Self-Management of Heart Disease by Older Adults

Assessment of an Intervention Based on Social Cognitive Theory

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A randomized, controlled trial involving 636 older individuals was conducted to evaluate an intervention to enhance self-management of heart disease. Program participants experienced less impact of illness on their psychosocial functioning ($p \leq .05$), especially their emotional behavior ($p \leq .05$) and alertness ($p \leq .01$). Compared to controls, male program participants experienced improvements in their physical functioning, specifically their ability to ambulate ($p \leq .05$) and the frequency and severity of their symptoms. Female program participants did not experience gains in physical functioning. Most group differences emerged by 12 months and decayed by the 18-month final evaluation. To accurately assess the pattern of change associated with a program of this type, evaluation over at least 18 months following program completion may be needed. Separate interventions for older men and women with heart disease appear warranted, as do follow-up activities at strategic points in time to sustain program effects.

Several studies (see, for example, Clark et al. 1988; Rakowski and Clark 1985) have shown that maintaining independence is of great

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concern to older adults. Being able to function fully enough to carry out daily activities with a minimum of outside assistance is an important measure of life's quality and imbues a sense of personal control (Patrick and Erickson 1993). Older adults with heart disease can experience significant impairment of functioning, sometimes living with debilitating symptoms of their condition. They must manage medical regimens that can involve modification of diet and exercise patterns in addition to daily use of medicine. They must cope with feelings of fear and uncertainty that often arise when the diagnosis of serious illness has been made.

Disease self-management programs are interventions through which patients learn to carry out at home the recommendations of their clinicians and manage the physical and psychosocial impairment that disease can engender in daily life. Positive effects related to increased levels of functioning have been demonstrated in self-management programs targeted at asthma (Wigal, Creer, and Kotses 1990), diabetes (Brown 1990; Goodall and Halford 1991; Padgett et al., 1988), and other chronic conditions (Mullen, Green, and Persinger 1985). Improved management of coronary heart disease by middle-aged men (see, for example, Mullen, Mains, and Velez 1992), and arthritis by older adults (see, for example, Lorig, Konkol, and Gonzales 1987) have also been documented. To date, however, self-management of heart disease by older adults has not been extensively studied. Exploring the potential for interventions to enhance functioning of older adults with cardiovascular disease is important given the extent of the illness in society. Heart disease continues to be a leading cause of death in the United States and accounts for significant morbidity, especially among older individuals (National Center for Health Statistics 1994; Verbrugge and Patrick 1995).

The study discussed here was a controlled evaluation of a self-management program for older heart patients, titled "take PRIDE." It was hypothesized that the program would result in enhanced physical and psychosocial functioning for participants.

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Method

THE INTERVENTION

The "take PRIDE" program employs an interactive group format consisting of four two-hour sessions offered at weekly intervals. Based on social cognitive theory, particularly the principles of self-regulation (Bandura 1986; Clark and Zimmerman 1990), the program introduces participants to a process for identifying and resolving problems they encounter in managing their heart disease. The theoretical underpinnings and development of the program are described elsewhere (Clark et al. 1992b). PRIDE is an acronym for phrases that reflect the self-regulatory steps participants are asked to follow: Problem selecting, Researching one's daily routine, Identifying a behavioral goal, Developing a plan to reach one's goal, and Establishing a reward for making progress. Facilitated by a health educator, the sessions include 8 to 10 older adults with diagnosed heart conditions. Basing decisions on the medical regimens recommended by their physicians, participants select a heart disease management problem to resolve using the PRIDE steps. The program is designed so that subjects can work individually on their particular management problem (e.g., diet, exercise, stress reduction, or medicine taking) and, at the same time, receive information, help, and social support from group members and the health educator. The common target across subjects is the PRIDE problem-solving process. Participants are encouraged to select a management problem that is important to them and that they believe they can make progress toward resolving in the following four weeks. The intervention aims to enable participants to apply this process to whichever management problem they confront. Participants share experiences in coping with their health problems through group discussion and have the opportunity to rehearse needed skills that may support attainment of the behavioral goal (e.g., role-playing communications with family members or health professionals). Tools for teaching include a videotape of an older adult demonstrating use of the PRIDE problem-solving process, a participant guidebook, and instructions from the health educator. Over a four-week period, participants work through the problem they have selected both within the group and at home using the PRIDE steps.

SUBJECTS

Potential participants in the study were identified through a review of medical records at outpatient cardiology clinics in four large hospitals in southeastern Michigan. All subjects met the following inclusion criteria: 60 years of age and older, diagnosed cardiac disease, treated daily by at least one heart medication, and seen by a physician at least once every six months. Cardiac disease was defined as any condition directly involving the heart (e.g., arrhythmia, angina, myocardial infarction, or valvular disease). The program was intended for persons experiencing limitations due to their heart disease on a daily basis. Subjects were excluded if hypertension was the only diagnosis, since hypertension is often asymptomatic. Subjects were also excluded if their physicians felt they would not be able to benefit fully from the program due to other medical reasons (e.g., terminal illness, memory loss, significant hearing loss).

Potential subjects received an introductory letter explaining the research and their physicians' participation, followed by a telephone call describing the study in more detail. A total of 1,410 individuals met the study criteria and could be reached by telephone. All subjects were told that the purpose of the study was to learn more about what it is like for older adults to live with a heart condition and to evaluate the effectiveness of a self-management education program. They were told that half of the participants would be randomly selected to attend the "take PRIDE" self-management education program. Further, they were told that if they did not receive the program initially, they would have an opportunity to receive it at the end of the study if they were interested and if the program was shown to be beneficial. Six hundred thirty-six individuals consented to participate and provided baseline data. The primary reasons for declining participation, given by those who were eligible but declined involvement, included time constraints, difficulties in traveling to the program site, and poor health. Complete information regarding the study recruitment process has been reported elsewhere (Dodge et al. 1993). By the 18-month follow-up, complete data were available on 455 individuals, or 72% of the sample. No appreciable differences in dropout rates between the intervention and control groups were found over the postintervention data collection points. Those who died or voluntarily withdrew be-

tween the baseline and the 18-month follow-up period were significantly more likely to be older, less educated, female, and Black. No differential effect between treatment and control was found for those who died or withdrew.

The study sample at baseline was 59% male, 88% Caucasian, and 70% married. The mean age of participants was 69.6 years with a range of 60 to 93 years. The majority (74%) had graduated from high school, although 8% had an eighth-grade or less education. Most respondents were retired from work outside the home; 15% were still employed full- or part-time. Minority representation comprised African American (10%), Hispanic/Latino (0.5%), Native American (0.3%), and other (0.9%). A variety of heart conditions were represented in the study population including arrhythmia (57%), angina (57%), and congestive heart failure (18%). In addition, 55% of the subjects had hypertension. Fifty-four percent of the sample reported a history of myocardial infarction, 32% had undergone bypass surgery, and 25% angioplasty. The length of time since the initial cardiac diagnosis ranged from a minimum of 6 months to 20 or more years. There were no significant differences in the types of heart disease diagnoses between intervention and control groups. Regarding the presence of comorbidities, intervention group members were significantly more likely than those in the control group to report having arthritis (69% vs. 61%, $p \leq .05$).

An examination of gender differences revealed that women were significantly more likely than men to report arrhythmias (70% vs. 50%, $p \leq .001$), high blood pressure (63% vs. 50%, $p \leq .01$) and congestive heart failure (24% vs. 13%, $p \leq .01$), while the men reported significantly more myocardial infarctions (59% vs. 46%, $p \leq .01$) and coronary bypass surgery (39% vs. 22%, $p \leq .001$). There were no gender differences in the reporting of angina. Compared to the men, women were significantly more likely to report arthritis ($p \leq .001$), walking problems ($p \leq .01$), back pain ($p \leq .01$), episodes of dizziness ($p \leq .001$), headaches ($p \leq .001$), cataracts ($p \leq .001$), and bladder problems ($p \leq .01$).

Mean attendance at each program session was 6.6 subjects. Problem areas addressed by participants were as follows: diet, 39%; exercise, 33%; medications, 8%; mental health/stress reduction, 6%; and other (e.g., rest, communications, smoking, social, etc.), 14%. No main effects were observed at any point in time on the Sickness Impact

Profile (SIP; Bergner et al. 1981) physical or psychosocial scores according to whether a subject chose to work on diet, exercise, or some other problem area during the education.

Those agreeing to take part in the study were assigned, by use of a random-numbers table, either to the PRIDE program or a usual care control group. *Usual care* meant seeing their physicians at the intervals specified by the particular physician and receiving any information or communications that would be provided as part of routine care in that setting. No feedback about individual participants was provided to medical or nursing personnel at the sites by the research staff in an effort to assure similar care to both the program and control groups. Unless a subject happened to mention the study during the course of a visit, the clinic staff had no knowledge of which patients had agreed to participate in the research. In addition to usual care, those subjects randomized to the intervention group received the PRIDE education program.

All study participants completed telephone interviews averaging 50 minutes in length at baseline (prior to the intervention) and at 2, 6, 12, and 18 months. While the option of dividing interviews into two segments was offered to reduce respondent burden, most subjects completed them in one telephone call. All interviewers were required to complete an extensive and in-depth training program that focused on standardizing the manner in which questions were asked, data recorded, and subject responses clarified. As part of the training, interviewers completed several practice interviews. Performance of interviewers was monitored by a staff supervisor listening in at random on actual interviews, regular staff meetings, and supplemental training sessions. Individual subjects were interviewed by different interviewers at the different time points, with the detailed training protocol assuring a standard approach to data collection.

MEASURES

After examining available measures in light of the target population, objectives, and methodology of the educational intervention, the SIP (Bergner et al. 1981) was selected as the appropriate measure of functional health status. Specifically, the SIP dimension scores assess physical and psychosocial functioning. The SIP has been shown to

discriminate in expected directions among different populations at different age levels and for different degrees of disease severity (Patrick 1990; Patrick and Deyo 1989). Its psychometric properties have been examined extensively (Bergner 1985; Bergner et al. 1981; Pollard et al. 1976). Test-retest reliability of the measure has been found to be .97, and Cronbach's alpha coefficient is .94. In validity trials comparing SIP scores on functioning with clinical assessments of physical limitation made by physicians, correlation results were .50.

The SIP uses 136 items and provides a total score, 2 dimension scores that comprised the major study variables, and 12 category scores. The physical dimension is composed of the categories of ambulation, mobility, and body care and movement. The psychosocial dimension includes the categories of social interaction, communication, emotional behavior, and alertness. In addition, the independent categories of sleep and rest, eating, work, home management, and recreation and pastimes are added into the calculation of the total SIP score. Scores are derived by adding the values for the items using predetermined weights for each item within that category and dividing the sum by the maximum possible dysfunction score for that dimension or category. Thus, a mean percentage score is derived for each dimension (or category) for each individual. Scores range from 0 to 100 with higher scores representing increased functional impairment due to illness. The SIP total score, and psychosocial and physical dimension scores, were examined as the primary study outcome variables. It was hypothesized that participants in the "take PRIDE" program would experience less impact of the heart disease on their psychosocial and physical functioning and, therefore, would have lower SIP scores. The SIP includes many items relevant to patients at terminal stages of illness or experiencing significant disability (i.e., homebound or bedridden). A ceiling effect in the scores for more mobile populations such as the one studied here is expected. As a result, changes attributable to an intervention for such a group are more difficult to measure. Therefore, findings in a population meeting criteria for this research are likely to be conservative.

In addition to scores on the SIP, patients' symptom experience was determined to be an indicator of impediments to optimum functioning and comprised an important outcome variable. Symptom experience overall and symptoms attributed to the heart condition were assessed

regarding symptom frequency and severity. The symptom measure employed in the study was a checklist of 17 symptoms of clinical concern in heart disease. The list of symptoms included chest pain, shortness of breath, fatigue, rapid or irregular heart beat, waking with chest pain, waking with shortness of breath, feeling blue, bored, tense or stressed, worried, not in control, trouble falling asleep, trouble sleeping through the night, waking early, not getting a good night's sleep, pain other than chest, and numbness or cramping in legs. Data were collected regarding the presence, frequency, and severity of these symptoms in the seven days prior to each interview. Additional questions were posed to determine if respondents attributed specific symptoms to their heart condition. Total symptom scores and scores for symptoms attributed to the heart condition were calculated for each subject. Higher mean scores reflected increased impairment due to symptoms. We have used the symptom chart in previous research, and it has yielded a mean test-retest reliability score of .79.

The demographic information collected included sex, age, race, marital status, number of children, number of persons living in the household, employment status, and educational level. In addition, data were collected regarding the type of cardiac diagnosis and the presence of comorbidities.

DATA ANALYSIS

Initial data analyses included frequency distributions and descriptive statistics (means, standard deviations, and ranges) for both the SIP and symptoms scores. The longitudinal configuration of the study was emphasized in the subsequent analyses using repeated measures ANOVA with adjustments for covariates always including the corresponding baseline value. Particular interest focused on the change (from baseline) in values of the variables postintervention. There were no baseline differences between the experimental and control groups on any demographic variables important in this study. Nonetheless, in all analyses presented here, postprogram scores were adjusted for baseline scores to control for any other differences that may have existed between groups. The SIP was administered at four points in time (baseline, 2-, 12-, and 18-month follow-up). Data on symptoms were collected at these points and, in addition, at 6 months follow-up.

Initially, repeated measures analyses including main effects for treatment, time and gender, as well as adjustment for the baseline value of the corresponding variable and interactions such as treatment by time, were conducted for each of the primary SIP and symptom variables. These analyses indicated that there were some significant interactions ($p < .05$) between treatment group and the baseline variable and between gender and the baseline variable for the SIP dimensions and total score. With respect to the symptom variables, fewer interactions were found. In light of these findings, we recognized that significant differences existed between treatments and gender for the primary variables of our study. Therefore, these repeated measures analyses were not pursued further, since first a more sensitive measure was sought that allowed results of the program to be seen at specific points in time, given that some effects of this type of intervention were thought to appear early on, some subsequently diminished, and some emerged later. Second, in a global repeated measures analyses, approximately one third of the subjects were lost, as complete data on all items for all subjects are not available for all points in time.

Further analyses employed general linear statistical models that included as predictors treatment and the corresponding baseline variable as covariate for each primary outcome at each time point across the entire sample and separately by gender. These analyses permitted us an in-depth assessment of outcomes at each time point while permitting maximum use of available data.

Data analyses reported here were conducted in all instances for participants who attended at least one of the four sessions that comprised the "take PRIDE" program. Process evaluation data shed some light on whether participants followed the program. These measures included reports of the progress achieved and use of the approach. Eighty-nine percent of participants found the program useful, and 77% reported that they completed their goal or made moderate to significant progress. Almost 90% reported they would use the approach again. There were no demographic differences in participants who used the program as measured by these proxy variables and those who did not. A comparative analysis was also conducted of all persons assigned to receive the intervention who attended one or more meetings and

participants who failed to attend any session. The latter were more likely to be married and African American. They also reported less mobility, less social interaction, and fewer recreational or pastime involvements. In all cases, the analyses of data used—as the criterion of participation—attendance at one session (i.e., this is the minimal program "dose").

Results

FUNCTIONAL HEALTH STATUS OUTCOMES

Table 1 presents postprogram scores, adjusted for baseline, on the SIP for study participants. There were no significant differences in the physical dimension score between those receiving the intervention and the control group. There was a significant difference, however, in the psychosocial dimension score. By the 12-month follow-up, the impact of illness on the program participants' psychosocial functioning was significantly less (5.52 vs. 7.05, $p \leq .05$) when compared to the impact on the control group. When category scores of the SIP psychosocial dimension were examined, program participants experienced significantly less impact of illness than control group members on two specific aspects of psychosocial functioning, that is, their emotional behavior, including areas such as nervousness, irritability, feelings of hopelessness, and fright (4.80 vs. 6.82, $p < .05$) and on their alertness, including areas such as forgetting, becoming confused, and having difficulty reasoning (7.36 vs. 10.98, $p < .01$) at 12 months.

SYMPTOM-RELATED OUTCOMES

Table 2 presents the postprogram symptom experience of the study population, adjusted for their preprogram scores. There were changes in the frequency of symptoms. Immediately following the intervention, at the two-month assessment, program participants experienced symptoms of all types significantly less frequently than the control group (16.39 vs. 18.03, $p < .05$). Symptom severity was also altered. Just subsequent to the intervention, at the two-month assessment,

TABLE 1
Total Score, Dimension Scores, and Psychosocial Categories of the Sickness Impact Profile (SIP): Program Participant and Control Group Follow-up Scores[a]

	Baseline (N = 636)		*2 Months (N = 529)*		*12 Months (N = 472)*		*18 Months (N = 455)*	
Outcome Measure	*Program*	*Control*	*Program*	*Control*	*Program*	*Control*	*Program*	*Control*
SIP total score	8.46	8.97	7.38	7.32	7.26	8.09	7.93	7.41
Physical dimension	6.25	6.53	5.55	5.20	5.89	6.00	6.40	5.25
Psychosocial dimension	6.70	7.37	5.70	6.03	5.52	7.05*	6.05	6.23
Emotional behavior	6.87	7.53	5.48	6.01	4.80	6.82*	5.35	7.18
Social interaction	6.78	7.29	5.70	6.17	5.85	6.96	6.15	6.02
Alertness	9.51	9.98	7.86	8.37	7.36	10.98**	8.96	8.42
Communication	3.34	4.58	3.38	3.50	3.42	3.40	3.28	3.48

a. Adjusted for corresponding baseline score. No six-month data were collected for the SIP.
*$p \leq .05$. **$p \leq .01$.

program participants experienced significantly less severe symptoms of all types compared to the control group (15.67 vs. 17.65, $p \leq .05$). By the six-month data collection point, program participants experienced significantly fewer (2.62 vs. 3.18, $p \leq .05$) and significantly less severe (8.17 vs. 10.09, $p \leq .05$) symptoms attributed to their cardiac condition than did the control group. No difference in symptom experience of the overall sample lasted beyond the six-month assessment point.

MALE/FEMALE DIFFERENCES IN OUTCOME

While there were no significant differences between men and women on the SIP dimension scores, there were differing effects when SIP category scores were examined. Male program participants' physical functioning compared to males in the control group was significantly better related to ambulation (6.34 vs. 8.79, $p \leq .05$), and their psychosocial functioning was significantly better related to alertness (6.41 vs. 10.23, $p \leq .05$) by the 12-month evaluation point. Men experienced much less impact of their illness on these aspects of functioning.

Two months subsequent to the intervention, scores on the ambulation subscale for women participating in the program were significantly higher than the scores of control group women (14.08 vs. 11.47, $p \leq .05$). That is, they reported greater impact of illness on their ambulation. Further, at 18 months, program women were more likely than control group women to experience greater impairment of their mobility (6.78 vs. 3.00, $p \leq .01$) measured by the SIP category subscale. Program women did less well in physical functioning than control women and program men.

Effects of the program on symptom experience of male and female participants also differed. Table 3 indicates that by the six month follow-up, program men had fewer total symptoms (3.45 vs. 4.18, $p \leq .05$), less frequent symptoms (14.91 vs. 17.52, $p < .05$), and less severe symptoms (13.56 vs. 16.96, $p \leq .01$) of all types compared to control group men. They also had fewer (1.87 vs. 2.88, $p \leq .01$) and less severe (6.03 vs. 9.00, $p < .01$) cardiac symptoms than men in the control group. Symptoms of all types for program men remained fewer at the 12-month follow-up (3.57 vs. 4.20, $p < .05$). No differences in

TABLE 2
Symptom Experience: Program Participant and Control Group Follow-Up Mean Scores[a]

	Baseline (N = 636)		*2 Months[a] (N = 529)*		*6 Months[a] (N = 506)*		*12 Months[a] (N = 472)*		*18 Months[a] (N = 455)*	
Symptom Experience	*Program*	*Control*	*Program*	*Control*	*Program*	*Control*	*Program*	*Control*	*Program*	*Control*
Number of symptoms										
Total	5.15	4.95	4.46	4.74	4.40	4.81	4.40	4.69	4.28	4.71
Cardiac	3.18	2.85	2.77	2.93	2.62	3.18*	2.57	2.75	2.39	2.71
Frequency of symptoms										
Total	18.07	16.93	16.39	18.03*	16.78	18.37	15.75	17.05	16.80	17.91
Cardiac	10.54	9.21	8.89	9.49	8.55	9.73	8.22	8.59	8.06	8.98
Severity of symptoms										
Total	17.19	15.77	15.67	17.65*	16.24	18.19	15.21	16.95	15.86	17.71
Cardiac	10.28	8.69	8.42	9.42	8.17	10.09*	7.97	8.72	7.56	9.04

a. Adjusted for corresponding baseline score.
*$p \leq .05$.

TABLE 3

Symptom Experience: Program Participant and Control Group Follow-Up Mean Scores, by Male Gender[a]

	Baseline (N = 372)		*2 Months* (N = 318)		*6 Months* (N = 304)		*12 Months* (N = 285)		*18 Months* (N = 271)	
Symptom Experience	*Program*	*Control*	*Program*	*Control*	*Program*	*Control*	*Program*	*Control*	*Program*	*Control*
Number of symptoms										
Total	4.26	4.25	3.56	3.84	3.45	4.18*	3.57	4.20*	3.81	3.90
Cardiac	2.83	2.53	2.32	2.67	1.87	2.88**	2.21	2.80	1.97	2.45
Frequency of symptoms										
Total	15.73	15.10	14.50	15.34	14.91	17.52*	13.55	15.55	15.36	15.32
Cardiac	9.27	8.20	7.71	8.34	6.57	8.86	7.26	8.70	6.72	7.77
Severity of symptoms										
Total	14.33	13.24	13.16	15.09	13.56	16.96**	12.90	14.93	14.30	15.11
Cardiac	8.78	7.53	7.13	8.40	6.03	9.00**	7.00	8.75	6.29	7.88

a. Adjusted for corresponding baseline score.

*$p \leq .05$. **$p \leq .01$.

symptoms were evident among women until the 18-month assessment when program women had fewer symptoms of all types than control group women (4.97 vs. 6.00, $p < .05$).

Discussion

The outcomes in this study suggest a sequential pattern of early changes in symptoms and later effects on functioning. At 2 months postbaseline, effects related to global symptoms were evident among program participants. Initially, that is, participants reported reductions in their symptoms of all types. By 6 months, symptoms specifically attributed to heart disease were fewer in number and less severe. By 12 months, psychosocial functioning was better (and, for men, there were modest signs of improved ambulation).

Other patterns were evident. First, effects on functioning decayed between 1 year and 18 months. Second, significant symptom abatement was experienced early on but was no different between groups by the 12-month assessment. Third, men appeared to benefit from the intervention more than women. In addition to better psychosocial dimension scores than control group men, male participants had significant if modest gains in ambulation. Program men also had a more distinct pattern of symptom abatement with effects emerging at 6 months and lasting up to 1 year postintervention. Women, on the other hand, had declines in aspects of their physical functioning, that is, poorer scores related to ambulation and mobility.

There may be programmatic explanations for the male-female differences seen in physical functioning. For example, a significantly higher percentage of men than women chose exercise as the focus for self-management learning (39% vs. 25%, $p < .05$) in the program. Attention to exercise could be expected to improve ambulation. There are several other possible explanations for why this benefit did not accrue to program women. For example, they had significantly more arthritis than control group women, and worsening of this condition by the 18-month evaluation point could have accounted for the reductions observed in their mobility. The program may also have failed to assist women with physical functioning in a way that they found adequate. Even when they experience physical improvements, re-

search has shown that women have higher dropout rates in formal cardiac rehabilitation programs than do men (Murdaugh and O'Rourke 1988). Unique barriers to exercise for women, for example, dealing with comorbidity (especially arthritis) and safety while walking outside, may not have been sufficiently addressed. Another possibility is that program group women experienced more significant heart disease that prevented them from optimal physical functioning. However, we have no evidence of differential physical changes in heart disease for control and intervention group women. Perhaps differing results were due to differing male-female expectations. For example, program activities may have engendered social comparisons. During the intervention program, women may have observed less constrained ambulation among their male counterparts and changed their views of their own ability by comparison. They may have come to view their own functioning as less robust than that of men.

Implications

There are both programmatic and measurement implications in this study for future work.

PROGRAMMATIC

First, programs that address the unique needs of older women with heart disease, especially problems they face related to their physical functioning, seem warranted. Self-management skills needed by men and women have been described in recent work (Clark et al. 1992a; Sharpe, Clark, and Janz 1991) that suggests that obstacles to effective heart disease management are, to some extent, gender related. Tailored self-management education and delivery of programs to women and men separately may enhance skill development and obviate inadvertent and inappropriate social comparisons between the sexes.

Second, absence of findings in a major study variable (i.e., physical functioning) and decay of outcomes over time (i.e., after 12 months) suggest the need for an intervention of greater power. The short-lived nature of some of this intervention's effects has been observed in other research, particularly research related to exercise adherence, where

dropout rates of approximately 50% have been observed by six months following the intervention (Cosmoss 1988; Steinhaus et al. 1990). Emery and Blumenthal (1990) found perceived positive effects of an exercise intervention to be transitory, while Buchner et al. (1992) stressed the need for programs that demonstrate that effects of exercise interventions can be sustained over time. This research suggests that there may be gender effects to consider in evaluations. It may be that a program of longer duration that focuses more emphatically on how to maintain newly developed self-management skills may lead to more sustained outcome. In addition, booster or follow-up sessions at strategic times when motivation begins to wane, or new behavior has not yet become habit, may enhance sustainability. Data from King et al. (1988) suggest one form of booster. In that research, baseline instruction followed by continuing telephone contact helped people adapt new behavior through self-monitoring of a type similar to the process used in the intervention reported here.

MEASURES

Functional status measures, like the SIP used in this research, may be less sensitive to deterioration than improvement (Deyo and Diehl 1983; MacKenzie et al. 1986). The ceiling effect apparent with these measures (McColl et al. 1995) may preclude observation of change that occurs among participants who are functioning at fairly high levels at baseline. Combining the SIP with such measures as direct observation of ambulation or mobility as well as more disease-specific measures may increase the opportunity to document effects. In addition, the SIP and other standardized measures have been criticized for their emphasis on negative versus positive aspects of functioning. This bias may have particular significance in studies of women's health behavior and status. Shumaker and Czajkowski (1993) have noted that there may be gender differences in reports of positive and negative stressful events, social experiences, and emotions. Specifically, women experience and report more positive affect than men. As these investigators also observe, most studies in populations with cardiovascular disease have focused on the negative aspects of functioning, precluding the opportunity to determine if perceptions of deterioration are offset in any way by perceptions of improvement.

Finally, evaluations of interventions similar to this one may need to follow participants for at least one year and preferably 18 months to be able to adequately assess patterns of change and the point of diminishing returns. Ultimately, we need to determine which programs are effective for which subpopulations of the elderly and how long-lasting results are. Longitudinal studies are critical to address the question of duration of effect.

Conclusion

Positive outcomes related to the critical aspect of psychosocial functioning of older men and women were associated with this self-management education program. Men also exhibited modest improvements in one area of their physical functioning. Better functional health status as well as life with fewer and less severe symptoms are important benefits for older adults in their efforts to maintain their independence and manage heart disease.

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