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What is the Optimal Duration of Participation in a Community-Based Health Promotion Program for Older Adults?

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Abstract

Optimizing duration of participation in health promotion programs has important implications for program reach and costs. We examined data from 355 participants in EnhanceWellness (EW) to determine whether improvements in disability risk factors (depression, physical inactivity) occurred early or late in the enrollment period. Participants had a mean age of 74 years; 76% were women, and 16% were non-white. The percent depressed declined from enrollment to six months (35% to 28%, $p = .001$) and from six to 12 months (28% to 22%, $p = .03$). The percent physically inactive declined over the first six months, without substantial change thereafter (47%, 29%, and 29%). Those remaining inactive at six months had worse self-rated health and more depressive symptoms initially;

a subset of those increased their physical activity by 12 months. These data suggest that enrollment could be reduced from 12 to six months without compromising favorable effects of EW participation, although additional benefits may accrue beyond six months.

Keywords

aging; health promotion; health status; physical activity; depression

The community-based EnhanceWellness program (EW), formerly known as the Health Enhancement Program (HEP), has consistently shown health-related benefits for community-living older adults, including reduced disability risk factors such as physical inactivity and depression (Wallace et al., 1998; Leveille et al., 1998; Phelan, Williams, Penninx, LoGerfo, & Leveille, 2004). The efficacy of EW has been demonstrated (Leveille et al., 1998). EW has been described in detail previously (Leveille et al., 1998; Phelan et al., 2002; Phelan et al., 2004; Phelan, Williams, Snyder, Fitts, & LoGerfo, 2006). Briefly, EW is a community-based, health promotion, disability prevention intervention intended to preserve the health and functioning of elders residing in the community who have a high risk of functional decline due to chronic conditions. EW is delivered in senior centers or other community settings by nurses and social workers trained in individualized assessment and counseling for behavior modification to reduce disability risk factors (e.g., depression, physical inactivity). EW emphasizes collaborative, client-centered care in a nonclinical setting. Motivational interviewing and behavior change strategies are employed by EW staff in order to enhance older adults' self-efficacy for managing chronic conditions, to adopt behaviors (e.g., regular physical activity) that have been shown to reduce disability risk (Seeman et al., 1995; Centers for Disease Control and Prevention, 2001; Lorig & Holman, 2003; Leveille, Phelan, Davis, LoGerfo, & LoGerfo, 2004), and to communicate effectively with primary care providers. The EW program has been disseminated nationally (Phelan et al., 2006) and has also been replicated in a for-profit setting (Holland, Greenberg, Tidwell, & Newcomer, 2003; Tidwell et al., 2004; Holland et al., 2005) and, as previously described (Phelan et al., 2006), programs similar to EW are being tested in different parts of the country with different populations.

EW was originally designed and implemented as a 12-month program. Analyses of program dissemination demonstrated that a large proportion of individuals discontinued program activities before completing the full 12 months (Phelan et al., 2002; Phelan et al., 2006). This observation raised the question of whether 12 months' participation was necessary for program benefits to be achieved. The question of optimal program duration is important, because community-based health promotion programs can serve more individuals if enrollment duration is limited to the briefest effective time frame; thus, such evidence should be informative to program planners (Bryant, Altpeter, & Whitelaw, 2006). This information may also be relevant to other audiences, such as program funders (who may be reluctant to support seemingly lengthy enrollments), researchers (who may find information about optimal duration of the EW program helpful for planning other interventions with older adults), and clients (who may seek to optimize their time commitments to various activities). Therefore, our objective with the current evaluation was to determine if the majority of health-related benefits realized by EW participants occurred during their first six months of enrollment or the second six-month time interval.

Methods

Setting

EW was implemented as a 12-month program at 26 diverse community sites, 15 in Washington state, one in Maine, two in New York state, three in Illinois, and five in Michigan. Sites within

Washington state had been established during a local dissemination of EW (Phelan et al., 2002), while those outside of the state of Washington had expressed interest in implementing the program and were able to do so through funding support provided by the Robert Wood Johnson Foundation as part of an effort to disseminate and evaluate the program nationally (Phelan et al., 2006).

Participants

Five hundred ninety-five (595) community dwelling elders enrolled in the EW program between April 1998 and December 2003. Our analytic sample included 390 of the 595 participants who returned questionnaires within a two-month window of each scheduled evaluation (i.e., from one month before to one month after enrollment, six months, and 12 months). Thirty-five of these 390 participants were excluded because of missing data (21 were missing more than one of the outcome measures and 14 lacked demographic information), leaving a maximum of 355 participants. Complete (i.e., enrollment, six months, and 12 months) data were available for 295 of these 355 participants for the disability risk factors (depression and physical inactivity) which were our primary outcome measures.

Intervention

Details of the EW intervention have been described previously (Leveille et al., 1998; Phelan et al., 2002, Phelan et al., 2004; Phelan et al., 2006). EW nurses use a standardized questionnaire to assess each individual's risk factors for disability. Nurses then work with each participant individually to develop a specific "health action plan" targeting personal health goals to reduce disability risk. Participants are encouraged to exercise regularly, to seek treatment for depression if a high level of depressive symptoms is elicited, and to meet with a health mentor (an EW-trained volunteer of comparable age with a similar chronic condition) (Davis, Leveille, Favaro, & Logerfo, 1998). They are also encouraged and supported by EW staff to become skilled at self-management of any chronic condition(s) they may have. Additional information regarding the EW program and ongoing dissemination is available from Senior Services of Seattle/King County (SSSKC) at <http://www.projectenhance.org/>.

Data collection

Participants completed self-administered questionnaires at enrollment, six-, and 12-month follow-ups, for program evaluation. These questionnaires were the source of all data presented herein, including demographic information, chronic conditions, disability risk factors (depression, physical activity), self-rated health, emergency department (ED) visits, and smoking status. The institutional review board (IRB) of the University of Washington (UW) approved this study, which was carried out using a de-identified dataset received by UW researchers from SSSKC.

Description of variables

Our primary outcomes of interest were the proportions of participants meeting criteria for disability risk factors (depression and physical inactivity) and the mean severity of each risk factor at follow-up compared to enrollment. We assessed depression with the short form (15-item) Yesavage Geriatric Depression (GDS) Scale, a self-administered inventory of depressive symptoms that is valid and reliable for older adults (Yesavage et al., 1982-1983). GDS scores of five or higher indicate probable clinical depression (Sheikh & Yesavage, 1986). The Physician-based Assessment and Counseling for Exercise scale (PACE) is an ordinal measure developed by the Centers for Disease Control and Prevention to assess physical activity level and readiness to exercise (Long et al., 1996). PACE scores of four or less correspond to infrequent or no exercise and served as our definition of physical inactivity (Phelan et al., 2002).

Secondary outcomes included self-rated health status and ED visits. Health status was assessed by a single question from the Medical Outcomes Study, "In general, would you say your health is:" (Ware, 1995). Response options were 1 = excellent, 2 = very good, 3 = good, 4 = fair, 5 = poor. This single item has been shown to be valid (Manderbacka, Lundberg, & Martikainen, 1999), reliable (Martikainen et al., 1999), and sensitive to change (Idler & Kasl, 1995) in older adults. ED visits, the number of visits to an emergency room in the past year, were self-reported at enrollment, six, and 12 months. We posited that participants should be less likely to seek emergency care as they became more skilled at managing their chronic conditions and communicating with their PCPs about their health issues (Christakis, Mell, Koepsell, Zimmerman, & Connell, 2001).

Self-reported demographic characteristics, number of eleven chronic conditions (heart problems, hypertension, arthritis, emphysema, cancer, diabetes, cataract, stroke, broken bone, emotional problems, and foot problems), and smoking status were examined as potential explanatory factors.

Statistical Analysis

Analyses included the 355 participants who provided data for any outcome at two or more of the three time points (enrollment, six months, and 12 months of follow-up). To describe characteristics of the sample, we used t-tests for continuous variables and chi-square tests for categorical variables. The significance of change in proportions of participants meeting the criterion for each disability risk factor at each time point was assessed with chi square tests. We examined mean improvement in disability risk factor severity, using one-tailed t-tests to evaluate the significance of improvement and two-tailed t-tests for other comparisons (e.g., health status, ED visits) where improvement was not hypothesized. Change scores were calculated as the difference between enrollment and six-month scores and the difference between six-month and 12-month scores. A supplemental analysis was conducted using the same methods as just described to compare results for the 355 participants to the 295 participants who had complete data at enrollment, six, and 12 months. *P* values of $\leq .05$ were considered statistically significant. All analyses were carried out using the Statistical Package for the Social Sciences, version 9 for Windows (SPSS, Inc., Chicago, Illinois).

Results

Participant Characteristics

The 355 participants included in the intention-to-treat analyses had a mean age of 74 ± 8.5 years. Sixteen percent were non-white, 76% were women, and 37% were married. Participants self-reported an average of 3.5 ($SD = 1.8$) chronic conditions; seven percent reported more than five chronic conditions. Participants reported an average of 5.0 ($SD = 3.1$) prescription medications. Ninety-one (35% of 261 reporting prescription medication use) reported taking a psychotropic medication (e.g., benzodiazepines, such as Valium, skeletal muscle relaxants, such as Robaxin, and medications with anticholinergic side effects, such as Benadryl). Utilization of emergency rooms in the year before enrollment was generally low, averaging 0.7 ($SD = 1.2$) ED visits per person, with 39% having at least one ED visit.

Changes in Primary Outcomes: Depression and Physical Inactivity

Five or more depressive symptoms were reported by 35% of the 355 participants at enrollment, 28% at six months, and 22% at 12 months ($p = .001$ for difference in proportions between enrollment and six months; $p = .03$ for difference in proportions between six and 12 months).

Forty-seven percent of the 355 participants reported infrequent or no exercise at enrollment; this proportion was 29% at six months and 29% at 12 months ($p < .001$ for difference in

proportions between enrollment and six months; $p = .45$ for difference in proportions between six months and 12 months).

Table 1 shows the severity of disability risk factors (depression and physical inactivity) at enrollment, six, and 12 months among all 355 participants. Depression severity was determined by the mean score on the 15-item Geriatric Depression Scale; scores of five or more indicate probable clinical depression (Sheikh & Yesavage, 1986). Severity of physical inactivity was determined by the mean score on the Physician-based Assessment and Counseling for Exercise (PACE) scale (Long et al., 1996); scores of four or less indicate physical inactivity. Depression scores and physical inactivity scores improved significantly from enrollment to six months and from six months to 12 months. However, the magnitude of improvement was greater from enrollment to six months for both measures.

When the prior analyses were re-run for the 295 participants who had complete data for both depression and physical inactivity at all three time points, we found nearly identical proportions at risk and risk severity (means) as just described for the 355 participants; thus, only results for the 355 participants are presented herein.

Disability risk factors improved more between enrollment and six months among participants who met criterion on each disability risk factor at enrollment (Table 2), compared to all participants (Table 1). For example, comparing the magnitude of change shown in Tables 1 and 2, improvement was more than double (mean PACE score change = +1.7) among 167 participants who screened positive for physical inactivity compared to all participants (mean PACE score change = +0.7). Improvement was more than triple (mean GDS score change = -2.5) among participants ($n = 110$) who screened positive for depression compared to all participants (mean GDS score change = -0.7).

Changes in Secondary Outcomes: Health Status and ED Visits

The percent of the 355 participants reporting fair or poor health was 34% at enrollment, 27% at six months, and 27% at 12 months ($p = .004$ for difference in proportions between enrollment and six months; $p = .50$ for difference in proportions between six and 12 months). Improvement in average self-rated health scores occurred primarily in the first six months (mean score, 3.13 ± 0.9 at enrollment and 2.97 ± 0.8 at six months [change = -0.16], $p < .001$; vs. 2.97 ± 0.8 at six months and 2.94 ± 0.9 at 12 months [change = -0.03], $p > .05$).

The percent with any ED visits in the prior year was 39% at enrollment, 31% at six months, and 27% at 12 months ($p = .002$ for difference in proportions between enrollment and six months; $p = .15$ for difference in proportions between six and 12 months).

Participants Still Physically Inactive at Six Months

In order to explore which participant characteristics might be related to a lack of increase in physical activity within a six-month time frame, we conducted a subgroup analysis of the 82 participants who were physically inactive at enrollment and remained physically inactive at six months compared to the 85 who improved from physically inactive to physically active by six months. Results, presented in Table 3, showed that participants who remained physically inactive at six months had more depressive symptoms and worse self-rated health at enrollment. However, they were not significantly older, not more likely to be women, nor were they more likely to smoke. The average PACE score for this subgroup continued to improve from 2.6 at six months to 3.4 at 12 months, such that 30% of those still physically inactive at six months were physically active by 12 months.

Discussion

In this evaluation of the timing of improvements in health-related outcomes for participants in the EW program, we observed significant reductions in the percent of participants with each disability risk factor (i.e., depression and physical inactivity) over the first six months of the program. During the second six months, the percent that was physically inactive did not decrease further; however, the percent with depression continued to decrease between six and 12 months. Improvements in risk factor severity were significant for both depression and physical inactivity over the first six months of the program, with additional significant change in the second six months. Secondary outcomes showed significant improvement only during the first six months.

Other year-long health promotion programs have also reported greater improvements from enrollment to six months than from six-month to 12-month follow-up. For example, one study of algorithm-based individual counseling to improve self-management among patients with diabetes demonstrated that almost all of the reduction in hemoglobin A1C (HbA1C), a measure of blood glucose control, occurred during the first six months of the program – i.e., the maximum effect was attained by six months and was sustained through the twelfth month (Aubert et al., 1998). Similarly, Gill and colleagues found that a six-month PREHAB program reduced disability, although no further gains were observed during months seven to 12 (Gill et al., 2002; Gill et al., 2004). A 48-week, cluster-randomized, controlled trial of Tai Chi provides another example of early improvement exceeding later improvement (Sattin, Easley, Wolf, Chen, & Kutner, 2005). An intense Tai Chi exercise intervention reduced fear of falling among frail older adults with a history of falls (Sattin et al., 2005) compared to a control group that received wellness education. Fear of falling was similar in intervention and control groups at baseline, and improved after four months in the Tai Chi group, but was not significantly different by study group until subsequent evaluations at months 8 and 12. Notably, in the Tai Chi intervention group, fear of falling improved more from baseline to four months than from four to 8 or 8 to 12 months.

Our finding that more benefits occurred early than late for most participants has important implications from the standpoint of both health promotion programs and the persons served by them. From the program standpoint, more clients can be served by a program of shorter duration, making it more valuable to potential funding partners (e.g., health care systems) in the communities where the program resides. From the participant standpoint, older adults who may be reluctant to join a year-long program may find a six-month program more attractive.

It should be noted that improvements in severity of disability risk factors continued over 12 months of program participation, both for participants who met criteria and for those who did not meet criteria for the disability risk factors we assessed. Improvements from enrollment to twelve months were clinically relevant for participants who met the criterion for physical inactivity at enrollment, and likely clinically relevant for those who met the criterion for depression at enrollment (Table 2). For example, going from a mean score of 2.6 to 4.6 on the PACE measure corresponds to a change in the average response from, “I am trying to start to exercise or walk” to an average response of, “I am doing moderate exercise less than 3 times per week.” With regard to depression, a decrease in the mean GDS score from 8.3 to 5.4 indicates less severe depressive symptoms. Thus, although the magnitude of improvements from 6 to 12 months may be smaller, one could argue that clients meeting criteria for physical inactivity or depression upon program entry may benefit from continued participation beyond 6 months. This information has implications for program implementers and for participants themselves: for example, program duration could be tailored to the needs of the individual participant, based on his/her scores on disability risk factors at the time of enrollment.

Our assessment of participants who remained physically inactive at six months suggested that depressive symptomatology may have limited their physical activity. However, about one-third of those participants did improve by 12 months. Although reducing the proportion of participants meeting risk criteria is an important goal, it is also important to acknowledge the value of any improvement that may prevent or slow the rate of physical decline to disability. That is, some individuals who did not improve might have worsened more in the absence of EW participation. Empirical evidence in support of this assertion is available in studies that have involved older adults as control participants: for example, data from the randomized trial of the EW intervention demonstrate that the cumulative incidence of disability in basic activities of daily living (e.g., bathing, dressing, transferring) in the control group was 10.5% at six months and 21.3% at 12 months (Phelan et al., 2004).

The EW program is offered to the public at large, and thus participants are self-selected. The authors did not direct recruitment of program participants but simply analyzed the data that were collected from this real-world program (i.e., a program that is not being implemented as part of a research study). This study is limited by reliance on self-report data; however, the outcome measures are valid and reliable, and participants' responses ranged from minimum to maximum on each scale. Additional limitations that bear mention include 1) the lack of complete data for all 355 participants who initially enrolled in the program (295 of 355 or 83% had complete data), and 2) potential selection bias associated with the study of volunteers, in particular the possibility that results may not be generalizable to the overall population of all older adults.

The major strength of this study is that these results should be broadly generalizable to most community-dwelling older adults, because participants enrolled in a community-based health-promotion program and were not recruited for a research study. Another strength worthy of mention is the large number of participants who completed questionnaires at EW sites in several regions (i.e., Northeast, Midwest, West) of the United States.

The EW program may be even more beneficial for enhancing recovery of function among older adults after hospitalization or rehabilitation. Long-term follow-up of participants would be invaluable for determining whether health-related benefits are maintained and what the impact of minimizing disability risk factors may be on health care use and costs over several subsequent years. We conclude that the findings reported herein support a six-month enrollment period in EW for most participants.

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References

- Aubert RE, Herman WH, Waters J, Moore W, Sutton D, Peterson BL, et al. Nurse case management to improve glycemic control in diabetic patients in a Health Maintenance Organization. A randomized, controlled trial. *Annals of Internal Medicine* 1998;129:605–612. [PubMed: 9786807]
- Bryant LL, Altpeter M, Whitelaw NA. Evaluation of health promotion programs for older adults: An introduction. *Journal of Applied Gerontology* 2006;25:197–213.
- Centers for Disease Control and Prevention. Increasing physical activity. A report on recommendations of the Task Force on Community Preventive Services. *MMWR Recommendations and Reports* 2001;50(RR-18):1–16.

- Christakis DA, Mell L, Koepsell TD, Zimmerman FJ, Connell FA. Association of lower continuity of care with greater risk of emergency department use and hospitalization in children. *Pediatrics* 2001;107:524–529. [PubMed: 11230593]
- Davis C, Leveille S, Favaro S, LoGerfo M. Benefits to volunteers in a community-based health promotion and chronic illness self-management program for the elderly. *Journal of Gerontological Nursing* 1998;24(10):16–23. [PubMed: 9923237]
- Gill TM, Baker DI, Gottschalk M, Peduzzi PN, Allore H, Byers A. A program to prevent functional decline in physically frail, elderly persons who live at home. *New England Journal of Medicine* 2002;347:1068–1074. [PubMed: 12362007]
- Gill TM, Baker DI, Gottschalk M, Peduzzi PN, Allore H, Van Ness PH. A prehabilitation program for the prevention of functional decline: effect on higher-level physical function. *Archives of Physical Medicine and Rehabilitation* 2004;85:1043–1049. [PubMed: 15241748]
- Holland SK, Greenberg J, Tidwell L, Malone J, Mullan J, Newcomer R. Community based health coaching, exercise, and health service utilization. *Journal of Aging and Health* 2005;17:697–716. [PubMed: 16377768]
- Holland SK, Greenberg J, Tidwell L, Newcomer R. Preventing disability through community-based health coaching. *Journal of the American Geriatrics Society* 2003;51:265–269. [PubMed: 12558726]
- Idler EL, Kasl SV. Self-ratings of health: Do they also predict change in functional ability? *Journals of Gerontology Series B, Psychological Sciences and Social Sciences* 1995;50:S344–353.
- Leveille SG, Phelan EA, Davis C, LoGerfo M, LoGerfo JP. Preventing disability through community-based health coaching. *Journal of the American Geriatrics Society* 2004;52:328–329. [PubMed: 14728658]
- Leveille SG, Wagner EH, Davis C, Grothaus L, Wallace J, LoGerfo M, Kent D. Preventing disability and managing chronic illness in frail older adults: A randomized trial of a community-based partnership with primary care. *Journal of the American Geriatrics Society* 1998;46:1191–1198. [PubMed: 9777899]
- Long BJ, Calfas KJ, Wooten W, Sallis JF, Patrick K, Goldstein M, et al. A multisite field test of the acceptability of physical activity counseling in primary care: Project PACE. *American Journal of Preventive Medicine* 1996;12:73–81. [PubMed: 8777071]
- Lorig KR, Holman H. Self-management education: History, definition, outcomes, and mechanisms. *Annals of Behavioral Medicine* 2003;26:1–7. [PubMed: 12867348]
- Manderbacka K, Lundberg O, Martikainen P. Do risk factors and health behaviours contribute to self-ratings of health? *Social Science & Medicine* 1999;48:1713–1720. [PubMed: 10405010]
- Martikainen P, Aromaa A, Heliovaara M, Klaukka T, Knekt P, Maatela J, Lahelma E. Reliability of perceived health by sex and age. *Social Science & Medicine* 1999;48:1117–1122. [PubMed: 10390049]
- Phelan EA, Williams B, Leveille S, Snyder S, Wagner EH, LoGerfo JP. Outcomes of a community-based dissemination of the Health Enhancement Program. *Journal of the American Geriatrics Society* 2002;50:1519–1524. [PubMed: 12383149]
- Phelan EA, Williams B, Penninx BW, LoGerfo JP, Leveille SG. Activities of daily living function and disability in older adults in a randomized trial of the Health Enhancement Program. *Journals of Gerontology Series A, Biological Sciences and Medical Sciences* 2004;59:838–843.
- Phelan EA, Williams B, Snyder SJ, Fitts SS, LoGerfo JP. A five state dissemination of a community based disability prevention program for older adults. *Clinical Interventions in Aging* 2006;1:267–274. [PubMed: 18046880]
- Sattin RW, Easley KA, Wolf SL, Chen Y, Kutner MH. Reduction in fear of falling through intense Tai Chi exercise training in older transitionally frail adults. *Journal of the American Geriatrics Society* 2005;53:1168–1178. [PubMed: 16108935]
- Seeman TE, Berkman LF, Charpentier PA, Blazer DG, Albert MS, Tinetti ME. Behavioral and psychosocial predictors of physical performance: MacArthur studies of successful aging. *Journals of Gerontology Series A, Biological Sciences and Medical Sciences* 1995;50:M177–183.
- Sheikh, JI.; Yesavage, JA. Geriatric Depression Scale (GDS): Recent evidence and development of a shorter version. In: Brink, TL., editor. *Clinical Gerontology: A Guide to Assessment and Intervention*. NY: The Haworth Press; 1986. p. 165-173.

- Tidwell L, Holland SK, Greenberg J, Malone J, Mullan J, Newcomer R. Community-based nurse health coaching and its effect on fitness participation. *Lippincott's Case Management: Managing the Process of Patient Care* 2004;9:267–279.
- Wallace JI, Buchner DM, Grothaus L, Leveille S, Tyll L, Lacroix AZ, Wagner EH. Implementation and effectiveness of a community-based health promotion program for older adults. *J Gerontology: Medical Sciences* 1998;53A:M301–306.
- Ware JE Jr. The status of health assessment 1994. *Annual Review of Public Health* 1995;16:327–354.
- Yesavage JA, Brink TL, Rose TL, Lum O, Huang V, Adey M, et al. Development and validation of a geriatric depression screening scale: A preliminary report. *Journal of Psychiatric Research* 1982-1983;17:37–49. [PubMed: 7183759]

Table 1

Severity (Score, $M \pm SD$)^a of Disability Risk Factors at Enrollment, After Six Months, and After One Year for All Participants ($N = 355$)

Risk Factor	Score, $M \pm SD$	Improvement	<i>p</i> value
Depression ($n = 302$)			
Enrollment	4.2 $\pm$ 3.7		
Six months	3.5 $\pm$ 3.1	-0.7	<0.001 ^b
Twelve months	3.2 $\pm$ 3.2	-0.3	0.026 ^c
Physical Inactivity ($n = 346$)			
Enrollment	4.6 $\pm$ 2.3		
Six months	5.3 $\pm$ 2.1	+0.7	<0.001 ^b
Twelve months	5.5 $\pm$ 2.3	+0.2	0.009 ^c

^aSeverity of depression was determined by the mean score on the 15-item Geriatric Depression Scale; scores of five or more indicate probable clinical depression; severity of physical inactivity was determined by the mean score on the Physician-based Assessment and Counseling for Exercise (PACE) scale; scores of four or less indicate physical inactivity.

^b1-tailed *p* value for change between enrollment and six months.

^c1-tailed *p* value for change between six and 12 months.

Table 2

Severity (Score, $M \pm SD$)^a of Disability Risk Factors at Enrollment, After Six Months, and After One Year for Participants Meeting Criterion for Risk Factor at Enrollment.

Risk Factor	Score, $M \pm SD$	Improvement	<i>p</i> value
Depression ($n = 110$)			
Enrollment	8.3 ± 2.9		
Six months	5.8 ± 3.4	-2.5	$<0.001^b$
Twelve months	5.4 ± 3.5	-0.4	0.112^c
Physical Inactivity ($n = 167$)			
Enrollment	2.6 ± 1.0		
Six months	4.3 ± 1.9	+1.7	$<0.001^b$
Twelve months	4.6 ± 2.3	+0.3	$<0.01^c$

^aSeverity for depression refers to mean score on the 15-item Geriatric Depression Scale; scores of five or more indicate probable clinical depression; for physical inactivity refers to mean score on the Physician-based Assessment and Counseling for Exercise (PACE) scale; scores of four or less indicate physical inactivity.

^b1-tailed *p* value for change between enrollment and six months.

^c1-tailed *p* value for change between six and 12 months.

Table 3

Characteristics of Participants (Mean $\pm$ SD or Percentage) Remaining Physically Inactive at Six Months compared to Participants No Longer Physically Inactive at Six Months.

Enrollment Characteristic	Physically Inactive at Six Months (<i>n</i> = 82)	Physically Active at Six Months (<i>n</i> = 85)	<i>p</i> value
Age	74.5 $\pm$ 10.0	73.8 $\pm$ 8.5	0.620
Female (%)	80.5	85.9	0.952
Smoker (%)	8.5	4.7	0.895
Chronic conditions, number	3.9 $\pm$ 1.7	3.4 $\pm$ 1.6	0.075
Depressive symptoms ^a	6.6 $\pm$ 3.8	4.0 $\pm$ 3.3	<0.001
PACE score ^b	2.4 $\pm$ 1.0	2.7 $\pm$ 1.0	0.011
Self-rated health	3.5 $\pm$ 0.9	3.0 $\pm$ 0.9	0.003
Any ED visits in pre-EW year (%) ^c	43.1	28.2	0.089

^a Depressive symptoms as measured by the 15-item Geriatric Depression Scale

^b PACE: Physician-based Assessment and Counseling for Exercise scale

^c ED: emergency department