

## Effects of *Hata* Yoga on Knee Osteoarthritis

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### ABSTRACT

**Background:** The purpose of this research was to study the effects of 8 weeks of *Hata* yoga exercises on women with knee osteoarthritis. Studies about effects of Yoga on different chronic diseases show that these exercises have positive effects on chronic diseases. As knee osteoarthritis is very common among middle age women we decided to measure effectiveness of these exercises on knee osteoarthritis.

**Methods:** Sample included 30 women with knee osteoarthritis who voluntarily participated in this semi-experimental study and were divided into a control group (15) and a yoga group (15). The yoga group received 60 minutes sessions of *Hata* yoga, 3 times a week and for 8 weeks. Pain, symptoms, daily activities, sports and spare-time activities, and quality of life were respectively measured by Visual Analog Scale (VAS) and Knee injury and Osteoarthritis Outcome Scale (KOOS) questionnaire. The Analysis of Variance (ANOVA) method for repetitive data was used to analyze the results ( $P = 0.05$ ).

**Results:** Findings showed that pain and symptoms were significantly decreased and scores of daily activities, sports, spare-time activities, and quality of life were significantly increased in the yoga group.

**Conclusions:** It seems that yoga can be used as a conservative treatment besides usual treatments and medications to improve the condition of people with osteoarthritis.

**Keywords:** Knee osteoarthritis, pain, quality of life, yoga

### INTRODUCTION

Osteoarthritis is a chronic and incapacitating condition.<sup>[1]</sup> This is the second common complain of the outpatients and incapacitates about 10% of the whole human population with chronic pain and inflammation.<sup>[2]</sup> Knee is the most common joint involved with primary osteoarthritis. Knee osteoarthritis mainly occurs in elders and middle age people and is more common among women and overweight subjects.<sup>[3]</sup> The condition's progress is slow and joints are rather involved bilaterally and symmetrically.<sup>[4,5]</sup> The symptoms include pain, stiffness and decreased range of motion (ROM), which result in limited activity and reduced quality of life.<sup>[6-8]</sup> The main goal of rehabilitation in such patients is reducing pain, restoring function, and improving patient's quality of life.<sup>[9]</sup>

Treatment methods of knee osteoarthritis can be put in three main groups: Medicine, surgical, and non-medicinal.

Generally, non-steroid anti-inflammatory medicines are prescribed for osteoarthritis. In some cases, intra-articular injection of corticosteroids may be done too. These medicines have numerous harming side effects on cardiovascular, digestive system, and kidneys.<sup>[4,10]</sup> Methods used in surgical treatment include debridement and osteotomies, which are all temporary reliefs and only delay the condition's progress. Ultimately, with progression of the problem other surgical procedures such as joint arthrodesis or arthroplasty may be necessary. Joint arthrodesis is not popular as it totally diminishes joint's ROM. Knee arthroplasty is a widely accepted treatment is severe knee osteoarthritis. But surgical treatment is very stressful for the patient and the family and also it's expensive and time consuming process specially because the patients are mostly old and find it difficult to tolerate vast surgical procedures.<sup>[1]</sup> Thus non-surgical treatments, which do not have the side effects of the medicines, are popular among doctors and patients.<sup>[11]</sup> Non-medicinal treatments for knee osteoarthritis include physical therapy,<sup>[4,10]</sup> acupuncture medicine, using assistive devices like crutch, knee brace, medical insoles and heel wedges,<sup>[1,3,4]</sup> losing weight, and exercise.<sup>[1,4,6,7,12]</sup>

In physical therapy of the involved knee, modalities like exercise therapy, patient instruction, mobilization, electrotherapy, which includes pain reducing stimulations like Transcutaneous Electrical Nerve Stimulation (TENS), diathermy, ultrasound, etc., and warmth and cold are used.<sup>[4,6]</sup>

According to studies, exercise can help controlling symptoms of osteoarthritis such as pain, lack of flexibility, decreased strength, and morning stiffness. Controlling each of these can improve function which will result in improvement of quality of life.<sup>[1,4,6,7,12]</sup> In the recent years, using exercise in addition to usual treatments has gained a good popularity in rehabilitation of these patients.<sup>[6,12]</sup>

Blackmon (2011) did a research on effects of exercise on physical function of subjects with knee osteoarthritis<sup>[13]</sup>. It studied the effectiveness of aerobic and resistive exercises on physical function of the patients with knee osteoarthritis. Results showed that both aerobic and resistive protocols increased physical function of the patients and both protocols had similar effects.

Ebnezar *et al.*, (2012) studied the effects of yoga exercises on pain, morning stiffness, and anxiety of 250 patients with knee osteoarthritis. The control group only received physical therapy but the experimental group received physical therapy and yoga. Researchers concluded that doing yoga and physical therapy together has more positive effects than physical therapy alone. The results showed greater decrease in pain, morning stiffness, and anxiety in the patients of the experimental group.<sup>[14]</sup>

Sled *et al.*, (2010) did a research to study the effects of hip abductors strengthening home protocol on knee osteoarthritis. The results showed that hip abductors strengthening home exercises decreased pain and increased function of the patients with knee osteoarthritis.<sup>[15]</sup>

Wang *et al.*, studied the effects of 12 weeks of tai chi exercises on patients with knee osteoarthritis. The results showed improvement in the parameters measured by Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) questionnaire and reduced pain in VAS.<sup>[16]</sup>

Yoga is one of the least harming sports with proven positive physiological and mental effects in treatment of chronic conditions.<sup>[17-20]</sup> Osteoarthritis is one of the most common inflammatory conditions that involve the knee joint.<sup>[21]</sup> Although it's not fatal, most of the patients have to suffer chronic pain and knee problems if it's left untreated.<sup>[22]</sup>

Because yoga is very popular and the studies on effects of this sport on patients with knee osteoarthritis are limited, we decided to do this study.

## METHODS

### Study design

Methodology of this study was semi-experimental in execution and applicable in results. Thirty female patients with knee osteoarthritis diagnosed by a physician were voluntarily participating in this study. They were put in a control group (height:  $161.35 \pm 5$  cm, weight:  $77.14 \pm 14.02$  kg, age:  $53.11 \pm 10.9$  years) and a yoga group (height:  $159.81 \pm 7.1$  cm, weight:  $77.09 \pm 8.06$ kg, age:  $51 \pm 8.9$  years). Eleven patients from yoga group and 14 patients from control group cooperated until the end of experiment. After the inclusion of the patients, the yoga group had 60 minutes *Hata* yoga sessions, three times a week

and for 8 weeks. The sessions were run by a yoga professional trainer and supervised by a physical therapist. The control group was only doing their ordinary daily activities. All subjects took part in pre- and post test.

### Selection criteria

Sample included patients of orthopedics specialists' offices in Bojnourd, Iran. Inclusion criteria were complaining about knee pain for about 3 months, worsening of knee pain in activities like climbing stairs, walking a ramp, squatting, decreased ROM and stiffness on knee, and lack of other musculoskeletal conditions. Exclusion criteria were history of knee surgery, history of acute knee damage in recent 6 months, and participation in exercise programs in recent 6 months.

### Measures

Pain, symptoms, daily activities, sports, spare-time activities and quality of life parameters were respectively measured by VAS and KOOS<sup>[23]</sup> questionnaire before and after intervention.

### Exercise training

Each yoga session consisted of *Asana* (Movement), *Pranayama* (Breathing), and meditation (Relaxation) practices. Every exercise session consisted of three parts: 15 minutes warm-up exercises, main exercises, and 15 minutes cool down exercises. During the period, according to each patient's abilities, the principle of overload was applied as increase in repeats or time of holding a move or more advanced exercises.

### Data analysis

The data of pre- and post-intervention scores were analyzed with Statistical Product and Service Solutions (SPSS) 16. Descriptive (Mean and

Standard diversion scores) and inferential (ANOVA for repetitive data) statistics are presented in Table 1 were used ( $P = 0.05$ ). Microsoft Excel was used to draw the charts.

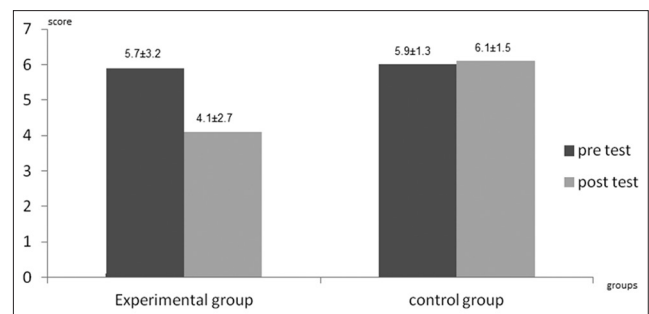
## RESULTS

There were no significant differences in pain between the control group and the yoga group. Pre- and post-intervention scores had a significant difference in the yoga group ( $P < 0.05$ ) but the difference in control group wasn't significant [Figure 1].

There was no significant difference in symptoms between the control group and the yoga group. Pre- and post-intervention scores had a significant difference in the yoga group ( $P < 0.05$ ) but the difference in control group wasn't significant [Figure 2].

There was no significant difference in daily activities between the control group and the yoga group. Pre- and post-intervention scores had a significant difference in the yoga group ( $P < 0.05$ ) but the difference in control group wasn't significant [Figure 2].

There was no significant difference in sports and spare-time activities between the control group and the yoga group. Pre- and post-intervention scores had a significant difference in the yoga

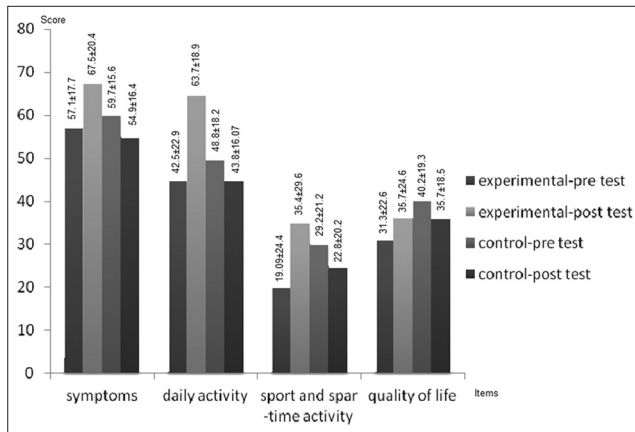


**Figure 1:** Comparing pre-intervention and post-intervention pain in the yoga and control group

**Table 1:** Patient's descriptive statistics and results of repeated measure analysis of variance

Groups	Tests	VAS	Symptoms	Daily activity	Sports and spare-time activity	Quality of life
Control group	Pretest	1.37±5.95	15.6±59.72	18.22±48.84	21.29±29.28	19.39±40.23
	Posttest	1.58±6.11	16.44±54.93	16.07±43.82	20.25±22.85	18.5±35.71
Yoga group	Pretest	3.20±5.79	17.78±57.14	22.22±42.51	24.47±19.09	22.61±31.31
	Posttest	2.75±4.12	20.41±67.53	18.90±63.77	29.61±35.45	24.69±35.79
Differences F (P)	Interaction	16.8 (0.000)	16.3 (0.001)	37.9 (0.000)	19.75 (0.000)	5.9 (0.002)
	Within	11.5 (0.002)	8.2 (0.04)	14.48 (0.001)	3.75 (0.006)	0 (0.004)
	Between	1.4 (0.2)	0.5 (0.4)	0.8 (0.35)	0.01 (0.8)	0.2 (0.5)

VAS=Visual analog scale



**Figure 2:** Comparing pre-intervention and post-intervention symptoms, daily activities, sports and spare-time activities, and quality of life in the yoga and control group

group ( $P < 0.05$ ) but the difference in control group wasn't significant [Figure 2].

There was no significant difference in quality of life activities between the control group and the yoga group. Pre- and post-intervention scores had a significant difference in the yoga group ( $P < 0.05$ ) but the difference in control group wasn't significant [Figure 2].

## DISCUSSION

The purpose of this research was to study the effects of 8 weeks of *Hata* yoga on women with knee osteoarthritis. According to the results, there was a significant difference between pre- and post-intervention scores of pain, symptoms, daily activities, sports and spare-time activities, and quality of life in the yoga group. Pain and symptoms were significantly decreased ( $P = 0.05$ ) and daily activities, sports and spare-time activities, and quality of life were significantly increased.

Ebnezar *et al.*, (2012) studied the effects of yoga exercises on pain, morning stiffness, and anxiety of 250 patients with knee osteoarthritis. The control group only received physical therapy and the experimental group both received physical therapy and yoga. They concluded that receiving yoga and physical therapy at the same time has more positive effects than physical therapy alone. The results showed greater decrease in pain, morning stiffness, and anxiety in the patients of the experimental group.<sup>[14]</sup> Similarly, our study's results show the positive effects of yoga in reducing pain and symptoms of knee osteoarthritis too.

Ebnezar (2011) studies the effects of yoga exercises on quality of life in patients with knee osteoarthritis. The results showed more improvement of quality of life in the experimental group (yoga and physical therapy).<sup>[24]</sup> Results of our study confirm the positive effects of yoga on improvement of quality of life in patients with knee osteoarthritis.

Sled *et al.*, (2010) studied the effects of hip abductors strengthening home protocol on knee osteoarthritis and the results were similar to ours. They stated that hip abductors strengthening home exercises reduce the pain and increase the function of the patients with knee osteoarthritis.<sup>[15]</sup> Similarly, in our study, yoga exercises caused a significant decrease in pain and a significant increase in function of the patients in the experimental group too.

Lee *et al.*, studied the effects of 8 weeks of tai chi exercise on 44 patients with knee osteoarthritis. Patients filled WOMAC and quality of life questionnaires before and after intervention. The results showed that after intervention scores of the experimental group improved in both questionnaires.<sup>[25]</sup> Similarly, in our study the experimental group had a significant improvement in the items measured by KOO's questionnaire (symptoms, daily activities, sports and spare-time activities, and quality of life).

In another research, Wang *et al.*, studied the effects of 12 weeks of tai chi exercises on patients with knee osteoarthritis.<sup>[16]</sup> The results showed improvement in the parameters measured by WOMAC questionnaire and reduced pain in VAS, which matches with our results showing reduced pain in VAS and improvement in the items measured by KOO's questionnaire.

Kawasaki *et al.*, compared intra-articular injection and home exercise protocol in a study and concluded that both interventions had the same effects on reducing the pain and increasing function of the patients with knee osteoarthritis.<sup>[10]</sup> In our study, we had significant decrease of pain and significant increase of daily activity.

Hinman *et al.*, studied the effects of an 8 week protocol of exercise in water on subject with knee and hip osteoarthritis and concluded that physical function, physical activity, and quality of life of patients was increased and pain was decreased after it.<sup>[26]</sup> Their results match with ours, and it seems that exercising is effective in reducing pain and increasing function and quality of life of the patients with knee osteoarthritis.

Bukowski *et al.*, studied the effects of Iyengar yoga and resistive exercises on subjects with knee osteoarthritis and concluded that flexibility, strength, and quality of life and function increased and pain was decreased in the patients after the exercises.<sup>[7]</sup> Their conclusion matches with our results which showed decrease in pain and symptoms and increase in daily activities, sports and spare-time activities, and quality of life after a period of *Hata* yoga exercises.

## CONCLUSION

Findings of our research showed that pain, symptoms, daily activities, sports and spare-time activities, and quality of life had no significant differences before and after intervention. In the yoga group, we had a significant decrease in pain and symptoms and a significant increase in daily activities, sports and spare-time activities, and quality of life after intervention, while the difference in control group was not significant ( $P < 0.05$ ).

Generally, we can state that *Hata* yoga is an important non-medicinal method in rehabilitation of patients with knee osteoarthritis and will result in a significant decrease in pain and symptoms and a significant increase in daily activities, sports and spare-time activities, and quality of life. So we recommend using these exercises in addition to usual treatments to slow down the incapacitating process of knee osteoarthritis.

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