Journal of Aging and Physical Activity, 2009, 17, 344-361

The Application of Peer Mentoring to Improve Fitness in Older Adults

Sandor Dorgo, George A. King, and Gregory D. Brickey

Purpose: To investigate the effectiveness of a peer-mentored exercise program, this study compared the program perception, retention and participation rates, and physical improvements of older adults trained by peer mentors (PMs) with those of a group trained by student mentors (SMs). ***Methods:*** After a 30-week peer-mentor preparation, 60 older adults ($M \pm SD$ age: 68.7 ± 6.1 yr) were recruited and randomly assigned to either the PM or the SM group. Both groups completed an identical 14-week fitness program. Pre- and posttraining assessments of fitness were completed, and the efficacy of the PMs and SMs was surveyed. ***Results:*** High retention was observed in both groups, but the SM group had higher participation. Both groups improved their fitness significantly, with no significant posttest differences between the groups in most fitness measures or in program perception rates. ***Discussion:*** Findings suggest effectiveness of the peer-mentor model in an older adult exercise program.

Keywords: aging, elderly exercise, peer counseling

Despite the growing body of research documenting the benefits of physical activity on several medical conditions, epidemiological research indicates that regular engagement in physical activity decreases with age (Rhodes et al., 1999; Stephens & Caspersen, 1994). More than 85% of adults age 65 years or older are considered inactive because they do not engage in at least 20 min of physical activity 3 days per week (Centers for Disease Control and Prevention, 2006), and participation in regular physical activity declines significantly beyond 74 years of age (Taylor et al., 2004). The benefits of physical activity for older adults are well established, yet the majority of exercise interventions fail to set older adults on a physically active lifestyle (van der Bij, Laurant, & Wensing, 2002). Although many older adults will begin participation in an exercise program, several of them will fail to stay in these programs for extended periods. Program retention, defined as the ratio between retained participants and the total number of participants at the beginning of a given program, has been a key focus in several intervention programs. It has been estimated that most short-term programs for older adults experience 66–94% retention rates (Boyette et al., 2002), and other estimates reported retention rates below 50% within 6–12 months of program initiation (Rhodes et al.). Previous experimental research studies focused on physical activ-

The authors are with the Dept. of Kinesiology, University of Texas at El Paso, El Paso, TX.

ity have reported retention rates among older adults as low as 54% for a 4-month intervention (Caserta & Gillett, 1998). For most physical activity interventions, the greatest number of dropouts occurs during the initial 3 months of the program (Boyette et al.).

Program participation, calculated as the ratio of the average number of sessions attended by all participants to the total number of sessions offered, has also been a focus of interest in older adult exercise programs. A review of 38 previously reported physical activity intervention programs indicated that participation rates ranged from 55% to 100% for interventions of 1.5–10 months duration and from 36% to 84% for interventions longer than 1 year (van der Bij et al., 2002). However, most of the reviewed interventions were unclear about how dropouts were considered in the calculation of participation rate, which might lead to a potential inflation of the reported participation rates (van der Bij et al.). It has been suggested that previously successful interventions that achieved high participant retention and changes in participants' physical activity levels can help in designing more effective physical activity programs for older adults (King, Rejeski, & Buchner 1998; Taylor et al., 2004). Trials of intervention strategies are needed to determine the most successful approaches for promoting physical activity and program participation among older adults (Taylor et al.; van der Bij et al.).

Individual and organizational factors influence older adults' exercise adherence (Rhodes et al., 1999). Perceived peer support, described as social support from individuals of similar age and background, has been identified as a major influence on exercise adherence and continued physical activity participation (Rhodes et al.; van der Bij et al., 2002). However, most previously reported exercise intervention programs for older adults did not use any type of peer- or social-support system or any special reinforcement strategies (van der Bij et al.). Furthermore, most physical activity programs have been implemented as professional services offered to older adults. Barriers to older adult involvement in professional service programs include resistance by professionals to treating the elderly, the high costs of professional services, and older adults' resistance to using professional services (Bratter & Freeman, 1990). It has been suggested that these barriers might be overcome by preparing and employing older adults as peer mentors (Bratter, 1986; Bratter & Freeman). Peer mentoring is based on the idea that individuals who share common problems have a unique resource to offer one another (Medvene, 1992), and with adequate training and supervision, these individuals are capable of providing the basic counseling necessary to help others (Kirkpatrick & Patchner, 1987). Among older adults, peer mentors have been reported to be empathic and respectful toward one another, and through positive role modeling they can dispel the stereotypes of aging more affectively than can younger professionals (Bratter). Consequently, a peer-mentor-based exercise program might be more appealing to older adults, have a higher retention and participation rate, and be more affordable than professional services while being similarly effective.

Peer mentoring has been used successfully in various intervention programs. For example, a peer-mentor-supervised self-management intervention effectively increased self-efficacy and self-reported health distress in patients with arthritis (Lorig et al., 2001). Similarly, peer support successfully decreased anxiety in cardiac patients during hospitalization (Parent & Fortin, 2000) and effectively

enhanced quality of life in breast cancer patients (Ashbury, Cameron, Mercer, Fitch, & Nielsen, 1998). Peer mentoring has also been reported to be a helpful and effective intervention method for other populations such as HIV patients (Broadhead et al., 2002), frail elderly (Ezumi et al., 2003), burn patients (Williams et al., 2002), and those with diabetes (Joseph, Griffin, Hall, & Sullivan, 2001). One known study, however, reported that peer mentoring was ineffective and unappealing to patients hospitalized with heart failure (Riegel & Carlson, 2004). Despite the successful application of peer mentors in social and medical intervention programs, no known studies have used older adult peer mentors to train other older adult program participants in a physical fitness setting. In the current study, a comprehensive exercise program was designed and implemented to improve functional performance in individuals over 60 years of age. To establish a peer-support system, selected older adults were trained as peer mentors with the role of guiding other older adults through a 14-week exercise intervention. It was hypothesized that older adult exercise program participants who were peer trained would have better program perception and greater adherence and derive physical benefits comparable to those of other older adults trained by qualified young trainers. The purpose of the study was to document the program perception, retention and participation rates, and improvements in physical fitness for a group of older adults who were trained by peer mentors compared with a similar group trained by qualified young trainers.

Methods

Program Design

For this study, the program was implemented in two stages. The purpose of Stage 1 was to identify and train 30 older adults as peer mentors. For Stage 2, 60 additional older adults from the local community were enrolled in an intervention program and assigned to one of two exercise groups: a group trained by peer mentors or a group trained by young student mentors. Pre- and posttraining assessments of functional fitness were completed for all participants, and a survey was administered to assess the efficacy of the trainers (peer or student mentors). The project was approved by the appropriate institutional review board, and each participant in both Stage 1 and Stage 2 provided written informed consent to participate. Before the experiment, the complete testing procedure and training protocol were both thoroughly explained to each participant orally and written in the consent form.

Preparation of Peer Mentors

At the beginning of this longitudinal intervention program, 30 older adults (15 men and 15 women) with a mean (± *SD*) age of 68.4 ± 5.9 years were selected to participate from a pool of 90 applicants. The age range of the selected older adults was 60–79 years. Selection was based on previously developed screening criteria (Hoffman, 1983; Wilson & Johnson, 2001) to evaluate each applicant's potential as a peer mentor. Criteria included being 60 years of age or older, good physical health, positive personality traits (e.g., extraversion, agreeableness, conscientious-

ness, emotional stability, openness), desire to be trained, full commitment to regular participation, willingness to work as a peer mentor, and previous supervisory experience.

All applicants completed a questionnaire about their health status and medical concerns, physical activity background and habits, general mentoring experience, and personality characteristics. Applicants' responses to the survey questions in these four categories were evaluated by the researchers and converted into numeric scores using a rubric. The rubric was designed by the researchers specifically for the study and is presented in Table 1. Applicants were ranked based on the calculated numeric scores, and the 30 highest scoring individuals were invited to the program. All selected individuals reported being healthy and fit to participate in an exercise program. In addition, most individuals reported performing regular physical activities. Recruited participants provided a written release statement from their personal physician clearing them for participation in the program.

After the recruitment process, a 30-week peer-mentor preparation program was implemented to improve the participants' physical health and fitness and to train them to be peer mentors of older adults who would join the program in Stage 2. The initial 14 weeks of the program focused on physical fitness, exposure to a variety of exercises and training techniques, and improving participants' image as a positive role model of health. During Weeks 15–30 of the peer-mentor preparation, vigorous physical-fitness training was maintained as the prospective peer mentors began developing and practicing their mentoring skills during exercise sessions.

During the 30-week peer-mentor preparation, participants attended physical activity sessions three times per week. A group of senior-level undergraduate kinesiology student volunteers who had completed a series of academic courses

Table 1 Rubric Used to Evaluate Peer-Mentor Applicants

Criteria/ Category	Low or below average (1 point)	Medium or average (2 points)	High or above average (3 points)
Health status and medical concerns	Applicant with severe health complications or medical concerns	Applicant with minor health complication or medical concerns	Applicant free of any health complications or medical concerns
Physical activity (PA) background and habits	Primarily sedentary lifestyle, minimal or no regular PA	Dominantly sedentary lifestyle, irregular or inconsistent exercising	Physically active lifestyle, regular exercise
General mentoring experience	No mentoring experience, profession with no mentoring activities	Some mentoring experience, profession with some mentoring activities	Abundant mentoring experience, profession with frequent mentoring activities
Personality characteristics	Below average on extraversion, agreeableness, conscientiousness, emotional stability, and openness	Average scores on extraversion, agreeableness, conscientiousness, emotional stability, and openness	Above average on extraversion, agreeableness, conscientiousness, emotional stability, and openness

related to physical fitness (anatomy, exercise physiology, personal training, fitness programs, etc.) supervised the training sessions. In addition, before the peer-mentor preparation program, students received 3 weeks of hands-on training to work with older adults one on one.

During the first 14 weeks, exercise sessions focused on improving participants' cardiovascular fitness, muscle strength, muscle mass, power, agility, and flexibility. Each 75-min exercise session followed a detailed exercise plan that was part of a thoroughly elaborated training program with progressively increasing exercise intensities. All participants followed the same program (i.e., same exercises and number of sets and repetitions), but training intensities were individualized. Participants' fitness level was assessed before the beginning of the peer-mentor preparation program and at 14 weeks using a functional-fitness-testing battery specifically developed for older adults (Rikli & Jones, 1999). Physical-fitness testing included functional assessment of muscle strength (assessed by handgrip dynamometer), muscle endurance (30-s chair-stand and 30-s arm-curl tests), flexibility (chair sit-and-reach and back-scratch tests), cardiovascular fitness (6-min-walk test), balance (forward-reach test), and motor agility/dynamic balance (8-ft up-and-go test).

For Weeks 15–30, an additional emphasis of the training program was to prepare participants for their peer-mentoring role. During this 16-week period, the student trainers no longer worked with the participants on a one-on-one basis. Instead, they supervised the training sessions as all participants paired up and acted as trainers (peer mentors) to one another. Kinesiology student trainers were responsible for supervising each pair of participants and assisting the peer mentors as necessary. In two consecutive training sessions pairs were instructed to switch roles. In subsequent training sessions participants were asked to change partners; thus, they were able to practice the mentoring role with several different individuals. During Weeks 28–30, participants practiced their peer-mentoring role with a new group of unfamiliar kinesiology undergraduate student volunteers. These students were fit and familiar with all exercises and training routines. However, they were specifically instructed to act as inexperienced trainees but allowed to assist the participants if they had trouble in the mentoring process.

In addition to the physical exercise sessions, participants attended monthly educational lectures. The purpose of the lectures followed the same pattern as the two parts of the 30-week training period. For Weeks 1–14, lecture classes were designed to enhance general knowledge of aging, health, and fitness. For Weeks 15–30, lectures were more specific to physical training and mentoring. These lectures were similar to those that undergraduate kinesiology students receive in their personal trainer preparation courses where topics included the principles of training, methods of warm-up and stretching, and exercise safety. At the conclusion of the 30-week physical and educational preparation period, participants remaining in the program became peer mentors and recognized "ambassadors" of the program.

Peer Mentoring

Recruitment of new program participants (Stage 2) occurred simultaneously during Weeks 25–30 of the peer-mentor training. Sixty new older adults were

invited to become intervention participants based on the following criteria: age 60 years or older, a written statement from personal physician indicating a level of physical health conducive to exercise participation, a written statement of full commitment to regular participation, and having reliable personal transportation. All 60 older adult volunteers provided the physician's release for program participation, so no other health conditions were used to exclude individuals from program enrollment. Although the intervention program was offered free of charge, volunteers received no incentives or financial compensation and were allowed to withdraw from the program at any time.

The 60 older adult intervention participants (31 men and 29 women, $M \pm SD$ age 68.7 ± 6.1 years, age range 60–82 years) were randomly assigned to one of two groups: a student-mentored (SM) group (15 men and 15 women) or a peer-mentored (PM) group (16 men and 14 women). Before the program, intervention participants were informed that they would be assigned to work with either student mentors or peer mentors, but they were not aware of their exact group assignment until the first program session. Student mentors were undergraduate kinesiology students similar to those previously described. The SM and PM groups engaged in a 14-week intervention program with three 75-min training sessions per week. The exercise programs for the SM and PM groups were identical and were designed by the researchers. Both groups performed the same exercises with the same number of sets and repetitions. The rest intervals between sets and exercises were also identical. For each respective group, the role of the student mentors and peer mentors was exactly the same; they were instructed to follow the prescribed exercise program, guiding their intervention participant through all exercises, assisting them with the execution of movements, and motivating them toward greater effort. In general, the mentor-to-participant ratio was 1:1 in the SM group and the PM group. The pairing of the intervention participants with student mentors or peer mentors was not controlled by the researchers; however, it was ensured that all intervention participants paired up with a mentor and that mentors were not left without an intervention participant. Participants were allowed to partner with any of the mentors and to switch mentors from session to session. Conversely, neither student mentors nor peer mentors were allowed to refuse partnering with any given participant. Trained and experienced program supervisors were responsible for the daily supervision of the program. Supervisors' duties included monitoring program safety, ensuring proper execution of the prescribed training session, and answering questions from mentors. One program supervisor was present for each SM and PM group session and was instructed to intervene with the mentoring only if necessary (i.e., unsafe exercise execution or improper spotting noticed). General intervention activities during Stages 1 and 2 are summarized in Table 2.

Physical fitness of all SM and PM participants was assessed before and after the 14-week intervention program using the functional-fitness-testing battery described for the peer-mentor preparation program. In addition to the physical-fitness tests, program perception of the retained participants was appraised at 14 weeks by the Program Perception Survey, a 16-item questionnaire with Likert-scale response scores ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Specific questionnaire statements (Table 3) were aimed toward assessing perceived program enjoyment, perceived program benefits, and the effectiveness of

Table 2 Summary of Activities During Stage 1 and Stage 2 of the Intervention

Stage	Weeks	Main focus of intervention
1	1–14	Peer mentors pretested, then participated in three 75-min physical-fitness training sessions weekly. Supervised by kinesiology student trainers on a one-on-one basis. Peer mentors learned names and correct execution of a variety of exercises. Peer mentors attended monthly lectures on general aspects of aging, health, and fitness.
	15–27	Peer mentors continued with 3 fitness-training sessions weekly receiving group supervision. Peer mentors developed mentoring skills by pairing up with one another and role playing. Mentoring role included exercise demonstration, assistance with exercise setup, observation of execution, motivation of partner. Peer mentors attended monthly lectures specific to physical training and mentoring.
	28–30	Peer mentors practiced mentoring with a new group of student volunteers, then posttested at 30 weeks.
2	1–14	Intervention participants randomly assigned to student- or peer-mentored group. Intervention participants pretested before intervention. Intervention participants attended three 75-min physical-fitness-training sessions weekly. Intervention participants posttested at 14 weeks of intervention.

the student or peer mentors. Similarly, a 6-item questionnaire was used with the peer mentors to assess their perception of the peer-mentoring role. Both questionnaires were developed by the researchers specifically for the current study. Internal consistency of the developed questionnaires was measured by calculating Cronbach's alpha, the pairwise correlations between items, which indicated high reliability (.9).

Statistical Analysis

All statistical analyses were performed using SPSS for Windows, version 13.0 (SPSS, Inc., Chicago). Pre- and postintervention fitness performance data were analyzed for main effects using analysis of variance (ANOVA) with repeated measures. When significant main effects were revealed (<.05), specific differences were assessed using Bonferroni-adjusted *t* tests. Performance on the handgrip-strength test was defined as the greatest score (in kilograms) achieved on the handgrip dynamometer with the dominant hand. Performance on the 30-s chair-stand and 30-s arm-curl tests was defined as the maximum number of repetitions achieved in 30 s. Flexibility performance assessed by the chair sit-and-reach and back-scratch tests and balance performance assessed by the forward-reach test

Table 3 Program Perception Survey Questions, Perception Scores, Percent Perception, and 95% Confidence Intervals (CI) for Peer Mentors and the Student-Mentored (SM) and Peer-Mentored (PM) Groups

Survey category	Related questionnaire statements	Score,[a] *M* ± *SD*	Percent perception[b]	95% CI
Program enjoyment		SM 6.4 ± 0.8, PM 6.4 ± 0.7	SM 91.9%, PM 91.1%	SM 6.09–6.78, PM 6.09–6.67
	I enjoy the strength-training component of the exercise program.			
	I enjoy the cardiovascular-training component of the program.			
	I enjoy the agility, balance, power component of the prwogram.			
	Overall, I am enjoying participating in the program.			
Perceived program benefits		SM 6.2 ± 1.3, PM 6.5 ± 0.6	SM 87.9%, PM 93.5%	SM 5.61–6.70, PM 6.32–6.76
	I feel stronger since I began participating in the program.			
	I have more energy since I began participating in the program.			
	I can accomplish daily tasks easier since I began the program.			
	I feel the program has helped to improve my overall health.			
Efficacy of student mentors and peer mentors[c]		SM 6.4 ± 0.8, PM 5.9 ± 1.3	SM 91.0%, PM 84.3%	SM 6.02–6.72, PM 5.41–6.40
	Mentors provided appropriate assistance/guidance.			
	Mentors motivated me to work harder.			

(continued)

Table 3 *(continued)*

Survey category	Related questionnaire statements	Score,[a] *M* ± *SD*	Percent perception[b]	95% CI
	Mentors were good role models of fitness.			
	Mentors were well prepared to train others.			
	Mentors had the knowledge to train others.			
	Mentors encouraged me to attend sessions frequently.			
	Mentors improved my knowledge/understanding of fitness.			
	Overall, I enjoyed working with student and peer mentors.			
Perception of peer-mentor role[d]		PM 6.3 ± 0.9	PM 90.5%	PM 5.95–6.72
	I enjoy training other older adult participants.			
	I like the responsibility and sense of ownership that I have.			
	I can fully cope with the demands of the ambassador role.			
	Being a mentor motivated me to exercise harder and be a role model.			
	Being a mentor encouraged me to attend sessions more frequently.			
	Being a mentor improved my knowledge/understanding of fitness.			

[a]Perception rating was based on a 1–7 Likert scale (1 = *dissatisfied,* 7 = *highly satisfied*). [b]Percent perception calculated as the mean score divided by 7. [c]Effectiveness of mentors was measured with questions specific to the SM and PM groups and represents how the SM and PM group perceived the effectiveness of the student mentor and peer mentor, respectively. [d]Perception of peer-mentor role was measured with questions specific for the peer mentors and represents how the peer mentors perceived their role.

were defined as the maximum distance (in inches) achieved. Cardiovascular-fitness performance was defined as the maximum distance (in yards) walked in 6 min. Finally, motor-agility performance was defined as the least amount of time (in seconds) required to complete the 8-ft up-and-go test. Program perception data were analyzed using an independent-sample *t* test. Participation was defined as attendance at a given program session, and participation rate was determined by dividing the number of sessions attended by the total number of sessions offered. Program participation data for the SM and PM groups were compared by an independent-sample *t* test. Alpha for all analyses was set at the .05 level.

Results

Stage 1 of the study resulted in a 93% retention rate of the peer mentors; 28 of the 30 peer mentors completed the 30-week peer-mentor preparation program. The peer mentors significantly ($p < .002$) improved their functional-fitness test scores from baseline to the completion of the preparation program for the 6-min-walk, 30-s chair-stand, 30-s arm-curl, and the 8-ft up-and-go tests. No significant improvements were observed for the handgrip-strength, chair sit-and-reach, or back-scratch tests ($p > .058$; data not shown).

In Stage 2, 50 of the 60 intervention participants completed the 14-week intervention. Specifically, 23 SM participants (12 men and 11 women) and 27 PM participants (15 men and 12 women) completed the posttraining assessment at 14 weeks (76.7% and 90% retention, respectively). Baseline descriptive characteristics of all individuals enrolled as peer mentors ($N = 30$) and SM and PM group intervention participants ($N = 60$) are presented in Table 4. At baseline, there were no statistically significant differences between the SM and PM groups for age, height, weight, or body-mass index ($p > .48$). In addition, no significant difference was observed between the SM and PM groups related to self-reported overall physical functioning ($p > .18$), as measured by the PCS subscale of the SF-36vr2 health survey instrument (Ware, Kosinski, & Dewey, 2000).

Table 4 Descriptive Characteristics of Peer Mentors and the Student-Mentored (SM) and Peer-Mentored (PM) Group Participants at Baseline, *M* ± *SD*

Group	*n*	Age (years)	Height (cm)	Body mass (kg)	BMI (kg/m²)
Peer mentors					
male	15	70.4 ± 5.9	174.5 ± 6.7	83.6 ± 11.4	27.4 ± 2.8
female	15	66.8 ± 5.3	162.3 ± 5.0	70.0 ± 7.7	26.6 ± 3.1
SM group					
male	15	68.9 ± 5.4	173.0 ± 8.4	89.4 ± 11.4	29.8 ± 2.9
female	15	68.9 ± 8.1	160.0 ± 6.8	67.81 ± 9.1	26.7 ± 4.3
PM group					
male	16	69.3 ± 6.3	173.4 ± 5.0	88.2 ± 11.0	29.3 ± 3.1
female	14	67.8 ± 4.5	158.8 ± 5.3	69.5 ± 15.3	27.6 ± 6.0

Table 5 Functional-Fitness Scores for the Student-Mentored (SM) and Peer-Mentored (PM) Groups

Test	Baseline	Posttraining	Absolute change	Percent change	Pre–post *p*
30-s chair stand (reps)[a]					
SM	19.9 ± 5.8	26.9 ± 7.0*	7.0	35.1	<.001
PM	17.2 ± 4.3	23.0 ± 5.5	5.8	34.0	<.001
30-s arm curl (reps)[b]					
SM	22.0 ± 4.4	29.7 ± 6.0	7.7	34.9	<.001
PM	21.3 ± 4.8	29.2 ± 4.8	7.9	37.0	<.001
Handgrip dynamometer (kg)[b]					
SM	35.8 ± 12.0	37.9 ± 11.9	2.1	5.9	.031
PM	34.4 ± 10.3	36.7 ± 10.3	2.4	6.9	.003
Chair sit-and-reach (in.)[c]					
SM	2.5 ± 5.8	4.8 ± 3.4	2.3	[d]	.022
PM	0.3 ± 4.7	4.2 ± 3.1	3.8	[d]	<.001
Back scratch (in.)[e]					
SM	−1.6 ± 4.6	−1.4 ± 3.6	0.2	[d]	.755
PM	−1.9 ± 3.2	−0.9 ± 3.0	1.0	[d]	.007
6-min walk (yd)[f]					
SM	633.0 ± 115.2	697.8 ± 92.6	64.8	10.2	.010
PM	611.8 ± 117.7	654.1 ± 164.8	42.3	6.9	<.001
8-ft up-and-go (s)[g]					
SM	5.2 ± 0.9	4.2 ± 0.7*	−1.0	18.7	<.001
PM	5.4 ± 1.0	4.7 ± 1.0	−0.7	13.0	<.001
Forward reach (in.)[h]					
SM	14.6 ± 3.1	16.5 ± 3.8	1.9	12.9	.005
PM	15.0 ± 2.0	17.5 ± 2.6	2.5	16.7	<.001

[a]Lower body strength. [b]Upper body strength. [c]Lower body flexibility. [d]Because of potential negative values for the flexibility tests, calculations of percent change are not applicable. [e]Upper body flexibility. [f]Aerobic endurance. [g]Motor agility. [h]Balance.

*Significantly different from the PM group ($p < .05$).

Functional-fitness tests for the intervention participants (Table 5) showed no significant differences between the SM and PM groups at baseline ($p > .06$), although the SM group scored slightly higher in all fitness measures except the forward-reach test. Compared with baseline values, the 14-week training program produced significant improvements ($p \leq .007$, range of $ES = 0.2–1.6$) in all fitness measures for the PM group (Table 5). Similarly, the SM group improved significantly ($p \leq .031$, range of $ES = 0.2–1.4$) after the 14-week intervention for all fitness measures except the upper body flexibility test ($p = .76$, $ES = 0.10$; Table 5). After the 14-week intervention, there were no significant differences between the

SM and PM groups for the 6-min-walk, 30-s arm-curl, forward-reach, handgrip-strength, chair sit-and-reach, and back-scratch tests ($p > .27$, range of $ES = 0.08$–0.3). However, the SM group scored significantly higher than the PM group for the 30-s chair-stand ($p = .034$, $ES = 0.56$) and the 8-ft up-and-go ($p = .045$, ES = 0.58) tests. Intervention participants in the PM and SM groups completed the 14-week fitness program without any adverse events or major injuries.

Questionnaire scores (Table 3) of peer mentors were high for their perceived role as a peer mentor (90.5%). For the SM and PM groups, program perception scores were similar ($p \geq .13$). Mean (± *SD*) program enjoyment scores of the SM and PM groups were almost identical (91.9% and 91.1%, respectively; $p = .80$, $ES = 0.06$). Perceived program benefits were scored lower for the SM group than for the PM group (87.9% and 93.5%, respectively), but the difference was not statistically significant ($p = .18$, $ES = 0.36$). The effectiveness of the student mentors for the SM group was rated higher than the effectiveness of the peer mentors for the PM group (91.0% and 84.3%, respectively); however, this also failed to achieve statistical significance ($p = .13$, $ES = 0.38$).

The retention rate during the 14-week intervention was lower for the SM group than for the PM group (76.7% and 90%, respectively). Conversely, the participation rate of the SM group was significantly higher than for the PM group ($p = .008$). The 23 SM group participants who completed the 14-week intervention program had an average 82.3% participation rate, while the 27 PM group participants completing the program had an average participation rate of 72.0% during the 14-week intervention (Table 6).

Discussion

The current study aimed to compare the program perception, retention and participation rates, and improvements in physical fitness for a group of older adults who were trained by peer mentors with those of a group of older adults mentored by qualified young trainers. A group of older adults was selected in a screening procedure for peer-mentoring qualities and later introduced to the basic principles of fitness training through a 30-week fitness and education program. The older adults

Table 6 Participant Retention and Participation Rates for the Student-Mentored (SM) Group and the Peer-Mentored (PM) Group

Group	Number of participants at baseline	Number of participants at 14 weeks	Retention rate	Average number of training sessions attended (out of 35)	Percent participation[a]
SM	30	23	76.7%	29.0 ± 3.9	82.3%*
PM	30	27	90.0%	25.2 ± 5.2	72.0%

[a]Percent participation calculated for participants completing the 14-week program.

*Significantly different from the PM group ($p = .008$).

who completed this preparatory program became peer mentors to other older adults joining the intervention program. The specific role of the peer mentors included pairing with older adult intervention participants and guiding them through the prescribed exercise program designed by the researchers. To assess the effectiveness of the peer-mentor-guided program, another group of older adult intervention participants simultaneously engaged in the same prescribed exercise program but were mentored by personal-training-qualified senior-level undergraduate kinesiology students. Although not all the students were certified personal trainers, at the time of the intervention program they had completed most of their coursework and were close to graduation. Therefore, it is reasonable to state that student mentors had a thorough knowledge of fitness and exercise prescription and that most had previous teaching or coaching experience. Conversely, although most peer mentors had some level of supervisory experience from their professional careers, none were trained in the field of fitness and wellness. Furthermore, although most peer mentors reported a generally active lifestyle before enrollment in the peer-mentor preparation program, their reported physical activities were generally limited to walking, biking, and gardening. Only 5 of the originally recruited peer mentors reported some level of participation in fitness or strength-training programs, and only 1 of these reported it as a vigorous weekly routine. Consequently, it is reasonable to state that most peer mentors were new to the area of fitness and strength training and had no prior experience with exercise supervision. Despite the peer mentors' lack of prior knowledge and experience, our original hypothesis was that a 30-week preparatory program would provide sufficient training for these older adults to become effective peer mentors of fitness. Furthermore, we hypothesized that the older adults who were trained by their peers would have better program perception, greater adherence to the program, and equal or greater physical-fitness improvement than those who were trained by student mentors. The findings of this study partially support these hypotheses.

Previous studies of older adult exercise programs of 12–16 weeks duration and three training sessions per week have reported retention rates of 75–90% (Emery & Gatz, 1990; Gillies, Aitchison, MacDonald, & Grant,1999; Rubenstein et al., 2000) and as low as 53% (Caserta & Gillett, 1998). Although our findings are comparable to previous reports, we found that the retention rate was higher for the PM group than for the SM group (Table 6). Twenty-seven of 30 PM group participants (90.0%) compared with 23 of 30 SM group participants (76.7%) completed the 14-week intervention program. In view of the previously reported retention rates, the 90% retention rate in our PM group compares favorably. When investigating the reasons for dropout we discovered that most attrition was explained by individuals' experiencing a substantial life change (i.e., moving away from the city, physician's recommendation to discontinue, undergoing a surgical procedure) rather than dissatisfaction with or loss of interest in the program. Because most of the attrition can be directly attributed to situational circumstances, we hesitate to infer from these data that the peer mentors positively affected program retention or that the young student mentors were not well accepted.

In fact, we found that greater retention rates did not equate to higher participation rates. We had 23 retained intervention participants in the SM group who attended the training sessions with a significantly greater frequency than the 27

PM group participants who completed the 14-week intervention (82.3% and 72.0%, respectively; $p = .008$). Our participation rates are similar to those reported for comparable exercise intervention programs for older adults (61–87%; van der Bij et al., 2002). These retention and participation rates suggest that participants generally enjoyed the program, and program perception scores justify this assumption.

When examining the program perception survey data (Table 3), we found a generally high rating of program perception for the SM and PM groups (mean range 83.7–95.7%), suggesting that participants were generally satisfied with the program. However, a limitation of the current study was that no program perception data were collected from participants who dropped out of the study. The inclusion of program perception data from those who dropped out might have provided a less biased perception of the program and possibly broadened the range of mean perception scores. Program enjoyment scores of the retained SM and PM participants were nearly identical (91.9% and 91.1%, respectively; $p = .44$). Perceived program benefits scores revealed that the PM group felt more direct physical performance benefits from the program than the SM group, although scores were not significantly different between the two groups ($p = .55$). Similarly, there was no significant difference ($p = .19$) for the perceived effectiveness of the mentors (i.e., student mentors or peer mentors) between the SM and PM groups; however, the student mentors were rated higher for their professional assistance: professional preparation, knowledge of training and fitness, and ability to improve intervention participants' knowledge of fitness.

The perception that the student mentors demonstrated a greater level of professional assistance is not surprising given the extent of differences in factual knowledge and professional preparation between the student mentors and peer mentors. The student mentors of this study were senior-level undergraduate kinesiology students nearing completion of their professional training and had completed a series of academic courses related to physical fitness, whereas the depth and breadth of information the peer mentors were exposed to was limited during the 30-week peer-mentor preparation program. In light of this, we found it very promising that peer mentors were viewed as somewhat knowledgeable and prepared for guiding others, as expressed by the 84.3% rating on the relevant survey questions. In addition, we believe that a particularly important outcome of this model is that the peer mentors were perceived as similarly effective role models of fitness and exercising as the young and fit undergraduate kinesiology student mentors (88% and 89% ratings, respectively). This finding supported our original theory that fit and healthy older adults might serve as positive role models to their peers.

Evidently, the 14-week exercise program was effective in improving the functional-fitness performance scores of both the SM and PM groups. Compared with pretraining values, both groups demonstrated significant improvements ($p \leq .03$) for the handgrip-strength, 6-min-walk, forward-reach, 8-ft up-and-go, sit-and-reach, 30-s chair-stand, and 30-s arm-curl tests (Table 5). Despite the improvement observed in the back-scratch flexibility test for both groups, the change was only significant for the PM group. When comparing the postintervention performance scores between the SM and PM groups, we found no significant differences for any but two measures: the 30-s chair-stand and the 8-ft up-and-go tests (Table 5). However, there were noticeable (although nonsignificant) differences

between the two groups before the intervention: The SM group scored higher for the handgrip-strength, 6-min-walk, 8-ft up-and-go, chair sit-and-reach, back-scratch, 30-s chair-stand, and 30-s arm-curl tests. Only for the forward-reach balance test did the PM group score higher at baseline and at 14 weeks. In the back-scratch flexibility test, although the SM group scored slightly higher at baseline, this group showed minimal and nonsignificant improvement during the 14 weeks, as opposed to the PM group's showing significant improvement and scoring noticeably higher postintervention. Our interpretation of the positive changes in various functional performance scores is not only that the program was effective for both groups but also that the peer mentors were able to guide the intervention participants adequately, eliciting considerable improvements in their fitness measures.

These findings suggest that an exercise program for older adults can be effectively implemented using trained and marginally experienced peer mentors and that peer mentors can effectively improve the functional fitness of older adult participants. These results are in accordance with previous studies that reported the effectiveness of peer mentoring in various clinical settings (Ashbury et al., 1998; Broadhead et al., 2002; Ezumi et al., 2003; Joseph et al., 2001; Lorig et al., 2001; Parent & Fortin, 2000; Williams et al., 2002). However, previous research has also found peer mentoring ineffective and unappealing to patients hospitalized with heart failure (Riegel & Carlson, 2004). It has also been suggested that reports that indicated the effectiveness of peer mentoring generally derived conclusions based solely on outcome measures, while partly or completely ignoring the difficulties encountered with the application of the peer-mentor model (Smith, Tobin, & Toseland, 1992). Similarly, if the interpretation of our findings were exclusively based on the significant fitness-score improvements or the similarity of the reported program perception, we might suggest that the peer-mentor model could be readily used in all older adult exercise programs. However, this peer-mentor model was not without limitations and incurred difficulties during the 14-week intervention.

Despite training received directly from the program supervisors during the 30-week preparation period, peer mentors initially had difficulty remembering the names and proper technique of some exercises. This was not surprising considering that more than 200 different exercises were used throughout the program, but it appears that the limited fitness experience of the peer mentors might have hampered their effectiveness. During the first several weeks of the 14-week intervention period, some peer mentors had difficulties guiding their older adult participants. Inconsistencies among peer mentors were observed, as some performed their mentoring role noticeably better than others. Older adult intervention participants soon identified the peer mentors with superior skill and would preferentially select to partner with them. Occasionally, the program supervisors intervened in the peer mentor–intervention participant pairing process, which might have contributed to the slightly lower program perception scores of the PM group. In addition, peer mentors intermittently experienced difficulty monitoring the safe and correct execution of the training techniques. At times they used spotting techniques incorrectly, and the feedback they provided to intervention participants was typically nonspecific and mostly limited to encouragement. During the initial intervention period, some peer mentors were uncertain in their decisions, strug-

gled to independently manage all supervisory tasks, and sought advice and guidance from the program supervisors. As the peer mentors gained experience and confidence, most of these deficiencies were corrected.

The difficulties experienced by the peer mentors during the initial intervention period are similar to those observed in most novice fitness professionals and personal trainers. In fact, the student mentors, with extensive academic preparation and knowledge specific to fitness and training, experienced the same difficulties as the peer mentors. The effectiveness of peer mentors, like novice professionals, might be attenuated by a lack of practical experience in guiding and mentoring participants in a fitness setting. Therefore, educational lectures addressing the principles of fitness and training combined with abundant practice opportunities for mentors might potentiate the effectiveness of a peer-mentor preparation program. These observations suggest that the peer-mentor preparation used in the current study needs to be improved to provide prospective peer mentors more practical experience.

Nonetheless, the peer-mentoring model has the potential to be a cost-effective method of reaching out to older adults, engaging them in physical exercise programs for extended periods, and improving their health and fitness. Although time and effort invested in the peer-mentor preparation process might seem burdensome, building on the assistance of older adults who are committed to serve as peer mentors is advantageous in the long run. The main advantages might include reduced program costs and consistency in participant mentoring over extended periods. While the assistance of professional trainers with extensive experience might be costly, especially in long-term programs with high numbers of participants, older adult peer mentors assisting on a volunteer basis significantly reduce program costs. In addition, our experiences indicate that peer mentors enjoyed and valued performing their mentoring duties and were willing to assist beyond the 14-week intervention period. Furthermore, peer-mentored intervention participants became excited about the opportunity of possibly becoming peer mentors and serving others, thus passing on the service they received to other older adult participants.

The findings of the current study are preliminary. To better prepare older adults serving others in a physical fitness setting, the peer-mentor preparation strategies and program details must be refined. Further research is needed to investigate peer mentors' ability to guide older adult participants independently and in community settings. In addition, longer interventions are needed to investigate program adherence and fitness adaptations of older adult exercisers. Our intentions for future research include a follow-up investigation with focus on the proper preparation of the peer mentors and obtaining data from interventions of longer duration. Other researchers examining the effectiveness and applicability of the peer-mentor model should use study methodologies that are sensitive to process details and to outcomes expected from professional program supervisors.

Acknowledgments

This research was supported by the Ageless Health Initiative of the Paso del Norte Health Foundation. We thank Brian Carter for facilities support and all student mentors who were involved in the intervention.

References

Ashbury, F.D., Cameron, C., Mercer, S.L., Fitch, M., & Nielsen, E. (1998). One-on-one peer support and quality of life for breast cancer patients. *Patient Education and Counseling, 35*(2), 89–100.

Boyette, L.W., Lloyd, A., Boyette, J.E., Watkins, E., Furbush, L., Dunhbar, S.B., et al. (2002). Personal characteristics that influence exercise behavior of older adults. *Journal of Rehabilitation Research and Development, 39,* 95–103.

Bratter, B. (1986). Peer counseling for older adults. *Generations (San Francisco, Calif.), 10*(3), 49–50.

Bratter, B., & Freeman, E. (1990). The maturing of peer counseling. *Generations (San Francisco, Calif.), 14*(1), 49–52.

Broadhead, R.S., Heckathorn, D.D., Altice, F.L., van Hulst, Y., Carbone, M., Friedland, G.H., et al. (2002). Increasing drug users' adherence to HIV treatment: Results of a peer-driven intervention feasibility study. *Social Science and Medicine, 55,* 235–246.

Caserta, M.S., & Gillett, P.A. (1998). Older women's feelings about exercise and their adherence to an aerobic regimen over time. *The Gerontologist, 38,* 602–609.

Centers for Disease Control and Prevention. Agency for Healthcare Research and Quality. (2006). *Behavioral Risk Factor Surveillance System*. Retrieved December 12, 2006, from http://apps.nccd.cdc.gov/brfss/age.asp?cat=PA&yr=2005&qkey=4419&state=UB

Emery, C.F., & Gatz, M. (1990). Psychological and cognitive effects of an exercise program for community-residing older adults. *The Gerontologist, 30,* 184–188.

Ezumi, H., Ochiai, N., Oda, M., Saito, S., Ago, M., Fukuma, N., et al. (2003). Peer support via video-telephony among frail elderly people living at home. *Journal of Telemedicine and Telecare, 9,* 30–34.

Gillies, E., Aitchison, T., MacDonald, J., & Grant, S. (1999). Outcomes of a 12-week functional exercise program for institutionalized elderly people. *Physiotherapy, 85,* 349–357.

Hoffman, S.B. (1983). Peer counselor training with the elderly. *The Gerontologist, 23,* 358–360.

Joseph, D.H., Griffin, M., Hall, R.F., & Sullivan, E.D. (2001). Peer coaching: An intervention for individuals struggling with diabetes. *The Diabetes Educator, 27,* 703–710.

King, A.C., Rejeski, W.J., & Buchner, D.M. (1998). Physical activity interventions targeting older adults: A critical review and recommendations. *American Journal of Preventive Medicine, 15,* 316–333.

Kirkpatrick, R.V., & Patchner, M.A. (1987). The utilization of peer counselors for the provision of mental health services to the aged. *Clinical Gerontologist, 6*(4), 3–14.

Lorig, K.R., Ritter, P., Stewart, A.L., Sobel, D.S., Brown, B.W., Bandura, A., et al. (2001). Chronic disease self-management program: 2-year health status and healthcare utilization outcomes. *Medical Care, 39,* 1217–1223.

Medvene, L. (1992). Self-help groups, peer helping, and social comparison. In S. Spacapan & S. Oskamp (Eds.), *Helping and being helped: Naturalistic studies* (pp. 49–81). Newbury Park, CA: Sage.

Parent, N., & Fortin, F. (2000). A randomized, controlled trial of vicarious experience through peer support for male first-time cardiac surgery patients: Impact on anxiety, self-efficacy expectation, and self-reported activity. *Heart & Lung. Journal of Acute & Critical Care, 29,* 389–400.

Rhodes, R.E., Martin, A.D., Taunton, J.E., Rhodes, E.C., Donnelly, M., & Elliot, J. (1999). Factors associated with exercise adherence among older adults: An individual perspective. *Sports Medicine (Auckland, N.Z.), 28,* 397–411.

Riegel, B., & Carlson, B. (2004). Is individual peer support a promising intervention for persons with heart failure? *The Journal of Cardiovascular Nursing, 19,* 174–183.

Rikli, R.E., & Jones, C.J. (1999). Development and validation of a functional fitness test for community-residing older adults. *Journal of Aging and Physical Activity, 7,* 129–161.

Rubenstein, L.Z., Josephson, K.R., Trueblood, P.R., Loy, S., Harker, J.O., Pietruszka, F.M., et al. (2000). Effects of a group exercise program on strength, mobility, and falls among fall-prone elderly men. *The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences, 55,* M317–M321.

Smith, M.F., Tobin, S.S., & Toseland, R.W. (1992). Therapeutic processes in professional and peer counseling of family caregivers of frail elderly people. *Social Work, 37,* 345–351.

Stephens, T., & Caspersen, C.J. (1994). The demography of physical activity. In C. Bouchard, R.J. Shephard, & T. Stephens (Eds.), *Physical activity, fitness and health* (pp. 204–213). Champaign, IL: Human Kinetics.

Taylor, A.H., Cable, N.T., Faulkner, G., Hillsdon, M., Narici, M., & Van der Bij, A.K. (2004). Physical activity and older adults: A review of health benefits and the effectiveness of interventions. *Journal of Sports Sciences, 22,* 703–725.

van der Bij, A.K., Laurant, M.G.H., & Wensing, M. (2002). Effectiveness of physical activity interventions for older adults: A review. *American Journal of Preventive Medicine, 22,* 120–133.

Ware, J.E., Kosinski, M., & Dewey, J.E. (2000). *How to score version 2.0 of the SF-36 Health Survey*. Lincoln, RI: Quality Metric Inc..

Williams, R.M., Patterson, D.R., Schwenn, C., Day, J., Bartman, M., & Engrav, L.H. (2002). Evaluation of a peer consultation program for burn inpatients—2000 ABA paper. *The Journal of Burn Care & Rehabilitation, 23,* 449–453.

Wilson, P.F., & Johnson, W.B. (2001). Core virtues for the practice of mentoring. *Journal of Psychology and Theology, 29,* 121–130.