, yet most studies focus on participation in a single evidence-based program, leaving repeated participation insufficiently understood. We aimed to compare participation in multiple evidence-based programs (repeaters) versus a single evidence-based program (nonrepeaters).

Research Design and Methods: Secondary data analysis was conducted on pre–post longitudinal data targeting older adults participating in evidence-based program(s) in Texas (2013–2016). Surveys included sociodemographic and health-related indicators (e.g., self-rated health, health behaviors, and falls-risks). Mixed-effects models examined pre–post changes in health-related indicators.

Results: Of the 734 study-eligible participants, 145 (20%) participated in two or more evidence-based programs. The participants' average age was 74 years, and the majority was female (80%), non-Hispanic White (79%), or lived in urban or large rural cities/towns (79%). At baseline, repeaters reported less depressive symptomology ($p = .049$), fewer chronic conditions ($p = .048$), and less concern of falling ($p = .030$) than nonrepeaters. Repeaters had better workshop attendance and completion rates ($p < .001$). Compared to nonrepeaters, repeaters showed significantly-better improvements in communication with physicians ($p = .013$).

Discussion and Implications: Study findings suggest potential benefits of participation in multiple evidence-based program workshops, but repeaters may have different health profiles than nonrepeaters in natural settings. Future evaluations should consider participants' past participations in evidence-based programs. Further research is needed to build more comprehensive evidence about the incremental benefits of participation in multiple evidence-based programs.

Translational Significance: Older adults who participate in evidence-based health and wellness workshops derive significant health-related gains from the first workshop, and the option to sequentially participate in other workshops can help sustain or further improve benefits obtained from participation in the first workshop.

Keywords: Evidence-based programs, Lifestyle interventions, Program evaluation, Repeated participation, Translational research

Background

Chronic conditions in late life are common with the majority (86%) of older Americans (i.e., those 65 years or older) (Ward, Schiller, & Goodman, 2014). Such chronic conditions are associated with leading causes of death (National Center for Health Statistics, 2016) and high costs for the American health care system, with 2014 estimates of state-level cost of chronic conditions ranging from $410 million (asthma) to $1.8 billion (diabetes) (Trogdon et al., 2015). Furthermore, having one or more chronic conditions is associated with physical, financial, social, and psychological burden for individuals, negatively influencing their independence and quality of life (Lam & Lauder, 2000; Megari, 2013). Thereby, effective prevention and management of chronic conditions and healthy lifestyles are needed to address the emerging challenges of having multiple or comorbid chronic conditions.

Over the past decades, the evidence-based movement has produced an abundant literature about the development, implementation, and evaluation of an array of evidence-based health and wellness programs serving community-dwelling older adults (Birkel et al., 2014; Boutaugh & Lawrence, 2014; Ory & Smith, 2015). Building on research- and practice-based evidence, evidence-based programs have been shown to improve health of participants and benefit society by promoting efficient utilization of limited resources and reducing health care costs (Ahn et al., 2013; Akanni, Smith, & Ory, 2017; Carande-Kulis, Stevens, Florence, Beattie, & Arias, 2015; Ory et al., 2013). The small group format, which is most commonly offered in community settings for older adults (Smith et al., 2017; Smith, Ory, Belza, & Altpeter, 2012), has shown to have a growing reach throughout the United States, reaching vulnerable populations (e.g., rural and/or underserved populations with limited access to care) (Smith et al., 2017; Towne et al., 2014a; Towne, Smith, Ahn, & Ory, 2014b).

One criterion for a health promotion and disease prevention program to be qualified as an evidence-based program is a strong experimental study such as a randomized controlled trial (efficacy) or a well-designed quasiexperimental study (effectiveness) (Ory & Wilson, 2012). These trials tend to focus on immediate or sustained effects of a single evidence-based program (Hughes et al., 2004; Hughes et al., 2006; Lorig et al., 1999; Lorig et al., 2001; Ory et al., 2014) or compare effects of two or more different evidence-based programs (Wilcox et al., 2006; Wilcox et al., 2008). However, the added benefits of sequential participation in multiple evidence-based program workshops remain unknown. While different evidence-based programs may address similar topics (e.g., physical activity), the plethora of evidence-based programs focus on different health issues and highlight different skills and resources.

Fueled by the American Recovery and Reinvestment Act (ARRA) of 2009, over 25,000 community-based evidence-based program workshops were delivered in 1,818 counties (out of 3,221 counties that exist in the United States), with over 300,000 participants enrollees documented in chronic-disease management evidence-based program workshops between December 2009 and December 2016 (Smith et al., 2017). In nonresearch implementation settings, community-dwelling individuals may be exposed to more than one workshop of the same or different evidence-based programs over time. A descriptive study of a national dissemination of multiple evidence-based programs (2006–2009) showed that more than one evidence-based program type was delivered in over 20% of service counties (Towne et al., 2014b). While the work to date provides valuable insights about the reach and effectiveness of various evidence-based programs, there is still a lack of understanding about the prevalence, determinants, and self-reported health outcomes of participating in multiple evidence-based program workshops.

In this context, the purposes of this study were to: (1) describe participant characteristics and attendance of those who participated in multiple evidence-based program workshops (i.e., repeaters) and compare their characteristics and attendance with those who participated in only one evidence-based program workshop (i.e., nonrepeaters); and (2) compare net changes in multiple health-related indicators between repeaters and nonrepeaters. Guided by the Health Belief Model (Champion & Skinner, 2008; Glasgow, 2008), it was hypothesized that repeaters have less perceived barriers (e.g., better health and less concern of falling at baseline) than nonrepeaters. Also, it was hypothesized that repeaters would have greater perceived benefits (e.g., show greater improvements in health-related indicators at their initial evidence-based program participation) than nonrepeaters. Furthermore, assuming the positive dose–effect relationship, it was hypothesized that participation in more than one evidence-based program would be associated with greater gains in health-related outcomes as compared to participation in a single evidence-based program.

Methods

Data

This study used the data collected from selected evidence-based program participants (September 2013–September 2016) in Texas. The evidence-based program workshops were offered in multiple sites across nine counties. According to the U.S. Census Bureau's 2016 estimates (available online from https://www.census.gov/quickfacts/fact/table/US/PST045216), the total population in these nine counties was 976,628, which represented 122,314 older adults (12.5% of the total population in the nine counties). The total population in each county ranged from 16,751 and 556,203.

Reflecting the three self-management programs, a falls prevention program, and a behaviorally-based exercise program, the five evidence-based programs included in the analyses were: Chronic Disease Self-Management Program (CDSMP), Diabetes Self-Management Program (DSMP), Chronic Pain Self-Management Program (CPSMP),

A Matter of Balance (AMOB), and Fit & Strong!. These evidence-based programs were offered in diverse settings (e.g., senior centers, senior living communities, health care settings, and faith-based organizations) throughout the study period. While the five programs differ in their specific objectives and contents, all programs are based on social cognitive theory and consist of a series of small group lay-led sessions offered over several weeks (i.e., 6–12 weeks). Commonly observed program impacts across the five programs included improvements in self-efficacy, social and functional abilities, pain, energy/fatigue, and engagement and maintenance of physical activity. Table 1 provides brief descriptions of each program included in this study. The programs differ in intensity of exercise which will serve as a distinguishing factor for examination. The data were collected at the baseline and again at the immediate conclusion of each workshop. While other evidence-based programs were offered in these counties during the study period, they were excluded from the analyses because of their unique population (e.g., caregivers) or delivery format (e.g., one-on-one).

All leaders received the required leader trainings for each program that they led. Required leader training varies by evidence-based program (National Council on Aging, 2018). In this project, all leader trainings were provided in-person. The leader training for CDSMP involved four days (24 hr) with cross-over training available for one or two days of training for DSMP and CPSMP. During leader training for CDSMP, DSMP, and CPSMP, leaders received a detailed leader manual for each program and learned about the program background and detailed program components and activities. They also practiced teaching and group facilitation through role-playing. Both Fit & Strong! and AMOB required a minimum of 8 hr of leader training, and AMOB leaders were also required to participate in a 2.5 hr

Table 1. Brief Description of Evidence-Based Programs Offered

Program	Program description	Previously-documented program outcomes that showed improvements
Chronic Disease Self-Management Program (CDSMP) (Lorig et al., 2001; Lorig et al., 1999; Ory et al., 2013)	6-week, lay-led group intervention provides education about chronic disease self-management for people with chronic disease problems as well as their family and friends [four out of six sessions]	Self-rated health Depression Health status (e.g., less pain and fatigue) Social and functional activities Health service utilization Perceived ability to manage chronic conditions and health Healthy behaviors (e.g., physical activities and communication with doctors)
Diabetes Self-Management Program (DSMP) (Lorig, Ritter, Villa, & Armas, 2009)	6-week, lay-led group intervention provides education about diabetes disease self-management for people with diabetes problems as well as their family and friends [four out of six sessions]	Depression Health status (e.g., less fatigue) Perceived ability to manage chronic conditions and health Healthy behaviors (e.g., physical activities, healthy diet, and communication with doctors)
Chronic Pain Self-Management Program (CPSMP) (LeFort, Gray-Donald, Rowat, & Jeans, 1998)	6-week, lay-led group intervention provides education about chronic pain self-management for people with chronic pain problems as well as their family and friends [four out of six sessions]	Health status (e.g., less pain and fatigue) Social and functional activities Perceived ability to manage pain and other associated symptoms
A Matter of Balance/Volunteer Lay Leader Model (AMOB-VLL) (Healy et al., 2008; Tennstedt et al., 1998)	8-week, lay-led group intervention provides education and exercise sessions to help falls prevention in older adults [five out of eight sessions]	Fear/Worry about falls (perceived ability to perform daily activities without falling; perceived control over falls; and perceived ability to manage falls); Social and functional activities Number of falls Healthy behaviors (e.g., physical activities)
Fit & Strong! (Hughes et al., 2006; Hughes et al., 2004)	8-week, lay-led group intervention provides exercise sessions to help older adults (especially older adults with osteoarthritis) engage in appropriate physical activity and reduce arthritis symptoms	Perceived ability to exercise Healthy behaviors (e.g., physical activities) Mobility Health status (e.g., less pain)

Note: [] = Minimum number of attended sessions to be classified as completers.

refresher training annually (National Council on Aging, n.d.; National Council on Aging, 2018). For Fit & Strong!, certified exercise instructors, physical therapists, or leaders of other evidence-based health and wellness programs were trained to be leaders. The leader trainings for both programs included program background, hands-on experience with the exercise components, group problem-solving skills, role-playing activities, and more (Fit & Strong!, n.d.; National Council on Aging, 2018).

Fidelity was monitored by trained staff members who observed workshops using fidelity checklists specifically developed for each evidence-based program. The trained staff members had experiences leading all five evidence-based program workshops and were certified to train leaders. The trained staff members visited at least one of the earlier workshop sessions and rated the leaders' compliance with program delivery. After the session was over, the trained staff members provided feedback to the leaders and recommended corrections (as needed). Based on the first fidelity assessment, the trained staff members visited additional sessions to ensure that the program was delivered safely and with fidelity.

Participants

This study targeted older participants (e.g., those aged 50 years and older) who enrolled in one of the evidence-based programs and completed the baseline survey. The participants were classified into two cohorts: repeaters and nonrepeaters. In order to prevent possibly misclassifying future repeaters (i.e., those who may have participated in an evidence-based program after the data collection ended in September 2016), we set a buffer of time of 4 months past the end of data collection, given that the median length of time between the first and second workshops was about four months among repeaters. For repeaters, the study participants must have completed the baseline survey from their first workshop. Also, repeaters were excluded from the study if they enrolled in two or more workshops concurrently (n = 13).

Measures

This study primarily focused on the program impacts on health status (pain and energy/fatigue) that were evaluated in the previous evaluations of the five programs (Table 1). Secondary outcomes were self-rated health, quality of life, depression, and communication with physician, which were examined in the series of self-management programs originally developed at Stanford (Lorig et al., 1999; Lorig et al., 2001; Lorig et al., 2009; Ory et al., 2013). Surveys were collected from the participants at the beginning and end of each workshop. Both the baseline and post-test surveys contained the same measures of health indicators. In addition, the baseline survey also collected information on participants' sociodemographics. Additionally, leaders recorded participants' attendance for each workshop session.

Health and quality of life indicators

At baseline, participants were asked to self-report if they had any of the given chronic conditions (i.e., arthritis/rheumatic disease, breathing/lung disease, cancer, depression, diabetes, heart disease, hypertension, stroke, osteoporosis, or other chronic conditions). Participant's self-reported health status was examined using the question: "Would you say that in general your health is: Excellent, Very good, Good, Fair, or Poor" (Lorig et al., 1996). Participants were also asked to rate their quality of life, pain, and fatigue on the scale of 0–10 (Lorig et al., 1996). General health scores were recoded such that a higher score indicate better health. In addition, the Exercise Assessment and Screening for You (EASY) tool (Resnick et al., 2008; Smith, Ory, Ahn, Bazzarre, & Resnick, 2011) had five yes/no questions about whether participants have the potential difficulties for engaging in an exercise. An affirmative response to each question was scored 1 while each negative response was scored 0. The sum of the five scores was used to calculate the total score, such that the total score ranges from 0 to 5 with a higher score indicating more health concerns. In addition, the Patient Health Questionnaire (PHQ-2) was used to screen for depression (Kroenke, Spitzer, & Williams, 2003). The overall depression score ranged from 2 to 8 (higher score indicates more depressive symptoms). Cronbach's alpha of the measure was over .7 for both repeaters and nonrepeaters.

Provider–patient interactions

Patients were also asked about their communication skills with their physicians using three survey items (Lorig et al., 1996). Responses were scored using a 6-point Likert scale with categories of never, almost never, sometimes, fairly often, very often, and always. A higher score indicates better communication skills with physicians. Responses to the three items were averaged to estimate the overall communication skills with physicians. Cronbach's alpha of the measure was about .8 for both cohorts.

Falls

Participants were asked about their fear of falling (4-Likert point scale ranging from 1 to 4, with a higher score indicating greater fear of falling) (Ory et al., 2010), concern about falling (5-Likert point scale ranging from 1 to 5, with a higher score indicating greater concern about falling), and confidence in falls-management and prevention. The confidence in falls-management and prevention was examined using six related items (i.e., steadiness on feet, balance while walking, ability walk in home, ability to walk outdoors, ability to prevent falls, and ability to get up if fall), and each item was scored from excellent (=5) to poor (=1) (Smith, Jiang, & Ory, 2012; Tennstedt et al., 1998). Responses to the six items were summed to estimate the overall confidence in falls-management and prevention. Cronbach's alpha of the measure was over .9 for both cohorts.

Sociodemographics

Participants' sociodemographic information used in this study included: age (based on birth year), sex, education (high school graduate or less, some college, or college graduate or higher), race/ethnicity (non-Hispanic White or other), whether individuals lived alone (yes, no), and rurality (rural, urban).

Attendance

Participants' attendance data were recorded for each session, and examined by proportion of sessions attended. Also, participants were classified as completers if they attended the minimum recommended dose for each evidence-based program (see Table 1).

Exercise intensity

Intensity of exercise involved in each workshop type was classified into three levels. Intensity level was coded 1 if exercise is discussed but not engaged during the workshop (e.g., CDSMP, DSMP, and CPSMP). Intensity level was coded 2 if relatively lower-level intensity exercise is engaged during the workshop (e.g., AMOB). Intensity level was coded 3 if relatively higher-level intensity exercise is engaged during the workshop (e.g., Fit & Strong!).

Analyses

Statistical analyses were performed using SAS 9.4. Sociodemographics and baseline characteristics were compared between repeaters and nonrepeaters using χ^2 tests for categorical variables (PROC FREQ) and independent-samples *t* tests (PROC TTEST) for continuous variables. Multiple mixed-effects models (PROC GENMOD for ordinal variables and PROC MIXED for interval variables) were used for comparing the pre–post changes in health indicators. Linear mixed-effects models (PROC MIXED) were used for interval outcome variables. Generalized linear mixed-effects models (PROC GENMOD) with multinomial distribution and cumulative logit link were used for ordinal outcome variables.

The first sets of models compared the pre–post changes in the health outcomes between nonrepeaters and repeaters' first workshop after controlling for sociodemographic factors (e.g., age, sex, education, race/ethnicity, and rurality), number of chronic conditions, and completion status. The purpose of this comparison was to examine if repeaters benefitted more or less from their first workshop than nonrepeaters.

Another set of models compared the pre–post changes in health outcomes between repeaters' first and second workshops. The examination of the pre–post changes from the first workshop among repeaters controlled for sociodemographic factors, number of chronic conditions, and completion status. The baseline assessment from the first workshop participation and post-test assessment from the second workshop participation among repeaters were compared after controlling for sociodemographic factors, number of chronic conditions, completion status, and number of days between their first and second workshops. The last set of models compared the overall pre–post changes between nonrepeaters and repeaters after controlling for sociodemographic factors, number of chronic conditions, and completion status.

Attendance rates from the repeaters' first and second workshops were compared after controlling for sociodemographic factors and number of chronic conditions. Then, attendance rates from the repeaters' first and second workshops were also compared after controlling for sociodemographic factors, number of chronic conditions, and the evidence-based programs' exercise intensity level.

Results

Between September 2013 and September 2016, 885 individuals participated in one or more evidence-based program workshops (see Supplementary Figure A1). Of the 885 participants, 717 were nonrepeaters and 168 were repeaters. After excluding those who did not meet the inclusion criteria, 589 nonrepeaters and 145 repeaters remained eligible for the study. Of the study-eligible repeaters, 117 had matching pre- and post-test surveys from their first workshop participation, and 100 had matching pre- and post-test surveys from their consecutive workshop.

Study Population Characteristics: Nonrepeaters Versus Repeaters

Table 2 shows sociodemographic characteristics, workshop attendance, and baseline health indicators by repeater status. The average age of the overall study participants was 73.7 years (*SD* = 9.13). The majority of participants were female (80%), self-identified as non-Hispanic White (79%), and lived in urban area or large rural city/town (79%). Compared with nonrepeaters, repeaters were significantly more likely to report less baseline depressive symptoms ($t(258.1) = 1.98$, $p = .049$, $d = .16$), fewer number of chronic conditions ($t(723) = 1.98$, $p = .048$, $d = .18$), and less concern of falling ($\chi^2(4) = 10.69$, $p = .030$). Repeaters were 2.4 times more likely to report slight to no concern about falling than nonrepeaters ($\chi^2(1) = 10.31$, $p = .001$, odds ratio [OR] = 2.42). Also, repeaters had significantly higher attendance ($t(288.59) = 5.99$, $p < .001$, $d = .47$) and had two times higher odds of completing a workshop than nonrepeaters ($\chi^2(1) = 11.41$, $p < .001$, OR = 2.04). The differences in attendance rates between repeaters and nonrepeaters were observed in AMOB ($t(94.6) = 4.72$, $p < .001$, $d = .57$) and Fit & Strong! ($t(151.4) = 4.81$, $p < .001$, $d = .75$) workshops, but were not observed in CDSMP and DSMP workshops ($p \geq .05$).

Workshop Participation

Repeaters participated in two to seven workshops (same or different evidence-based programs) between September 2013 and September 2016. The median number of days

Table 2. Sociodemographic Characteristics, Workshop Attendance, and Health Indicators Reported by Participants at the Baseline of Their First Evidence-Based Program Workshop

	Overall (n=734)	Nonrepeaters (n = 589)	Repeaters (n = 145)[a]	
Characteristics	Mean (*SD*) or frequency (%)	Mean (*SD*) or frequency (%)	Mean (*SD*) or frequency (%)	p
1. Sociodemographic				
Age	73.7 (9.13)	73.6 (9.42)	74.2 (7.86)	.459
Female	596 (80.1%)	464 (79.3%)	121 (84.6%)	.153
Non-Hispanic White[b]	572 (78.5%)	454 (79.5%)	108 (76.1%)	.367
Education				.410
High school graduate or less	212 (28.5%)	161 (27.5%)	47 (32.9%)	
Some College	258 (34.7%)	209 (35.7%)	45 (31.5%)	
College Graduate or higher	274 (36.8%)	215 (36.8%)	51 (35.7%)	
Live alone	335 (44.8%)	262 (44.6%)	68 (47.2%)	.565
Live in urban or large rural city/town	586 (79.2%)	464 (80.1%)	108 (74.5%)	.135
2. Workshop				
Attendance rates	0.7 (0.28)	0.6 (0.29)	0.8 (0.22)	<.001*
CDSMP	0.8 (0.23)	0.8 (0.24)	0.7 (0.14)	.759
DSMP	0.7 (0.29)	0.7 (0.30)	0.8 (0.23)	.144
CPSMP	0	0	0	NA
AMOB	0.7 (0.29)	0.6 (0.29)	0.8 (0.22)	<.001*
Fit & Strong!	0.6 (0.27)	0.6 (0.28)	0.8 (0.22)	<.001*
Completion rates	478 (64.5%)	357 (61.6%)	111 (76.56%)	.001*
CDSMP	47 (83.9%)	42 (84.0%)	5 (83.3%)	.967
DSMP	99 (65.6%)	85 (64.9%)	14 (70.0%)	.654
CPSMP	0	0	0	NA
AMOB	249 (68.8%)	199 (65.0%)	50 (89.3%)	<.001*
Fit & Strong!	73 (46.8%)	31 (33.3%)	42 (66.7%)	<.001*
3. Health Indicators				
Number of chronic conditions	2.4 (1.51)	2.5 (1.52)	2.2 (1.43)	.048*
General Health				.228
Poor	15 (2.0%)	12 (2.1%)	3 (2.1%)	
Fair	120 (16.3%)	98 (17.0%)	18 (12.5%)	
Good	363 (49.3%)	289 (50.0%)	67 (46.5%)	
Very Good	200 (27.1%)	153 (26.5%)	44 (30.6%)	
Excellent	39 (5.3%)	26 (4.5%)	12 (8.3%)	
Quality of Life	7.5 (1.99)	7.5 (2.03)	7.8 (1.79)	.058
Pain	4.0 (3.07)	4.0 (3.12)	3.9 (2.89)	.832
Fatigue	4.3 (2.86)	4.4 (2.88)	4.0 (2.78)	.186
Depression	2.9 (1.37)	3.0 (1.42)	2.76 (1.16)	.049*
Health issues related to engaging in exercises	1.3 (1.23)	1.3 (1.25)	1.1 (1.13)	.186
4. Health Behaviors				
Communication with physician	3.8 (1.40)	3.8 (1.41)	3.8 (1.35)	.489
5. Falls				
Fear of falling				.482
A Lot	91 (12.3%)	77 (13.3%)	13 (9.2%)	
Somewhat	182 (24.7%)	144 (24.8%)	33 (23.2%)	
A Little	286 (38.8%)	222 (38.3%)	57 (40.1%)	
Not at All	179 (24.3%)	137 (23.6%)	39 (27.5%)	
Concern about falling				.030*
Extremely	19 (2.6%)	17 (2.9%)	1 (0.7%)	
Quite a Bit	45 (6.1%)	39 (6.7%)	5 (3.5%)	
Moderately	93 (12.6%)	81 (13.9%)	10 (7.0%)	
Slightly	196 (26.5%)	147 (25.3%)	43 (30.3%)	
Not at All	386 (52.2%)	298 (51.2%)	83 (58.5%)	
Falls management efficacy	3.3 (1.01)	3.3 (1.02)	3.4 (0.96)	.086

Note: Mean (*SD*) or frequency (%) and p-values from comparing baseline characteristics of nonrepeaters and repeaters. AMOB = A Matter of Balance; CDSMP = Chronic Disease Self-Management Program; CPSMP = Chronic Pain Self-Management Program; DSMP = Diabetes Self-Management Program.

[a]For repeaters, the data from their first workshop was used for the description and comparison of the baseline characteristics. [b]Those who reported more than one race/ethnicity were excluded from this count.

*$p < .05$.

between the first and second workshops was 127 days (mean = 199.5, *SD* = 199.89). Table 3 provides the number of repeaters and nonrepeaters participating in each of the five evidence-based programs. Among the study-eligible repeaters, 56 (39%) participated in a same evidence-based program for both first and second time, and 95 (66%) participated in evidence-based programs (e.g., AMOB or Fit & Strong!) with exercise components for both first and second time. Repeaters' first workshop was two times more likely to be an evidence-based program with exercise components than the first workshop of nonrepeaters ($\chi^2(1) = 10.09, p = .002$, OR = 2.08). About 65% of repeaters who took AMOB and over 90% of repeaters who took Fit & Strong! as their first workshop returned for another workshop with some exercise components.

Improvements: Repeaters' First Versus Second Workshops

Table 4 shows comparisons between (1) the repeaters' baseline and post-test outcomes from their first workshop; and (2) the baseline from the first workshop and the post-test outcomes from the second workshop of the repeaters. From their first workshops, repeaters showed statistically significant improvements in general health status ($Z = 2.19, p = .029$) and significant reduction in fatigue ($F(1, 85.6) = 12.80, p = .001$) and concerns related to engaging in exercise ($t(81) = 2.60, p = .011$). Compared to baselines from their first workshops, repeaters reported significant reductions in pain ($F(1, 72.7) = 6.88, p = .011$) and fatigue ($F(1, 78.9) = 12.02, p = .001$), as well as significant improvements in communication with physicians ($F(1, 67.9) = 8.27, p = .005$), at end of their second workshop. In addition, repeaters' attendance rates to the first workshop was significantly higher than the attendance rates to the second workshop ($F(1, 96.7) = 8.50, p = .004$, adjusted difference = 0.10). The differences in the attendance rates for the first and second workshops remained statistically significant after including program exercise intensity as a control variable.

Improvements: Nonrepeaters Versus Repeaters' First Workshop

Table 4 also shows the comparison of the pre–post changes from the initial workshop attended between nonrepeaters and repeaters. There were statistically significant differences in the pre–post changes in self-reported fatigue ($F(1,488) = 6.20, p = .013$) and depression ($F(1,494) = 3.98, p = .047$) between nonrepeaters and repeaters after adjusting for the control variables. While the pre–post reduction in fatigue was statistically significant among both

Table 3. Number (%) of Repeaters and Nonrepeaters Attending Different Programs

	Nonrepeater (n = 589)	Repeater (n = 145)		
Program types	First workshop	First workshop	Second workshop	
CDSMP	50 (8.5%)	6 (4.1%)	CDSMP	1 (16.7%)
			DSMP	3 (50.0%)
			CPSMP	1 (16.7%)
			AMOB	0 (0%)
			Fit & Strong!	1 (16.7%)
DSMP	134 (22.8%)	20 (13.8%)	CDSMP	2 (10.0%)
			DSMP	2 (10.0%)
			CPSMP	0 (0%)
			AMOB	14 (70.0%)
			Fit & Strong!	2 (10.0%)
AMOB	310 (52.6%)	56 (38.6%)	CDSMP	12 (21.4%)
			DSMP	7 (12.5%)
			CPSMP	0 (0%)
			AMOB	19 (33.9%)
			Fit & Strong!	18 (32.1%)
Fit & Strong!	95 (16.1%)	63 (43.4%)	CDSMP	2 (3.2%)
			DSMP	2 (3.2%)
			CPSMP	1 (1.6%)
			AMOB	24 (38.1%)
			Fit & Strong!	34 (54.0%)

Note: Each cell contains the total number of participants taking the workshop and completion rates (i.e., percentage of the participants attending the minimum number of sessions required to be classified as completers). AMOB = A Matter of Balance; CDSMP = Chronic Disease Self-Management Program; CPSMP = Chronic Pain Self-Management Program; DSMP = Diabetes Self-Management Program.

Table 4. Comparison of Improvements in Health-Related Indicators

Characteristics	Nonrepeaters (n = 329)		Repeaters						
			First workshop (n = 117)		Second workshop (n = 100)				
	Baseline	Post-test	Baseline	Post-test	Post-test	(Baseline vs post-test from first workshop among repeaters) p^a	(Baseline from first workshop vs post-test from second workshop among repeaters) p^b	(Pre–post difference among nonrepeaters vs pre–post difference from first workshop among repeaters) p^a	(Pre–post difference among nonrepeaters vs overall pre–post difference from first second workshops among repeaters) p^a
Health Indicators									
General health	3.1 (0.80)	3.3 (0.83)	3.3 (0.86)	3.4 (0.82)	3.3 (0.84)	.029*	.697	.482	.218
Pain	6.2 (3.06)	6.3 (2.71)	4.0 (2.78)	3.5 (2.82)	3.3 (2.64)	.117	.011*	.340	.246
Fatigue	5.7 (2.94)	6.1 (2.57)	3.8 (2.68)	2.9 (2.45)	3.0 (2.60)	.001*	.001*	.013*	.071
Depression	7.0 (1.42)	7.2 (1.11)	2.7 (1.13)	2.8 (1.15)	2.7 (1.03)	.173	.339	.047*	.424
Health Behaviors									
Communication with physician	3.8 (1.40)	4.0 (1.33)	3.8 (1.35)	4.2 (1.29)	4.2 (1.36)	.063	.005*	.173	.013*

Note: Mean (*SD*) and *p*-values from comparing baseline and post-test assessments and comparing pre–post changes.
[a]Adjusted for age, sex, education, race/ethnicity, rurality, number of chronic conditions, and completion status. [b]Adjusted for age, sex, education, race/ethnicity, rurality, number of chronic conditions, completion status, and number of days between their first and second workshops.
*$p < .05$.

nonrepeaters ($t(328) = 2.46$, $p = .014$, $d = .14$) and repeaters ($t(115) = 3.85$, $p < .001$, $d = .36$), the magnitude of change (i.e., d) among repeaters was greater than the magnitude of change among nonrepeaters. The pre–post change in depression was statistically significant among nonrepeaters ($t(328) = 2.81$, $p = .005$, $d = .16$) but not among repeaters ($t(115) = 0.65$, $p = .520$, $d = .06$).

Overall Improvements: Nonrepeaters Versus Repeaters

The last column on the right side of Table 4 shows the comparisons between the pre–post changes among nonrepeaters and the net pre–post changes (i.e., changes between baseline from first workshops and post-test from second workshops) among repeaters. The overall improvements in communication with physicians ($F(1, 457) = 6.27$, $p = .013$) were significantly greater for repeaters compared to nonrepeaters after controlling for all other variables in the model (Table 4). While the pre–post change in communication with physicians was statistically significant among both nonrepeaters ($t(327) = 3.33$, $p = .001$, $d = .18$) and repeaters ($t(99) = 3.96$, $p < .001$, $d = .40$), the magnitude of change (i.e., d) among repeaters was greater than the magnitude of change among nonrepeaters. No statistically significant difference in pre–post changes in other health and health-related indicators was observed between repeaters and nonrepeaters ($p \geq .05$).

Discussion

In our study of noninstitutionalized, community-dwelling older adults in Texas, almost 20% of the participants returned for workshops of the same or different evidence-based programs in the defined study period. Furthermore, about 40% of the repeaters returned for the same evidence-based programs. Repeaters attended nearly 80% of the sessions, and the attendance rates were not significantly different between those who returned for same or different evidence-based programs. Repeaters showed better health-related indicators at baseline and higher attendance rates from their initial workshops compared to nonrepeaters.

Over 80% of the repeaters' first workshops involved some exercises during the workshops, and many of those repeaters returned for evidence-based programs with some exercise components (e.g., AMOB and Fit & Strong!). While it might be that participants who enrolled in an evidence-based program with exercise components subsequently enrolled in the same evidence-based program for ongoing physical activity, the motivation for enrollment in evidence-based programs was not collected from participants. Further efforts are needed to better identify factors related to the drivers and interests that motivate older adults to initially and subsequently enroll in certain evidence-based programs. Another potential explanation for participants participating in the same evidence-based program is that

in a community setting, only one type of program may be available at the delivery site (Towne et al., 2014b).

Repeaters reported less depressive symptoms, fewer chronic conditions, and less concern for falling at baseline assessment compared to nonrepeaters. Delbaere, Sturnieks, Crombez, & Lord (2009) showed that greater concern about falling was associated with poorer walking performance among older adults. Greater concern about falling is likely to be associated with poorer functional mobility and greater risk of falling. Poor mobility, in turn, has been discussed as a factor influencing older adults' participation in wellness programs (Biedenweg et al., 2014; Jancey et al., 2007; Watkins & Kligman, 1993). Similarly, previous studies showed that depression among older adults was associated with frailty (Vaughan, Corbin, & Goveas, 2015), which was associated with increased risk of falls (Schultz, Rosted, & Sanders, 2015). The differences in baseline mobility may be a potential reason for the differences in attendance rates between repeaters and nonrepeaters.

Given that repeaters had better baseline health, it is not surprising for repeaters to be more likely to attend exercise programs and have better attendance rates than nonrepeaters. While findings suggest that health status was associated with repeated program participation, the initial evidence-based program attended must be considered. For example, participants who enroll in a falls prevention program may differ based on their sociodemographic characteristics and health status relative to participants who enroll in a disease self-management class.

This study also observed that the program effects on fatigue was significantly greater among repeaters (first workshop) compared to nonrepeaters. Multiple studies conducted among older adults showed that fatigue is significantly associated with lower level of physical and social activities (Fagerström, Persson, Holst, & Hallberg, 2008; Schultz et al., 2015; Schultz-Larsen & Avlund, 2007). In a 5-year longitudinal study conducted in Denmark, developing or feeling fatigue was associated with the decreased level of physical activities among older adults (Schultz-Larsen & Avlund, 2007). Hence, improved fatigue may contribute to participants' level of physical and social activities and decision to participate in more workshops. On the other hand, nonrepeaters showed significantly-greater improvements in depression than repeaters. Less than 5% of repeaters reported depressive symptoms at the baseline, and hence, repeaters did not have a lot of room for improvement in depression. Therefore, it is not surprising that repeaters did not improve in depression as much as in nonrepeaters.

The net gains from participating in one workshop versus two workshops were examined. Repeaters (net gain from participating in two workshops) showed significantly-greater improvements in communication with physicians than nonrepeaters (gain from participating in one workshop). The overall improvement in doctor–patient communication is significant, because prior research has shown that such improvements are related to adherence to medical treatments (Zolnierek & DiMatteo, 2009), as well as health outcomes (Lee & Lin, 2008). Further, through participating in the second workshop, repeaters showed sustained or further improvements in health-related indicators. For example, compared to their baseline assessments, repeaters reported reduced fatigue at the end of their first workshop. Baseline fatigue from their second workshop remained lower than baseline fatigue from their first workshop, but was higher than the fatigue level reported at the end of their first workshop. By the end of their second workshop, repeaters reported reduced fatigue level that was similar to what was reported at the end of their first workshop. Similarly, repeaters reported reduced pain level after their first workshop, and then showed further reduction in pain at the end of their second workshop. Given the decaying effects of the evidence-based programs over time, our study implies the potential benefits of increasing sequential enrollment after the first evidence-based program concludes. This "bundling" of regularly offered programs will increase sequential enrollment and promote maintained outcomes among participants. The current study is a necessary first-step study to examine these relationships and offer recommendations about the sequence of program enrollment and the timeline for sequential participation that should occur between the first and second program to diminish tapering effects for intervention benefits.

There are few limitations to this study. First, the current study utilized secondary data from a community setting, and hence researchers did not have any control over bias (e.g., self-selection bias) or potentially-important factors (e.g., baseline motivation to exercise, environmental factors, transportation, sequential order of evidence-based programs, and duration between the first and consecutive evidence-based programs). For example, some of the differences observed between repeaters and nonrepeaters may be attributed to recruitment strategies used to engage participants (e.g., location, setting, and method) as well as the original intent of the program and target audience (e.g., falls prevention programs are intended for those aged 65 years and older while disease self-management programs may accommodate adults aged 50 years and older). As such, future studies should examine the role of the initial program enrolled in terms of subsequent program enrollment and associated benefits, which may be helpful to identify recommended evidence-based program enrollment sequences for potential repeaters (based on their baseline health status and needs). However, the study data represented the pragmatic real-life nature of evidence-based program implementation, and the ability to detect effects within the target setting and among the target population was a major strength.

Second, the generalizability of the study findings may be limited. The dissemination activities occurred mainly in central Texas, and the study finding may not be generalizable to a broader population. For instance, the study population was slightly older (mean age = 73.9 years old)

and had higher proportion of non-Hispanic White (78%) than the population from other national studies such as CDSMP national evaluation (mean age = 65.4 years; % non-Hispanic White = 55) (Ory et al., 2013) or Active for Life national study (mean age = 68.4 years; %White = 64 and %non-Hispanic = 94) (Wilcox et al., 2006). Also, repeaters in this study had better baseline health than non-repeaters, and this could limit the evaluation of effects from participating in multiple evidence-based programs. Third, the study relies on self-reported data, and the study may be limited by memory and social desirability. Although practically meaningful, small changes in outcomes like pain and fatigue may have resulted from measurement or reporting bias, which is common with self-reported data. Lastly, it was not possible to guarantee that all "nonrepeaters" did not eventually participate after the data collection ended. However, we did apply the 4-month buffer which was based on the median length of time participants who repeated within the data collection period.

Summary and Implications

Past research suggests that participation in evidence-based health and wellness program workshops by older adults can effectively improve participants' health and well-being. Many researchers and evaluators have examined the impacts of participating in a single workshop, but little is known about the nature or impact of participating in two or more workshops. Hence, this study contributes to existing literature by documenting repeated participation and comparing benefits gained through single and repeated participation.

Framed as a pragmatic evaluation, this study drew upon existing data from a community service project, in which older adults participated in one or more workshops over a defined time period. The participating older adults completed brief surveys about their health at the beginning and end of each workshop. This community service project was a natural experimental study, limiting the researchers' control over participants' enrollment in the workshops, but reflecting older adults' pathways through different evidence-based program offerings.

Compared to the participants who participated in a single workshop, the participants who participated in two or more workshops reported less depressive symptoms, fewer chronic conditions, and less concern about falling. Also, compared to the participants who participated in a single workshop, the participants who participated in two or more workshops showed a greater reduction in fatigue from their first workshop. There is suggestive evidence that taking multiple workshops can benefit participants by helping to sustain the program benefits over a longer duration.

A major study implication is the value of offering multiple programs in a community on a regular or routine schedule to allow older adults to engage in different health promotion options based on their needs and preferences. To make this possible, it is critical to have sustainable funding sources for aging, community, or health service sites to deliver these programs. An example of a sustainable funding mechanism could be reimbursement strategies such as via Title III-D funding or as a part of other prevention and treatment service reimbursement from health plans. Furthermore, the study finding implies the need for controlling the history of participants' participation in evidence-based program(s) in studies that examines program impacts. More structured and controlled research studies are needed to further investigate the impacts of sequential participation in more than one workshops in terms of costly health care utilization (e.g., emergency room visits or hospitalization) and return-on-investment, as well as participant- and environment-level factors that influence the program impacts and workshop participation.

Supplementary Material

Supplementary data are available at *Innovation in Aging* online.

Conflict of Interest

None reported.

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