

Improvements Following Short Term Home Based Physical Therapy Are Maintained at One Year in People with Moderate to Severe Rheumatoid Arthritis

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ABSTRACT. Objective. We previously demonstrated the efficacy of a 6 week home based physical therapy (PT) intervention for people with moderate to severe rheumatoid arthritis (RA). This followup study determined if short term improvements were maintained to one year.

Methods. Participants in the short term study were randomly assigned to receive a PT intervention (education, exercise, and pain relief modalities) delivered by physiotherapists with advanced rheumatology training (Weeks 0 to 6) or to a wait list control group. The control group received the intervention between Weeks 6 to 12. Outcome measures included the Stanford Arthritis Self-Efficacy Scale (SES), the Arthritis Community Research and Evaluation Unit Rheumatoid Arthritis Knowledge Questionnaire (KQ), and a visual analog scale for pain. Disease activity measures (tender joints, grip strength, and morning stiffness) were also included. MANOVA was used to compare within-subject scores at baseline and at 12 and 52 weeks. Paired t tests were used to determine if 12 week changes were maintained at 52 weeks.

Results. Of the 127 protocol completers, 117 (92.1%) were available for the one year followup. For those measures that showed significant improvement in the randomized controlled trial (SES, KQ, morning stiffness), improvements at 12 weeks were maintained at 52 weeks ($p > 0.010$).

Conclusion. Subjects who participated in a short term home based PT intervention delivered by specially trained therapists reported improved outcomes following treatment, and these improvements were maintained at one year followup. Future studies need to explore the relative contributions of education, exercise, home based care, therapist training, and reinforcement strategies in improving longterm outcomes in RA. (J Rheumatol 2001;28:165-8)

Key Indexing Terms:

PHYSICAL THERAPY
RHEUMATOID ARTHRITIS

HOME BASED THERAPY
OUTCOMES

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Supported by The Arthritis Society and the Health System-Linked Research Unit of the Ontario Ministry of Health.

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Submitted October 6, 1999 revision accepted July 25, 2000.

Longterm studies have shown that, in general, patients with rheumatoid arthritis (RA) deteriorate over time^{1,2}. Home based physical therapy (PT), particularly exercise interventions, may improve short term outcomes³⁻⁷; however, only one longterm (one year) study of home based exercise was identified and results were modest⁶. We reported a randomized controlled trial (RCT) to evaluate the short term efficacy of a 6 week (mean 4 hours) home based PT program of education and exercise for 150 patients with moderate to severe RA⁷. For 127 patients who adhered to the study protocol, there were significant improvements in self-efficacy, knowledge about self-management strategies, and morning stiffness in the treatment group compared to the control group at 6 weeks. By 12 weeks, both groups had received the intervention and both reported similar improvements from baseline. We report here the outcomes for the 117 patients who received the intervention and were available for one year followup. We investigated whether short term improvements were maintained at one year. The design was a prospective uncontrolled cohort study of all patients who received the intervention according to protocol.

MATERIALS AND METHODS

Details of the methods have been reported⁷. Briefly, adults with a diagnosis

of RA were randomly allocated to receive home based PT for 6 weeks (experimental group) or no treatment (wait list control group). The control group received PT during Weeks 6 to 12 and the experimental group continued with PT treatment as required. Therefore, at the 12 week assessment, all study participants had received the PT intervention.

Treatment was provided by Arthritis Society physical therapists trained in the treatment of arthritis using a self-management model. The intervention was standardized to include education about the disease and its management and individual goal setting.

Trained interviewers blinded to group assignment administered questionnaires at 0, 12, and 52 weeks. Outcome measures for the RCT included: (1) the Stanford Arthritis Self-Efficacy Scale (SES), (2) the Arthritis Community Research and Evaluation Unit (ACREU) Rheumatoid Arthritis Knowledge Questionnaire (KQ), and (3) a visual analog scale for pain [VAS(P)]. Other outcomes were included to monitor longer term changes in health status [Arthritis Impact Measurement Scales 2 (AIMS2), Sickness Impact Profile (SIP)], but were not reported in the previous article⁷. Disease activity (tender joints, grip strength, and morning stiffness) was also assessed.

MANOVA was used to compare scores at baseline and 12 and 52 weeks. Paired t tests were used to compare 0 to 12 week scores (short term change) and 12 and 52 week scores (maintenance of short term change). To adjust for multiple analyses a priori, a p value ≤ 0.001 was considered significant.

RESULTS

Of 150 randomized participants, 127 (84.6%) completed the study protocol, and of those 117 (92.1%) were available for followup at one year. There were no significant differences between patients followed to one year and those who were lost to followup ($n = 10$; $p > 0.05$) (Table 1).

During the study intervention, all participants received education about RA and its management and an individualized exercise program. The average number of visits was 4 and 39.4% of the participants required at least 2 additional visits beyond the study time frame.

Table 1. Baseline characteristics of patients followed to one year and those who were lost to followup.

	Followup Patients, n = 117, mean (SD)	Patients Lost to Followup, n = 10, mean (SD)	p*
Age, yrs	55.1 (12.8)	60.6 (17.1)	0.205*
Disease duration, yrs	6.6 (9.2)	15.1 (16.6)	0.143*
Tender joint count	31.4 (16.2)	24.0 (15.3)	0.169*
Grip strength, mm Hg [†]	116.0 (63.9)	100.2 (42.6)	0.348*
Duration of morning stiffness, min	152.4 (147.7)	108.0 (56.9)	0.445*
Self-Efficacy Scale	52.2 (19.4)	45.8 (17.3)	0.316*
Female, %	79.5	80.0	1.00**
Married/common law, %	70.9	80.0	0.898**
High school graduate, %	54.7	60.0	0.688**
Household income < \$19,999/yr, %	33.3	50.0	0.572**
Comorbidity (daily medication for other disorders), %	49.6	40.0	0.744**
Daily arthritis medication, %	82.9	90.0	0.787**

* Independent t test. ** Chi-square test. [†] Mean of both hands.

Baseline and 12 and 52 week scores are given in Table 2. For those measures that showed significant improvement in the RCT (SES, KQ, morning stiffness), improvements at 12 weeks were maintained at 52 weeks ($p > 0.010$). Longterm measures (SIP and AIMS2 subscales for mobility, walking and bending, hand and arm function, self-care and household activities, pain, tension, mood, satisfaction, perception, disease impact, physical symptoms, affect) improved between baseline and 12 weeks ($p \leq 0.001$). At 52 weeks, these improvements were maintained or continued to improve (AIMS2 pain subscale and the SIP). The VAS(P), grip strength, and number of tender joints were also improved at 12 weeks ($p < 0.001$) and continued to improve over time.

DISCUSSION

We describe the longterm outcome for a cohort of patients enrolled in a randomized controlled trial of home based PT. This cohort includes the patients in the experimental and control groups (all of whom had received the intervention by Week 12 and who were followed to Week 52). Outcomes showing significant changes in the RCT (self-efficacy, knowledge about self-management strategies, and morning stiffness) showed significant changes from baseline to 12 weeks for the combined cohort and these changes were maintained at one year. The VAS(P) and other measures, included to monitor outcomes over the longer term and not part of the short term trial protocol (SIP and subscales of the AIMS2), also showed improvements at 12 weeks, and these changes were maintained or continued to improve at one year.

Treatment in the home may facilitate learning and increase the relevance of the interventions provided⁸. As well, studies of educational interventions in RA have revealed improved outcomes, with some being maintained to one year and beyond^{9,10}. As in this study, those interventions using a self-management or goal-setting approach have been particularly effective^{2,4,11}. It has been suggested that increased self-efficacy may be the mediating factor resulting in improved health outcomes^{12,13}. Ronen, *et al* suggest that addressing psychosocial issues and involving the family may reinforce self-management strategies¹². Arthritis Society therapists addressed psychosocial issues and involved the family in treatment, and patients could self-refer for further treatment when needed. However, the role of reinforcement strategies in maintaining the benefits of educational interventions remains unclear^{12,14}.

It has been suggested that the experience of the provider may influence outcomes of treatment¹⁵. Arthritis Society physiotherapists are specially trained in the assessment and management of inflammatory polyarthritis and exclusively treat patients with arthritis. Further studies are required to establish the importance of therapist training and experience in treating this population.

Table 2. Analysis of outcomes and disease activity measures (n = 117).

Measure	n	Baseline, Mean (SD)	12 Weeks, Mean (SD)	p*	52 Weeks, Mean (SD)	p**	p***
Measures showing significant improvement compared to control group in RCT							
SES [†]	114	52.7 (19.2)	67.0 (18.6)	< 0.001	70.0 (19.3)	0.033	< 0.001
KQ [†]	115	15.7 (5.1)	19.2 (5.5)	< 0.001	19.1 (5.6)	0.872	< 0.001
Morning stiffness (min) ^{††}	112	155.4 (150.0)	83.8 (121.2)	< 0.001	62.0 (100.5)	0.040	< 0.001
Longterm outcome measures							
AIMS2 ^{††}							
Mobility	115	3.3 (2.2)	2.1 (2.1)	< 0.001	2.2 (2.2)	0.408	< 0.001
Walking	115	5.8 (2.2)	4.6 (2.6)	< 0.001	4.2 (2.8)	0.036	< 0.001
Hand function	115	4.9 (2.2)	3.1 (2.2)	< 0.001	3.0 (2.4)	0.488	< 0.001
Arm function	114	4.1 (2.2)	2.4 (2.0)	< 0.001	2.1 (2.0)	0.236	< 0.001
Self-care	115	2.1 (2.0)	0.8 (1.3)	< 0.001	0.6 (0.9)	0.007	< 0.001
Household activities	115	3.0 (2.7)	2.1 (2.4)	< 0.001	2.0 (2.5)	0.903	< 0.001
Social	115	5.7 (1.5)	5.5 (1.5)	0.160	5.2 (1.5)	0.005	0.001
Support	115	2.1 (1.8)	1.9 (1.8)	0.285	1.9 (1.9)	0.875	0.493
Pain	115	7.0 (1.8)	5.0 (2.4)	< 0.001	4.4 (2.7)	0.001	< 0.001
Tension	115	4.7 (1.7)	4.0 (1.8)	< 0.001	3.8 (1.8)	0.086	< 0.001
Mood	115	3.3 (1.6)	2.6 (1.6)	< 0.001	2.5 (1.7)	0.658	< 0.001
Satisfaction	115	5.3 (2.0)	3.7 (2.4)	< 0.001	3.2 (2.5)	0.003	< 0.001
Perception	115	5.8 (2.8)	5.0 (2.5)	0.002	4.6 (2.7)	0.042	< 0.001
Impact	113	4.9 (2.7)	3.8 (2.6)	< 0.001	3.5 (2.9)	0.124	< 0.001
Physical symptoms	114	3.9 (1.6)	2.5 (1.6)	< 0.001	2.4 (1.6)	0.128	< 0.001
Affect	115	4.0 (1.5)	3.3 (1.5)	< 0.001	3.2 (1.6)	0.201	< 0.001
Interaction	115	3.9 (1.3)	3.7 (1.3)	0.086	3.5 (1.3)	0.099	0.007
SIP ^{††}	115	154.7 (106.3)	114.3 (106.0)	< 0.001	93.3 (94.1)	< 0.001	< 0.001
Other measures							
VAS(P) ^{††}	114	60.0 (24.5)	42.8 (27.3)	< 0.001	38.5 (28.2)	0.159	< 0.001
Tender joints ^{††}	114	30.9 (16.0)	22.9 (18.2)	< 0.001	19.2 (18.2)	0.004	< 0.001
Fibromyalgia tender points ^{††}	113	6.9 (4.4)	5.9 (5.1)	0.014	5.5 (5.3)	0.220	0.002
L grip, mm Hg [†]	111	114.4 (66.9)	143.2 (71.3)	< 0.001	162.7 (77.3)	< 0.001	< 0.001
R grip, mm Hg [†]	112	114.6 (63.5)	148.2 (69.1)	< 0.001	165.1 (76.3)	< 0.001	< 0.001

* Paired samples t test comparing baseline and 12 week scores.

** Paired samples t test comparing 12 and 52 week scores.

*** MANOVA comparing baseline, 12 and 52 week scores.

[†] Higher score indicates improvement.

^{††} Lower score indicates improvement.

SES: Stanford Arthritis Self-Efficacy Scale, KQ: ACREU Rheumatoid Arthritis Knowledge Questionnaire, AIMS: Arthritis Impact Measurement Scales, SIP: Sickness Impact Profile, VAS(P): visual analog scale for pain.

A few studies have evaluated the longterm benefits of exercise^{12,14}, particularly aerobic exercises, and suggest that they may improve physical and psychosocial outcomes and decrease health care costs without exacerbating joint symptoms. Although exercise was prescribed for all participants in this study, the number who exercised regularly at an aerobic level is not known.

When interpreting the results of this study, possible alternative explanations need to be considered, particularly as there was no control group between Weeks 12 and 52. Other explanations for the sustained good outcomes include regression to the mean (patients had moderate to severe disease), the natural history of RA, and other co-interventions, including medications. A control group would help address these issues in future studies.

In conclusion, patients with moderate to severe RA who participated in short term home based physiotherapy

emphasizing self-management strategies reported improved outcomes, and these improvements were maintained at one year followup. Future studies need to explore the relative contributions of education, exercise, home based care, specialist training for therapists, and reinforcement strategies in improving longterm outcomes for patients with RA.

ACKNOWLEDGMENT

This study could not have happened without the recruitment and management expertise of Lyn Maguire. We acknowledge the dedication of our independent assessors, who ensured that visits occurred on time and data were collected accurately. We thank all participants, who allowed surveillance of their treatment and outcomes.

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