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Abstract: AIM: To measure the effects of a bi-weekly Raj yoga program on Rheumatoid Arthritis (RA) diseases activity.
METHODS: Patients were recruited among RA patients in Dubai, UAE 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.
RESULTS: 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.
CONCLUSIONS: 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.

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

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ABSTRACT

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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 function (1, 2). Studies have shown the benefits of dynamic exercises programs and Tai Chi in Rheumatoid Arthritis (RA) (3, 4). There have been small studies showing that yoga is beneficial for 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 (UAE) 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 enough 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 diseases activity, disability and quality of life indices in RA patients as compared with controls.

METHODS

Patients were recruited from 2 rheumatology centers which are involved in setting up 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 American College of Rheumatology (ACR) classification criteria of RA (9), they were capable of giving informed consent, and 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 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 10 patients each, by a licensed practitioner with a Master's qualification in Yoga and Ayurveda. The exercises were decided on in conjunction 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 called the Vishwas-Raj yoga (©2008 Vishwas) program (table 1; Figure1). 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 one hour each and occurred twice a week. Patients were given exercises to do 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±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 to 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, Texas, 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 with 26 yoga patients and 21 controls during 2 months of recruitment period. The controls were patients who were interested in yoga but unable to commit to the schedule at the present time due to work or personal priorities. Baseline demographics were similar in both groups (Table 2 and 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 2 patients experienced flares – 1 was started on rituximab treatment and the other on etarnecept. In addition, among the yoga group 3 patients discontinued corticosteroids, 1 discontinued etarnecept, and 2 discontinued methotrexate as a result of clinical improvements. These 3 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 patients had reported improvements in fatigue on the visual analog scales the SF fatigue scales did not reflect this.

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 in patients with cervical or lumbar instability or limited mobility, in 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 a 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.

ACKNOWLEDGEMENTS

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DISCLOSURES

Dr. Humeira Badsha : None

Dr. Vishwas Chhabra : None

Dr.Cathy Leibman : None

Dr. Ayman Mofti : None

Dr. Kok Ooi Kong : None

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TABLES

Table 1: Vishwas-Raj yoga (©2008 Vishwas) for arthritis program

Week 1-2	Week 3-4	Week 5-6	Week 7-8
Chair Yoga a. Basic Stretching	Chair Yoga a. Basic Stretching	Chair Yoga a. Basic Stretching	Chair Yoga a. Basic Stretching
Sukhasm Viyam (Easy postures): a. Joints rotations b. Warm-ups	Sukhasm Viyam (Easy postures): a. Joints rotations b. Warm-ups	Sukhasm Viyam (Easy postures): a. Joints rotations b. Warm-ups	Sukhasm Viyam (Easy postures): a. Joints rotations b. Warm-ups
Asanas: A. Standing: a. Tadasana (Palm Tree Pose) b. Veerasana (Warrior's Pose) B. Supine: a. Merudandasana (Spinal column pose) b.Uttan Padasana (Raised foot pose) c. Shavasana (Corpse pose) C. Sitting: a. Vajrasana (Thuderbolt pose) b. Sukhasana (Easy pose) D. Prone: a. Ardh Dhanurasana (Half Bow pose) b.Ardh Shalabasana (Half Locust pose)	Asanas: A. Standing: a. Triyak Tadasana (Triangular Palm Tree Pose) b. Ardhachakarasana (Half- Wheel Pose) B. Supine: a. Merudandasana (Spinal column pose) b. Setubandhasana (Bridge pose) c. Matsyasana (Fish pose) C. Sitting: a. Marjariasana (Cat stretch pose) b. Janu Sirshasana (Head to knee pose) D. Prone: a. Bhujangasana (Cobra pose) b.Ardh Shalabasana (Half Locust pose)	Asanas: A. Standing: a. Trikonasana (Triangular Pose) b. Dwikonasana (Double Angle Pose) B. Supine: a. Pavanmuktasana (wind releasing pose) b. Matsyasana (Fishpose) c. Shavasana (Corpse pose) C. Sitting: a. Vajrasana (Thuderbolt pose) b. Veerasana (Hero's pose) D. Prone: a. Sarapasana (Snake pose) b. Makarasana (Crocodile pose)	Asanas: A. Standing: a. Dolasana (Swinging Pose) b. Vrukshasana (Tree Pose) B. Supine: a. Setubandhasana (Bridge pose) b. Kadharasana (Shoulder pose) c. Shavasana (Corpse pose) C. Sitting: a. Ardhpadamasana (Half Lotus pose) b. Veerasana (Hero's pose) D. Prone: a. Dhanurasana (Bow pose) b. Supta Sahajasana (Sleeping pose)
Pranayama a. Kapalbhati (Basic) (Frontal brain cleansing breath) b. Nadi Shodhana (Psychic passage purification) c. Bhramara (Humming Bee)	Pranayama a. Kapalbhati (Basic) (Frontal brain cleansing breath) b. Nadi Shodhana (Psychic passage purification) c. Bhramara (Humming Bee)	Pranayama a. Kapalbhati (Frontal brain cleansing breath) b. Nadi Shodhana (Psychic passage purification) c. Samaveta (Together breathing)	Pranayama a. Bhastrika (Bellow's breath) b. Morchna (Fainting breathing) c. Bhramara (Humming Bee)

Table 2: Baseline characteristics of Patients were similar in Yoga and Control groups

	Yoga (n= 26)	Control (n=21)	p-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%)	

Table 3: Changes in Disease parameters at week 8

	Yoga			Control		
	Baseline	8-week visit	p-value	Baseline	8-week visit	p-value
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

Figure 1 Selected Vishwas Raj Yoga exercises.

Figure

Click here to download high resolution image

STANDING POSE

a. Palm Tree Pose b. Warrior's pose

FLOOR POSE

a. Bridge Pose b. Raised foot

SITTING POSE

Spinal Twist

Authors' Response to Reviewers' Comments
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HUMEIRA BADSHA

Ref.:

Ms. No. RHEI-D-08-00485
The benefits of yoga for rheumatoid arthritis: results of a structured 8-week program
Rheumatology International (Clinical and Experimental Investigations)

JAN 14 2009

Prof Lemmel,

Thanks for your useful comments. We are resubmitting our paper with answers to queries as below:

1) Reviewer #1: This manuscript should be revised to a manuscript under "preliminary results:

DONE AND TITLE ALSO MODIFIED

2) Under references nr. 4 publication is cited with the indication "WITHDRAWN" such an publication is not citable:

REFERENCE 4 HAS BEEN CHANGED

3) Have the patients bee evaluated by questionnaire or by clinical investigation ? For DAS joints have to be investigated, Who has done this?:

YES, PLEASE NOTE METHODS, PARAGRAPH 1 LINE 7.

4) It is stated, that from Yoga patients (after 6 weeks) 3 could discontinue cortisone, 1 Etanercept and 2 MTX. This seem really a big improvement of pharmacological needs. However was thew clinical?seriological activity in comparison to the rest of the group before and after cessation of therapy ?:

RESULTS LAST PARAGRAPH LAST 5 LINES

5) In case of concerning evidence of yoga results, a series of yoga exercises should be pictured on one page.

PLEASE SEE ATTACHED JPEG FILE

6) Risk of this exercises should be mentioned: Cerveral arthritis; severe osteporosis; hypermobility; ankylosing joints.

UNDER DISCUSSION PARAGRAPH 4

Best regards,

Humeira Badsha