Does Self-Management Lead to Sustainable Health Benefits in People with Arthritis? A 2-year Transition Study of 452 Australians

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ABSTRACT. ***Objective.*** To evaluate the Arthritis Self-Management Course (ASMC) when applied in a nationwide context.

Methods. Four hundred fifty-two people who participated in the ASMC across Australian states took part in a longitudinal followup study. ASMC is a 6 week, 2 h group educational program designed to assist people with chronic illness to better manage their condition. Measures of program effectiveness included health status and service utilization. Data were collected on 3 occasions: before intervention (baseline) and 6 months and 2 years after the program.

Results. Several indicators of health status showed improvement at 6 months following the ASMC. These included reduction in pain (4%; $p < 0.001$), fatigue (3%; $p < 0.01$), and health distress (12%; $p < 0.001$) as well as increase in self-efficacy (6%; $p < 0.001$). Increased self-efficacy was a significant predictor of positive change in health status. Health-related behaviors such as aerobic exercise also increased, with the proportion of people who did little or no exercise decreasing by up to 8%. These changes were sustained at 2 years. There was an increase in use of analgesics at 6 months and an increase in use of nonsteroidal antiinflammatory drugs at 2 years. No changes in healthcare utilization (physician visits, allied health visits, and hospitalizations) were observed.

Conclusion. The ASMC is a widely applied program in which participants benefit through a reduction in pain, fatigue, and health distress. Although the absolute changes in health status are small, the low cost and wide application of the intervention suggests the program may have a substantial public health effect. (First Release Mar 1 2007; J Rheumatol 2007;34:1112–7)

Key Indexing Terms:
SELF-MANAGEMENT ARTHRITIS HEALTH OUTCOMES FOLLOWUP

There is now increasing evidence that self-management programs can affect individuals within the research setting, but there is limited experience of how these programs translate into broader community settings. Self-management programs such as the Arthritis Self-Management Course (ASMC) have gained increasing acceptance and have been incorporated into many clinical guidelines[1]. Evaluations of these interventions, including randomized trials, have indicated that participants experience a variety of benefits, including increased self-efficacy[2,3]; however, a recent metaanalysis of studies of people with arthritis found that benefits were predominantly in the psychological domains[4].

Few studies have examined the longterm benefits of self-management. Studies by Lorig, *et al* in North America in both the ASMC and the general Chronic Disease Self-Management Program (CDSMP) have reported a decrease in physician visits[2,3], while another demonstrated a reduction in hospitalization but no significant change in physician visits[5].

There is an important role for self-management programs if they can increase quality of life while reducing healthcare utilization in a more general population. Very few data showing the efficacy of the self-management programs have been generated outside North America. For example, randomized controlled trials into the benefit of self-management programs have been undertaken in the UK and Australia, but the results showed only modest benefits[6,7]. Although it could be argued that cultural differences may mitigate against the transportability of the program and the associated health outcomes, programs run with Spanish-speaking people with arthritis in North America and Mandarin-speaking people in China have

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demonstrated health benefits of the self-management programs in these populations[8,9].

Amid increasing endorsement of self-management programs in many countries other than the US, we conducted a large longitudinal translation study of the ASMC to evaluate its potential benefits in an Australian population. Our aim was to measure the magnitude of improvement in health outcomes, sustainability, and the effect of the program across population subgroups.

MATERIALS AND METHODS

In Australia, the ASMC has been offered since 1985 through state and territory arthritis foundations. Leaders for the courses are all trained in Australia and course participants mostly enter the program through community advertisements and word of mouth; some may be referred to the program by their doctor. Courses were implemented from arthritis foundations or community health centers, leaders were voluntary, and participants were typically charged a minimal fee that covered the cost of the course book and catering.

Participants were recruited between October 1998 and July 1999 and completed a questionnaire immediately prior to the course, and at 6 months and 2 years after the course. As this was a voluntary cohort, the total number of eligible participants was not ascertained. Local authorities also indicated that the majority of those people undertaking the course at the time did participate in the survey. A total of 452 people took part. The mean age was 62.8 years, 81% were women, 60% reported osteoarthritis as their primary health condition, and 53% reported having at least one other major health problem (Table 1). The majority of participants (72%) had an Australian or New Zealand background, 19% had UK backgrounds, and 5% had European backgrounds, while the remaining 4% had Asian, American, African or Indian/Pakistani backgrounds. Seventy-eight percent of the participants attended at least 5 of the 6 course sessions. The response rate for posted followup questionnaires was 89.4% at 6 months, and 67.3% at 2 years.

Measures. The efficacy of the ASMC was assessed using a variety of questionnaires. In addition to questions about demographic factors and arthritis diagnosis, questions also covered self-reported health services utilization, medication use, pain and fatigue self-efficacy, general health, function, and healthy behaviors. Healthcare utilization was recorded for the previous 6 months, including visits to doctors, physiotherapists, and complementary and alternative practitioners (including chiropractors, osteopaths, and naturopaths), and time spent in hospital. Medication use was recorded for the previous week.

A 10-point visual analog scale was used to measure fatigue and pain. Self-efficacy was measured using 4 items from the original 8-item Stanford scale, 2 of which covered self-efficacy to manage symptoms (fatigue and pain), and 2 self-efficacy to manage the disease in general (distress and daily activities)[10]. Response options were anchored by "not at all confident" (1) and "totally confident" (10). For each respondent, an overall self-efficacy score was obtained as the mean of the 4 items. A reduced item scale was chosen so as to reduce the burden on respondents and possible item redundancy (the original scale had a Cronbach alpha reliability of 0.94). Items were removed after consideration of clinimetric and face validity factors. The Cronbach alpha for the 4-item scale was 0.92, indicating very high reliability. A positive change in self-efficacy was defined as an increase of at least 0.25 in the mean self-efficacy change score, corresponding to a change of at least 1 unit on one of the 4 self-efficacy items.

Table 1. Baseline characteristics of participants attending an Arthritis Self-Management Course (n = 452).

Characteristic	Distribution
Age, mean (SD) yrs	62.8 (12.4)
Sex, % female	81
Education, mean (SD) yrs	11.5 (3.4)
Marital status, % married or de facto	66
Diagnosis (%)	
Osteoarthritis	60
Rheumatoid arthritis	19
Other/unknown	21
Other major health problem (%)	53

Health distress was assessed using a 4-item scale from the Medical Outcomes Study[11]. The overall health distress score for each participant was calculated as the mean of the 4 items composing this scale. The items included "Were you discouraged by your arthritis problems?" and "Were you fearful about your future health?" Response options were anchored by "all of the time" (1) and "none of the time" (6). Social/Role Activities Limitations Scale [termed activities of daily living (ADL) role limitations] were measured by the Stanford 4-item scale that covers social activities, recreation, household chores, and shopping[11]. Healthy behaviors were assessed through questions that covered range of motion exercises and aerobic activities including walking[11]. The respondents were classified according to exercise frequency categories: nil, < 30, 30–60, 60–180, and > 180 min.

Disability was assessed using the Modified Health Assessment Questionnaire (HAQ)[12]. The participants completed the questionnaires before the program commenced (baseline) and then 6 months and 2 years after the program.

Statistical methods. The effect of the self-management program was assessed by calculating change scores from baseline to followup. Change was calculated such that positive scores represented an increase in the attribute being measured, whereas negative scores represent a decrease.

The nonparametric Wilcoxon sign-rank test was used to compare change from baseline to 6 months and 2 years as most variables were non-normally distributed. If the distribution reasonably approximated the normal distribution (e.g., self-efficacy change score) comparisons were made using the paired t test. The magnitude and direction of change was assessed using the standardized effect sizes (ES), calculated by dividing mean change score by pooled standard deviation. The Wilcoxon sign-rank test was used to investigate whether a change in self-efficacy was associated with demographic factors. The Kruskal-Wallis test was used to explore association between number of ASMC sessions attended and change in self-efficacy.

Logistic regression was used to model relationships between self-efficacy change and measures of health status, health-related behavior, and service use. A dichotomous outcome of positive self-efficacy change at 6 months versus zero or negative change was used as the dependent variable. Separate analyses were undertaken for each measure, with 6-month and baseline scores of the variable of interest included as covariates in addition to age, sex, education level, and course attendance. To model an association between self-efficacy and visits to physicians, physiotherapists, or alternative practitioners, a dichotomous dependent variable was created for each type of health professional, with a positive value indicating greater-than-median number of visits in the previous 6 (or 24) months. McNemar's test was used to examine change in medication use between baseline and followup.

Forty-four participants had some incomplete questionnaire data at both 6 months and 2 years and 104 participants had missing data at 2 years only. Four participants had missing responses at 6 months, but had completed questionnaires at 2 years. Where appropriate, chi-square tests of association, analysis of variance, and Kruskal-Wallis tests were used to compare respondents who had missing data with those who had complete data on demographic characteristics and outcome variables. There were no significant differences between these 2 groups of participants on any of the variables, so the conservative last-value-carried-forward method to impute missing data was used[13]. All analyses were undertaken using SPSS version 11.

RESULTS

Change in health status, health-related behavior, and service utilization. Baseline values, 6-month change, and 2-year

change are summarized in Table 2 and Figure 1. Improvement in 4 of the 6 health status measures was observed between baseline and 6 months. At 6 months, pain, fatigue, and health distress declined significantly, with the changes sustained at 2 years. ADL role limitations, on the other hand, showed no change between baseline and 6 months followup, but were significantly lower at 2 years followup. There was an increase in self-efficacy between baseline and 6 months (6.0% of scale range) that was still evident at 2 years followup (5.0%). There were no significant changes in health services utilization over the study period.

The mean time spent doing aerobic activity was significantly higher at 6 months than at baseline and remained higher at 2 years (Table 2). The effect of the program on the outcomes under consideration was greater at 6 months than at 24 months, as indicated by considerably higher effect sizes. The program had a moderate effect on health distress (ES = –0.64), and somewhat smaller effects on activity (ES = 0.24), range of

Table 2. Baseline and change scores at 6 months and 2 years for outcome variables*.

Outcome Measures	Baseline, Mean (SD)	6 Months Mean (SD)	6 Months Change**	6 Months ES†	6 Months Z (p)†	2 Years Mean (SD)	2 Years Change**	2 Years ES†	2 Years Z (p)
Self-efficacy	6.0 (2.4)	6.6 (2.3)	5.4	0.23	4.93 (< 0.001)	6.5 (2.4)	5.2	0.22	4.79 (< 0.001)
Fatigue	5.3 (2.7)	5.0 (2.5)	–3.0	–0.12	–3.26 (< 0.01)	5.1 (2.7)	–2.5	–0.09	–2.54 (< 0.05)
Pain	5.4 (2.6)	5.0 (2.7)	–4.5	–0.20	–4.42 (< 0.001)	4.8 (2.8)	–6.1	–0.25	–5.07 (< 0.001)
Health distress	2.5 (1.3)	1.7 (1.3)	–12.3	–0.64	–12.0 (< 0.001)	1.7 (1.3)	–13.2	–0.68	–12.5 (< 0.001)
HAQ disability	0.48 (0.43)	0.46 (0.42)	–0.5	–0.08	–1.2 (0.23)	0.47 (0.43)	–0.3	–0.05	–0.6 (0.56)
ADL role limitations	1.2 (1.1)	1.3 (1.1)	1.8	0.08	1.8 (0.07)	1.1 (1.1)	–2.0	–0.14	–2.9 (0.004)
General health	3.0 (1.0)	3.1 (0.9)	1.7	0.13	2.2 (0.03)	3.1 (0.9)	1.7	0.12	2.3 (0.02)
Doctor visits/6 mo	1.27 (0.64)	1.26 (0.72)	–0.02	–0.03	–0.66 (0.51)	1.27 (0.71)	0.0	0.01	–0.26 (0.19)
Physiotherapist visits/6 mo	0.47 (0.77)	0.40 (0.72)	–0.07	–0.09	–2.1 (0.04)	0.36 (0.70)	–0.12	–0.13	–2.8 (0.005)
Alternative medicine visits/6 mo	0.31 (0.58)	0.32 (0.61)	–0.01	–0.01	–0.16 (0.87)	0.33 (0.64)	–0.03	–0.05	–0.89 (0.37)
Hospital stay during the last 6 mo	0.14 (0.35)	0.11 (0.31)	–0.03	–0.08	–1.69 (0.09)	0.11 (0.31)	–0.03	–0.07	–1.39 (0.16)
Nights in hospital/6 mo	0.20 (0.59)	0.15 (0.51)	–0.05	–0.07	–1.43 (0.15)	0.16 (0.52)	–0.04	–0.06	–1.2 (0.23)
Range of motion exercise	1.0 (1.2)	1.3 (1.2)	6.0	0.24	5.2 (< 0.001)	1.2 (1.2)	4.0	0.12	3.0 (0.003)
Aerobic walking	1.7 (1.3)	2.0 (1.3)	6.0	0.24	5.1 (<0.001)	2.0 (1.3)	6.0	0.24	5.0 (< 0.001)
Total aerobic activity	2.7 (2.2)	3.2 (2.3)	2.5	0.24	5.1 (< 0.001)	3.2 (2.3)	2.5	0.22	4.5 (< 0.001)

* Scale range: self-efficacy 1 to 10; pain, fatigue 0 to 10; health distress, general health 0 to 5; HAQ 0 to 3; ADL role limitations 0 to 4; walking and range of motion 0 to 4; total aerobic activity 0 to 20. A higher score for fatigue, pain, health distress, general health, ADL role limitations, and disability indicates worse health. ** Change scores are represented as percentage change of the scale range. † ES (effect size) = mean divided by pooled standard deviation.

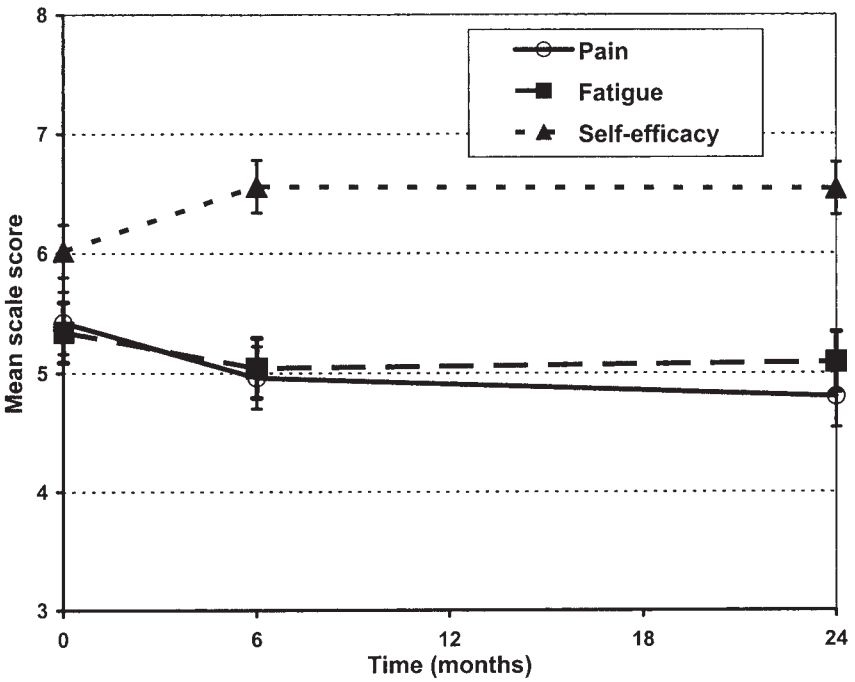

Figure 1. Changes in self-efficacy, pain, and fatigue in ASMC participants over 6 months and 2 years.

motion exercise (ES = 0.24), aerobic walking (ES = 0.24), total aerobic activity (ES = 0.24), self-efficacy (ES = 0.23), and pain (ES = 0.20). The pattern of the results was largely similar at 2 years.

Minor increases in medication use were observed over the study period (Table 3). Use of nonsteroidal antiinflammatory drugs did not differ between baseline and 6 months followup, but was significantly higher at 2 years, with an increase of 12%. The use of analgesics was significantly higher at 6 months than at baseline (31% and 38%, respectively), but dropped to near baseline levels at 2 years (35%). There were no significant changes in the frequency of taking other medications over the study period (Table 3).

The program appeared to have beneficial longterm effects on healthful behaviors. At baseline, 100 (22%) participants did no aerobic walking, compared with only 74 (16%) at 6 months. In contrast, only 128 (29%) of the participants engaged in 60 minutes or more of aerobic walking at baseline compared with 180 (40%) at 2 years (McNemar's test: chi-square = 37, $p < 0.001$; Table 4).

Associations between self-efficacy change and demographic variables, health outcomes, and service use. Increase in self-efficacy was observed for 222 (49%) participants at 6 months and for 233 (52%) at 2 years. To explore whether changes in self-efficacy were influenced by background characteristics, the association between demographics and changes in self-efficacy from baseline to 6 months or 2 years was explored. Change in self-efficacy was unrelated to sex (Wilcoxon rank-sum Z = 1.46, p = 0.2), age (Z = –0.67, p = 0.5), years of education (Z = –0.8, p = 0.4), or ethnicity (Z = –0.83, p = 0.4). Change in self-efficacy was, however, associated with program attendance. At 6 months, a strong positive association was found between the number of sessions attended and an increase in self-efficacy (Kruskal-Wallis chi-square = 14.6, $p < 0.001$). About 57% of those who attended all of the 6 sessions reported an increase in self-efficacy. The proportion who improved decreased monotonically for those who attended 5 through to one session (45%, 43%, 33%, 25%, and 23%, respectively). The pattern of the results was similar at 2 years (data not shown).

Increased self-efficacy was associated with positive changes in several self-reported health outcomes (Table 5). After adjustment for baseline self-efficacy and background factors (age, sex, education, and course attendance), those who reported an increase in self-efficacy also reported less pain, fatigue, HAQ disability, health distress, and ADL role limitations at 6 months. Self-efficacy was not associated with general health, exercise, or health services utilization at 6 months.

DISCUSSION

The findings of this 2-year longitudinal study indicate that the ASMC leads to sustained improvement in health status. Participants experienced reduced levels of pain and fatigue, with decreased role limitations, and a reduction in health distress. At the same time, no progression was seen in disability. About half the participants reported a positive change in self-efficacy, with self-efficacy being a significant predictor of improvements in health status. The overall reduction in pain and fatigue was small (up to 6% of the scale range). While this

Table 3. Frequency of use of medications and change over 2 years.

	Baseline,		6 Months,		6 Month Change		2 Years,		2 Year Change,	
	n	%	n	%	%	p	n	%	%	p
NSAID	154	34.1	155	34.3	0.2	0.9	210	46.5	12.4	< 0.001
Analgesics	141	31.2	173	38.3	7.1	0.002	156	34.5	3.3	0.19
Slow acting antirheumatic drugs	67	14.8	71	15.7	0.9	0.48	71	15.7	0.9	0.56
Cortisone	36	8	40	8.9	0.9	0.54	37	8.2	0.2	1.00
Narcotics	24	5.3	33	7.3	2.0	0.12	35	7.7	2.4	0.07
Aspirin	8	1.8	12	2.7	0.9	0.45	10	2.2	0.4	0.81

NSAID: nonsteroidal antiinflammatory drugs.

Table 4. Change in physical activity from baseline to 2 yrs.

		Aerobic Exercise Walking 24 Months (min)					
		Nil	< 30	30–60	60–180	> 180	Total
Aerobic exercise walking baseline (min)							
Nil	N (%)	44 (44)	20 (20)	19 (19)	13 (13)	4 (4)	100 (22)
< 30	N (%)	14 (13)	50 (45)	22 (20)	14 (13)	10 (9)	110 (24)
30–60	N (%)	12 (11)	21 (18)	43 (37)	25 (22)	13 (11)	114 (25)
60–180	N (%)	2 (3)	6 (8)	10 (13)	35 (47)	22 (29)	75 (17)
> 180	N (%)	2 (4)	4 (8)	3 (6)	14 (26)	30 (57)	53 (12)
Total	N (%)	74 (16)	101 (22)	97 (22)	101 (22)	79 (18)	452 (100)

Table 5. Association between change in self-efficacy and health status, health-related behavior, and service use.

	Baseline Score	Mean 6-Month Score			
	Mean (SD)	Positive Change in Self-efficacy (n = 222)	Zero or Negative Change in Self-efficacy (n = 230)	Adjusted OR*	95% CI
Pain	5.4 (2.6)	4.7	5.2	0.80	0.72–0.89
Fatigue	5.3 (2.7)	4.9	5.2	0.83	0.74–0.92
General health	3.0 (1.0)	3.11	3.14	0.77	0.58–1.03
Health distress	2.5 (1.3)	1.60	1.89	0.60	0.48–0.74
HAQ disability score	0.48 (0.43)	0.42	0.50	0.20	0.10–0.40
ADL role limitations	1.2 (1.1)	1.2	1.4	0.61	0.48–0.77
Range of motion exercise	1.0 (1.2)	1.5	1.2	1.26	1.06–1.50
Walking for exercise	1.7 (1.3)	2.2	1.9	1.35	1.13–1.61
Total aerobic activity	2.7 (2.2)	3.3	3.2	1.09	0.98–1.21
Doctor visits in last 6 mo	5.9 (6.7)	5.6	5.9	1.01	0.97–1.05
Physiotherapist visits in last 6 mo	2.3 (5.4)	1.9	1.7	1.02	0.98–1.07
Alternative practice visits in last 6 mo	1.23 (3.8)	1.4	1.4	0.97	0.91–1.04
Hospital stays in last 6 mo	0.20 (0.83)	0.15	0.12	1.21	0.79–1.86
Nights in hospital in the last 6 mo	0.9 (3.4)	0.68	0.68	1.01	0.94–1.09

* OR: odds ratio, adjusted for age, sex, education level, course attendance, baseline self-efficacy, and baseline dependent variable. ADL: activities of daily living.

may appear to be a clinically minor reduction, people undertaking the ASMC were a community-based cohort already receiving routine care. At the population level, the benefits are likely to be substantial, since the program is relatively inexpensive, as it is run in the community/volunteer sector and could potentially be applied to a large number of people.

The results clearly indicate that adherence to the course, i.e., participation in a majority of the 6 sessions, is a strong predictor of an increase in self-efficacy, which, in turn, is associated with improvements in health outcomes. Importantly, the ASMC displayed cross-demographic consistency with no association between changes in self-efficacy and demographic variables such as age, sex, education level, and ethnicity. This finding implies that the program's effect is consistent across population subgroups and is consistent with recent studies in people who speak languages other than English[8,9].

An important finding of our study is that the proportion of people who were doing no aerobic walking declined from 22% to 16% from baseline to 2 years. In people with one or more chronic diseases and an average age of 62.3 years, it might be expected that activity would reduce over the 2-year period. Our results suggest that the ASMC might be an important source of information and motivation for positive change in health behaviors and consequently, higher levels of activity.

Our study found no association between self-efficacy and healthcare utilization. The participants were self-selected for participation in a community-based program. About half reported at least one other significant illness in addition to their arthritis. Therefore, for many participants it may not be appropriate or desirable to reduce healthcare utilization. An important aim of the ASMC is to facilitate better care through improved communication between patients and doctors, and more effective application of self-care behaviors. For some patients this may lead to increased health service use, whereas for others the effect may be the opposite. Further research is required to investigate the possible association between the quality of consultations with health professionals and changes in the use of healthcare services.

An important limitation of our study is the lack of a control group. It has become increasingly difficult to undertake large controlled studies of readily available and popular interventions as they are often delivered by community organizations (e.g., arthritis foundations). A further difficulty is that blinding of participants in a control group is not practical, particularly when the program is widely promoted to clinicians and the public. A useful alternative research design to observe short-term effects is randomization to a wait-list group. This design has been used successfully in similar settings, with the control group receiving the intervention 6 months later[3,5,8]. In our study, the participants were self-selected, reasonably well educated, and clearly motivated enough to enroll in an education program. Those participants who reported improvements in self-efficacy were more likely to report health gains. This at least provides some supportive evidence that the health gains observed in this sample can be attributed to the ASMC. The changes we report in self-efficacy, health outcomes, and health-related behavior are similar to those reported in controlled trials[2,5,8,9,14]. The main expected gains from groups-based self-management interventions are likely to be in psy-

chosocial domains, and future studies would be improved through the use of questionnaires that comprehensively assess patient outcomes in this area[15].

Our evaluation of the ASMC indicated that the program produces sustained health benefits and improvements in healthful behaviors. Although average program benefits were small, they constitute a valuable contribution at the population level, which is a principal aim of the ASMC.

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