

# The benefits of yoga for rheumatoid arthritis: results of a preliminary, structured 8-week program

Humeira Badsha · Vishwas Chhabra ·  
Cathy Leibman · Ayman Mofti · Kok Ooi Kong

Received: 28 September 2008 / Accepted: 14 January 2009  
© Springer-Verlag 2009

**Abstract** The aim of this study was to measure the effects of a bi-weekly Raj yoga program on rheumatoid arthritis (RA) disease activity. Subjects were recruited from among RA patients in Dubai, United Arab Emirates by email invitations of the RA database. Demographic data, disease activity indices, health assessment questionnaire (HAQ), and quality of life (QOL) by SF-36 were documented at enrollment and after completion of 12 sessions of Raj yoga. A total of 47 patients were enrolled: 26 yoga and 21 controls. Baseline demographics were similar in both groups. Patients who underwent yoga had statistically significant improvements in DAS28 and HAQ, but not QOL. Our pilot study of 12 sessions of yoga for RA was able to demonstrate statistically significant improvements in RA disease parameters. We believe that a longer duration of treatment could result in more significant improvements.

**Keywords** Arthritis · Rheumatoid arthritis · Yoga · Exercise

## Introduction

Most patients with arthritis do not exercise regularly although it has been reported that those who exercise report less pain and have better social and physical functions [1, 2]. Studies have shown the benefits of dynamic exercise programs and Tai Chi in rheumatoid arthritis (RA) [3, 4]. There have been small studies showing that yoga is beneficial to rheumatoid arthritis and other forms of arthritis [5–7]. However, there is a lack of information on the effect of yoga on RA disease activity indices and quality of life.

In the United Arab Emirates RA patients have high disease activity. They have also been found to exercise rarely or not at all [8]. We believed that yoga would be a good form of exercise for our multi-ethnic population. However, there was a lack of sufficient evidence to support its use.

The aim of our study was to measure the effects of an 8-week, bi-weekly Raj yoga program on disease activity, disability and quality of life indices in RA patients as compared with controls.

## Methods

Patients were recruited from two rheumatology centers which are involved in the setting up of a national rheumatoid arthritis database. E-mails were sent to the patients to invite them to participate in the study. Patients were invited if their age was over 18 years, their diagnosis fulfilled the

---

H. Badsha (✉)  
Dubai Bone and Joint Center, Dubai, United Arab Emirates  
e-mail: humeira.badsha@dbaj.ae

V. Chhabra  
Prime Medical Center, Dubai, United Arab Emirates

C. Leibman  
Emirates Arthritis Foundation, Dubai, United Arab Emirates

A. Mofti  
American Hospital, Dubai, United Arab Emirates

K. O. Kong  
Tan Tock Seng Hospital, Singapore, Singapore

American College of Rheumatology (ACR) classification criteria of RA [9], they were capable of giving informed consent, and they did not have physical disabilities which would prevent them from participating in yoga. Controls were patients who were waitlisted to have yoga therapy at a later date. All patients were required to fill in the following self-report questionnaires at baseline and the completion of 12 sessions of yoga: health assessment questionnaires (HAQ), SF-36 quality of life (SF QOL), and fill in visual analog scales relating to pain, global assessment and fatigue indices. The Rheumatologists collected data on the use of disease-modifying anti-rheumatic drugs (DMARD), disease duration, demographics, disease activity score using 28 joint count (DAS28), erythrocyte sedimentation rate (ESR), at baseline and also follow-up visit after 12 sessions of yoga. Patients were given standard rheumatology care by their physicians. Controls were not treated with any extra interventions except for information about yoga and RA support groups. The main priori-defined outcomes being evaluated in the study were DAS28 and HAQ: whether there were any significant changes in these indices.

The yoga program was run in sessions of ten patients each, by a licensed practitioner with a Master's qualification in Yoga and Ayurveda. The exercises were decided on in consultation with the Rheumatologists and also with the yoga videos from the ACR. A structured program was developed consisting of stretches, strengthening, meditation and deep breathing, and was called the Vishwas–Raj yoga (©2008 Vishwas) program (Table 1; Fig. 1). Patients were required to complete 12 sessions of yoga and also were required to be able to do at least 80% of the prescribed exercises.

The sessions were for 1 h each and occurred twice a week. Patients were given exercises to be done at home. The whole program was completed in 6 weeks. Their compliance at home was monitored by telephone calls by the yoga instructor.

Data were presented as mean  $\pm$  SD (if data normally distributed) or median and range. Paired data, the outcomes before and after the study period, were analyzed using Wilcoxon matched-pairs signed-ranks test. Analyses were carried out on an intent-to-treat basis, with all available participant data included, regardless of compliance with the protocol. (factors associated with the intervention, such as class attendance and the sum and frequency of practice time over the first 2 months, were assessed within the treatment group alone, using linear regression models for the outcome.) All statistical analyses were performed using the Intercooled STATA 8.2 for Macintosh (Stata Corporation, College Station, TX, USA). A *P* value of  $<0.05$  was considered to be statistically significant. A sample size ( $n = 34$  in each arm) was calculated assuming an alpha error of 0.05, beta error of 0.20 and an effect size of 0.8 and accounting

for 5% non-completion rate, estimated from previous RA and exercise literature.

## Results

Out of 320 invited patients in the RA database, 233 did not reply. Among those who replied (87), a total of 47 patients agreed to participate: 26 yoga patients and 21 controls, for 2 months of training period. The controls were patients who were interested in yoga but were unable to commit to the schedule at the present time due to work or personal priorities. Baseline demographics were similar in both groups (Tables 2, 3). The drop-out or non-compliance rate was nil.

After completing 12 sessions, patients who underwent yoga improved in all RA disease activity parameters (Table 2). Most of these improvements in the yoga group were statistically significant, especially the HAQ scores ( $P = 0.015$ ). Quality of life (QOL) scores did not change significantly in either group (Table 2) except yoga patients had improvements in role limitations due to emotional health (Table 3).

At baseline, 70% of yoga patients and 86% of controls were on DMARDs. In the yoga group no new drugs were added and none of the patients required dosage escalation for control of the disease activity while in the control group two patients experienced flares—one patient was started on rituximab treatment and the other on etarnecept. In addition, among the yoga group, three patients discontinued corticosteroids, one discontinued etarnecept, and two discontinued methotrexate as a result of clinical improvements. These three patients who were able to reduce pharmacological therapy were compared to the rest of the group and there were no serological or das 28 or other clinical differences at baseline or at completion of the study. Patient 1 discontinued enbrel and steroid and remained on methotrexate. Patients 2 and 3 discontinued methotrexate and prednisolone, but remained on sulfasalazine.

## Discussion

We conducted an 8-week pilot study to evaluate an intervention of structured bi-weekly specially structured yoga program for rheumatoid arthritis. We looked at the impact of this program on disease activity indices, disability, quality of life, and impact on treatment. Significant benefits in disease activity scores, ability to reduce medications and, fatigue were noted.

A puzzling finding was that QOL was not much changed. We attributed this to the short study duration as well as small number of participants. Although yoga

**Table 1** Vishwas–Raj yoga (© 2008 Vishwas) for arthritis program

Week 1–2	Week 3–4	Week 5–6	Week 7–8
Chair yoga	Chair yoga	Chair yoga	Chair yoga
a. Basic stretching	a. Basic stretching	a. Basic stretching	a. Basic stretching
Sukhasm Viyam (easy postures)	Sukhasm Viyam (easy postures)	Sukhasm Viyam (easy postures)	Sukhasm Viyam (easy postures)
a. Joints rotations	a. Joints rotations	a. Joints rotations	a. Joints rotations
b. Warm-ups	b. Warm-ups	b. Warm-ups	b. Warm-ups
Asanas	Asanas	Asanas	Asanas
A. Standing	A. Standing	A. Standing	A. Standing
a. Tadasana (palm tree pose)	a. Triyak Tadasana (triangular palm tree pose)	a. Trikonasana (triangular pose)	a. Dolasana (swinging pose)
b. Veerasana (warrior's pose)	b. ArdhaChakrasana (half-wheel pose)	b. Dwikonasana (double angle pose)	b. Vrukshasana (tree pose)
B. Supine	B. Supine	B. Supine	B. Supine
a. Merudandasana (spinal column pose)	a. Merudandasana (spinal column pose)	a. Pavamuktasana (wind releasing pose)	a. Setubandhasana (bridge pose)
b. Uttan Padasana (raised foot pose)	b. Setubandhasana (bridge pose)	b. Matsyasana (fish pose)	b. Kadharasana (shoulder pose)
c. Shavasana (corpse pose)	c. Matsyasana (fish pose)	c. Shavasana (corpse pose)	c. Shavasana (corpse pose)
C. Sitting	C. Sitting	C. Sitting	C. Sitting
a. Vajrasana (thunderbolt pose)	a. Marjariasana (cat stretch pose)	a. Vajrasana (thunderbolt pose)	a. Ardhpadasana (half Lotus pose)
b. Sukhasana (Easy pose)	b. Janu Sirshasana (Head to knee pose)	b. Veerasana (Hero's pose)	b. Veerasana (Hero's pose)
D. Prone	D. Prone	D. Prone	D. Prone
a. Ardha Dhanurasana (half bow pose)	a. Bhujangasana (cobra pose)	a. Sarapasana (snake pose)	a. Dhanurasana (bow pose)
b. Ardha Shalabasana (half locust pose)	b. Ardha Shalabasana (half locust pose)	b. Makarasana (crocodile pose)	b. Supta Sahajasana (sleeping pose)
Pranayama	Pranayama	Pranayama	Pranayama
a. Kapalbhatai (basic) (frontal brain cleansing breath)	a. Kapalbhatai (basic) (frontal brain cleansing breath)	a. Kapalbhatai (frontal brain cleansing breath)	a. Bhastrika (bellow's breath)
b. Nadi Shodhana (psychic passage purification)	b. Nadi Shodhana (psychic passage purification)	b. Nadi Shodhana (psychic passage purification)	b. Morchna (fainting breathing)
c. Bhramara (humming bee)	c. Bhramara (humming bee)	c. Samaveta (together breathing)	c. Bhramara (humming bee)



**Fig. 1** Selected Vishwas Raj yoga exercises

patients had reported improvements in fatigue on the visual analog scales the SF fatigue scales did not reflect this.

**Table 2** Baseline characteristics of patients were similar in yoga and control groups

	Yoga ( <i>n</i> = 26)	Control ( <i>n</i> = 21)	<i>P</i> value
Age (years)	44.0 ± 10.0	46.2 ± 10.7	NS
Ethnicity			NS
Arab	1 (4%)	0	
Indian	18 (69%)	8 (38%)	
Caucasian	6 (23%)	9 (42%)	
Asian	1 (4%)	3 (14%)	
Symptom duration	72.4 ± 94	73.6 ± 64	NS
Lag time to initiation of treatment	9.3 ± 11.8	8.2 ± 10	NS
DMARD usage	70% (Methotrexate 38%, anti-TNF 12%)	86% (Methotrexate 47%, anti-TNF 9%)	

The biggest limitation of the study was the inability to blind Rheumatologists to the intervention. However, the study was designed to reflect daily practice where patients carry on their usual Rheumatologic care in conjunction with exercise or other modalities. An encouraging trend was observed where patients who practiced yoga were able to discontinue or reduce medications. We acknowledge the role of a possible expectation bias in many of these indices both from the Rheumatologist's evaluation and patient's perspective. In addition, the control group did not benefit from the social and emotional benefits of group exercise and interactions. Another limitation of our study was the small study size of 47 participants. In addition we were unable to reach the required sample size. This was mainly due to work commitments, patients being unwilling to commit to a rigorous exercise program, finding the location or timings inconvenient, or having no interest in exercise at the current time. However, we still find that the improvements after just 12 sessions of yoga are significant and provide valuable data on feasibility and plausibility, meriting further study.

Our series of exercises were specially designed by a Rheumatologist and certified yoga therapist with the rheumatoid arthritis patient in mind. It should be mentioned that yoga exercises should be undertaken with caution by patients with cervical or lumbar instability or limited mobility, those with rigid spines as a result of ankylosing spondylitis or any other form of deformity or severe osteoporosis. In our study we suggested modifications for those who were unable to perform or complete certain exercises.

Our small pilot study of 12 sessions of yoga for RA was the first to study the effect of yoga for RA disease parameters and especially HAQ scores. Despite the small study size, we were able to demonstrate statistically significant improvements in disease activity. Some patients in the yoga group were able to decrease or discontinue RA medications. We believe that a longer duration of treatment could result in more significant improvements and further study is warranted.

**Table 3** Changes in disease parameters at week 8

	Yoga		<i>P</i> value	Control		<i>P</i> value
	Baseline	8-week visit		Baseline	8-week visit	
Tender joint count	3.5	2.11	0.038	5	5.3	NS
Swollen joint count	3.2	1	0.003	3.9	3.8	NS
Patient global assessment (mm)	32	25	NS	26	40	NS
ESR (mm/hour)	31	27	NS	24.9	25.7	NS
DAS 28	3.9	3.3	0.021	3.8	3.9	NS
HAQ	0.8	0.49	0.0015	0.78	0.75	NS
Fatigue (mm)	34	26	NS	32	44	NS
Change in DMARD usage		Discontinuation of treatment: anti-TNF [1], corticosteroids [3], leflunomide [2], and methotrexate [1]			Initiation of treatment: anti-TNF [2]	
SF-36						
Physical functioning	65	66	NS	63	65	NS
Role limitations due to physical functioning	61	64	NS	59	48	NS
Pain	43	33	NS	39	39	NS
General health	52	53	NS	51	53	NS
Energy/fatigue	52	55	NS	51	55	NS
Social functioning	49	49	NS	50	47	NS
Role limitations due to emotional problems	73	85	NS	69	68	NS
Mental health	62	64	NS	64	63	NS

**Acknowledgments** This study was funded by the Emirates Arthritis Foundation and by an unrestricted grant from Abbott Pharmaceuticals. We would like to acknowledge Ms. Gemma Tapado for support in data entry and logistics and Freiburg Medical laboratory, Dubai, United Arab Emirates for ESR testing.

**Conflict of interest statement** None.

## References

- Der AC, Wilcox S, Watkins K, Saunders R, Evans AE (2008) Factors associated with exercise participation in adults with arthritis. *J Aging Phys Act* 16(2):125–143
- Neuberger GB, Aaronson LS, Gajewski B, Embretson SE, Cagle PE, Loudon JK et al (2007) Predictors of exercise and effects of exercise on symptoms, function, aerobic fitness, and disease outcomes of rheumatoid arthritis. *Arthritis Rheum* 57(6):943–952. doi:10.1002/art.22903
- Han A, Robinson V, Judd M, Taixiang W, Wells G, Tugwell P (2004) Tai chi for treating rheumatoid arthritis. *Cochrane Database Syst Rev* (3):CD004849
- Gaudin P, Leguen-Guegan S, Allenet B, Baillet A, Grange L, Juvin R (2008) Is dynamic exercise beneficial in patients with rheumatoid arthritis? *Joint Bone Spine* 75(1):11–17. doi:10.1016/j.jbspin.2007.04.015
- Bukowski EL, Conway A, Glentz LA, Kurland K, Galantino ML (2006) The effect of iyengar yoga and strengthening exercises for people living with osteoarthritis of the knee: a case series. *Int Q Community Health Educ* 26(3):287–305. doi:10.2190/IQ.26.3.f
- Kolasinski SL, Garfinkel M, Tsai AG, Matz W, Van DA, Schumacher HR (2005) Iyengar yoga for treating symptoms of osteoarthritis of the knees: a pilot study. *J Altern Complement Med* 11(4):689–693. doi:10.1089/acm.2005.11.689
- Raub JA (2002) Psychophysiological effects of Hatha yoga on musculoskeletal and cardiopulmonary function: a literature review. *J Altern Complement Med* 8(6):797–812. doi:10.1089/10755530260511810
- Badsha H, Kong KO, Tak PP (2007) Rheumatoid arthritis in Dubai—delayed diagnosis and low usage of disease modifying antirheumatic drugs. *Ann Rheum Dis* 66(6):835. doi:10.1136/ard.2006.068171
- Arnett FC, Edworthy SM, Bloch DA, McShane DJ, Fries JF, Cooper NS et al (1988) The American Rheumatism Association 1987 revised criteria for the classification of rheumatoid arthritis. *Arthritis Rheum* 31(3):315–324. doi:10.1002/art.1780310302