Original Article

Comparative Study on Hatha Yoga Vs Conventional Physiotherapy Management in Pain and Functional Outcome in Osteoarthritis Knee Subjects

Joyce Angel.S[1], K.Kotteeswaran[2]

[1]Undergraduate, [2]Professor, Saveetha College of Physiotherapy, Saveetha Institute of Medical and Technical Sciences, Chennai , Tamil Nadu, India.

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Abstract

Background: Osteoarthritis is a degenerative condition of the joints that frequently impacts the knee. OA can cause discomfort, stiffness, swelling, instability of joint and decreased muscle strength which limits the movement and lowers the quality of life. Hence the study is to determine the effects of Hatha Yoga VS Conventional Physiotherapy Management in pain and functional outcome in Osteoarthritis Knee Subjects.

Purpose: The purpose of the study is to compare Hatha Yoga VS Conventional Physiotherapy Management in pain and functional outcome in osteoarthritis knee subjects.

Materials and Methods: About 196 subjects were selected from Vijay Physiotherapy Clinic by using KOOS based on inclusion and exclusion criteria. Experimental protocol and procedures were informed to all the subjects before giving their informed consent. Subjects were allocated into 2 groups. Hatha yoga group and Conventional group, each had 98 subjects. Hatha yoga group performed Hatha yoga and Conventional group performed Conventional Physiotherapy Management for a duration of 45 minutes, 4 days per week with IFT for 10 minutes. These interventions were given for 4 weeks. Study period : October 2022 to July 2023.

Result: The Pre-test and Post-test values were analyzed results suggest that Hatha Yoga group has significant improvement when compared with Conventional group with P value<0.0001.

Conclusion: According to this study, Hatha yoga group had better results than conventional group, Hatha yoga is more effective in reducing pain and improving functional outcome among osteoarthritis knee subjects.

Keywords: Osteoarthritis of knee, Hatha yoga, KOOS, Conventional Physiotherapy Management, IFT.

Introduction

Osteoarthritis is a degenerative condition of the joints that frequently impacts the knee. OA can cause discomfort, stiffness, swollen unstable joints, and decreased muscle strength which can limit movement and lower the quality of life.[1] Osteoarthritis is a disorder marked by isolated areas of joint cartilage degradation within the synovial joints, together with bone enlargement and capsule becoming thicker.[2] Knee osteoarthritis symptoms are present in 10% men, 13% of women aged 60 years or more.[3] Globally the prevalence is about 9.8% among males and 18% among females above 65 years.[4]

Corresponding Author: K Kotteeswaran, Saveetha College of Physiotherapy, Saveetha Institute of Medical & Technical Sciences, Chennai, Tamil Nadu, India.

E-Mail: kotteeswaran.scpt@gmail.com

Elderly population, women, increased BMI, trauma to the knee, frequent usage of joints, the thickness of bones, and joint loosening can lead to the onset of osteoarthritis, especially in joints that bear weight.[3] A person's quality of life may be significantly impacted by pain and other OA symptoms on both physical and psychological level.5 Hatha yoga (ha) is the physical style of yoga that, in theory, helps to ease OA-related pain and stiffness by realigning the skeleton, strengthening the muscles that surround the joints, and loosening up constrictive joint structures.[6] Hatha yoga Performance includes asanas (postures), (pranayama), relaxation techniques. It features specialized body postures, such as relaxation poses, breath control, longer posture maintenance, and it also requires constant, judgment-free focus while practicing, which sets it apart from other forms of physical training.[7] Hatha Yoga can increase strength and flexibility.[8] The mindful prolonging of inhale, breath retention, and exhalation are the main focuses of Hatha yoga's breathing methods. Despite the emphasis on breathwork and meditation, Asanas stretch and strengthen various body parts while lubricating the joints, muscles, and ligaments, and massaging and providing new blood to the interior organs.[9] Exercises for strengthening the quadriceps, hamstrings, abductor muscles, active hamstring and quadriceps stretching are part of the Osteoarthritis management program.[4] The KOOS shows adequate content validity, test-retest reliability, construct validity, and responsiveness for age- and condition-relevant subscales.[10]

Aim

Aim of the study is to compare Hatha Yoga VS Conventional Physiotherapy Management in pain and functional outcome in Osteoarthritis Knee Subjects

Material and Method

Yoga mat, chair, IFT apparatus, Electrode pads, Electrode gel, cotton, Micropore. The study was conducted on 196 subjects with osteoarthritis among age groups of 40 years or more. Subjects were collected from Vijay Physiotherapy Clinic and convenient sample technique was used. Study period: October 2022 to July 2023.

Inclusion Criteria:

1. Subjects age 40 years or above
2. Subjects diagnosed with osteoarthritis knee grade I and II based on American College of Rheumatology Criteria
3. Chronic knee pain for more than 6 months.

Exclusion Criteria:

1. Knee replacement surgery
2. Congenital deformity of affected limb
3. Fracture in the lower limb

Outcome Measures:

Assessment was done before and after the end of 4 weeks of study.

1. Knee Injury and Osteoarthritis Outcome Score (KOOS) [10]

Procedure

Total of 196 subjects were selected by a convenient sampling technique based on selection criteria. This study includes both male and female, age groups from 40 and above years. Written informed consent was collected from all the subjects prior the commencement of the study. Experimental protocol and procedures were informed to all the subjects before giving their informed consent. These 196 participants were allocated into 2 groups. All the subjects underwent pre-test measurement with KOOS and the same repeated for post-test for a period of 4 weeks.

IFT was given for both the groups.

IFT Protocol: The patient was explained that a tingling sensation could be felt which should not be unpleasant.

Patient Position -Supine lying

Frequency- 4000 Hz

Base- 90 Hz

Sweep- 40 Hz

Beat Frequency- 90-130 Hz

Quadripolar/2 channel

Duration: 10 minutes

In Hatha Yoga Group: (n=98) subjects were selected and IFT was given for 10 minutes and Hatha yoga practice such as utkatasana (Chair pose), Janu sirsasana (head to knee Pose), Virabhadrasana I (warrior pose I), (Bridge pose) Setubandhasana, (Mountain pose) Tadasana, (Tree pose) Vrikshasana, Virabhadrasana II(Warrior II) were performed. Chairs were utilized during the class, poses might be changed according to the patient. Yoga was performed for 45 minutes for each session for 4 days per week. Each yoga pose was performed for 3 sets and 10 repetitions with a short period of rest in between.

Hatha Yoga Group:

1. Vrikshasana:

In standing pose the subjects were asked to exhale and bend left knee and place the foot against the inside of the right thigh with their heel abutting their groin. Ask the subjects to inhale and raise the arms overhead and keep palms together. Subjects were asked to repeat the asana on the other side.

2. Tadasana:

In standing pose subjects were asked to interlock their fingers and ask them to raise their arm overhead when raising their heel.

3. Utkatasana:

In standing pose subjects were instructed to inhale and lift their arms in front of their body up to shoulder level then ask them to exhale and bend their knees and lower trunk to the half squat pose without bending forward.

4. Virabhadrasana I:

The subjects were asked to stand with feet apart and then to exhale and turn to the right while turning their right foot. Then the subjects were asked to inhale, raise their arms overhead and bend back. Exhale and subjects were instructed to bend their right knee and lower their trunk. Subjects were asked to repeat asana on the other side.

5. Virabhadrasana II:

The subjects were asked to stand with feet apart and exhale and were instructed to turn their right foot, inhale and ask them to raise their arms sideways up to their shoulder level exhale and then ask the subject to bend the right knee and lower the trunk. Subject was asked to repeat asana on the other side.

6. Setu Bandhasana:

Subjects were told to lie in their back with their legs bent and foot flat on the floor with hip distance apart. The palms of the arms should be downward as they slide along the body. The fingertips have to be barely in contact with the heels. When rolling the spine off the ground ask them to raise their hips high while pressing the feet firmly into the ground and was asked to keep their knees hip distance apart by lightly squeezing them together. On raising chest ask them to apply downward pressure on shoulders and arms and raise the hip higher by contracting the legs. Ask them to hold their breath and then to release, instruct them to take a breath out and lower the spine to ground slowly.

7. Janu Sirsasana:

It was instructed for the subject to sit with their legs extended in front of them. Instruct the subject to relax their right knee by bending it and placing their right foot against their left inner thigh. Instruct them to lift their arms to either side of their head as they inhale, ask to bend their left feet to the outside and press the top of their thigh down and extend their spine. Subjects were asked to turn their upper body slightly to face their left leg and ask them to exhale and fold their hips forward. As they inhale, instruct the patient to flex their left foot, ask them to squeeze the top of their leg down and stretch their spine and raise both arms above their head. Instruct the patient to exhale while bending forward from the hips and rotating their upper body slightly to face their left leg.

Conventional group: (n= 98) participants were selected and IFT was given for 10 minutes, Conventional Physiotherapy Management was done for 45 minutes each session 4 days per week for 4 weeks. Program includes Quadriceps isometrics, ROM exercise for knee joint , Hamstring isometrics, Active ankle pump, Active quadriceps stretching, Straight leg raise each exercise performed for 3 sets and 10 repetitions.

1. Quadriceps Isometrics:

Subjects were instructed to lie supine. Underneath the affected knee, A small rolled towel / foam roller

was placed. Ask them to push the back of their knee into the rolled towel and encourage them to tense the quadriceps muscle on top of the leg. The subjects were told to contract for ten seconds, then relax gradually.

2. Active Ankle Toe Pumps:

Subjects were asked to lie down on their back and asked to pull their toes up toward their head and then point the toes down.

3. Hamstring Isometrics:

Subjects were instructed to lie on supine. On the affected side place a rolled towel or foam roller under the ankle. Ask them to push their ankle into the rolled towel or foam roller and encourage them to tense the hamstring muscle on the back of their thigh. The subjects were told to contract for ten seconds then relax gradually.

4. Straight Leg Raise:

The Subjects were asked to lie on their back, by straightening the leg that should be trained. The subjects were asked to bend the other leg. Subjects were told to tense the muscle at the top of their thighs and lift the leg keeping it straight and then slowly lower the leg.

5. Quadriceps Stretching:

Subjects were advised to lay on their left side and bend their right knee and pull the right leg back toward their buttocks by firmly grabbing the ankle but asked not to extend the heel of the right ankle all the way to the buttocks and instructed to push the hip forward at the same time.

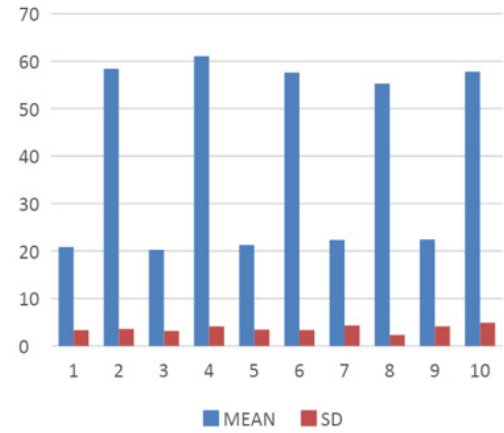
6. Hamstring Stretching:

Ask the subjects to sit with both the legs straight on the floor. Ask them to maintain the neutral position of the feet and then ask them to place the hands adjacent to their thighs on the ground. The head was lowered towards the leg as the waist was bent. Ask them to place their knees as close to the floor as possible. Ask them to slide their hands toward the feet while leaning forward.

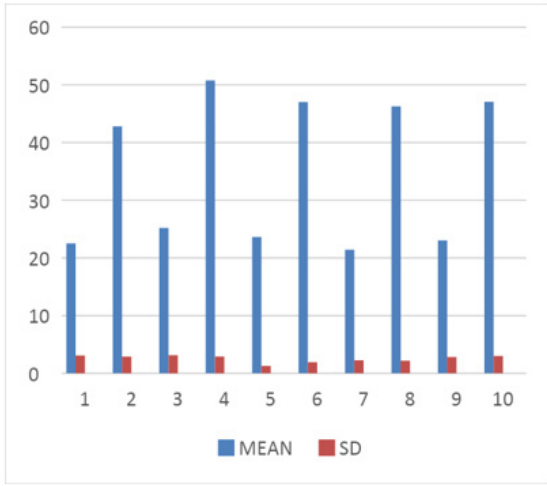
7. ROM Exercise for Knee:

Subjects were asked to lie on supine and asked to actively flex and extend the knee joint repeatedly for 10 times for 3 sets.

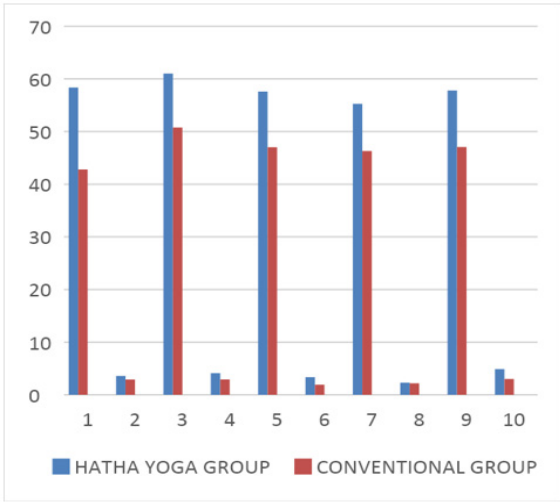
Data Analysis



Graph-1: Comparison between Pre-test and Post-test values of Hatha Yoga Group



Graph-2: Comparison between Pre-test and Post-test values of Conventional Group



Graph-3: Comparison between Post-test values of Hatha Yoga group and Conventional group

Result

Graph 1: Pre-test and post-test values of Hatha YOGA group using KOOS scale are as follows. The value of pain mean and SD pre-test 20.87(±3.34), post-test 58.38(±3.59), symptoms mean and SD pre-test 20.24(±3.17), post-test 61.03 (±4.12), ADL mean and SD pre-test 21.28(±3.43), post-test 57.60(±3.35), Sports mean and SD pre-test 22.35(±4.32) and post-test 55.26(±2.31), QOL mean pre-test 22.43(±4.13), post-test 57.79(±4.89). As a result, the findings are considered statistically significant when the p-value is <0.0001.

Graph 2: Pre-test and post-test values Conventional group using KOOS scale. The value of pain mean and SD pre-test 22.54(±3.09), post-test 42.79(±2.90), symptoms mean and SD pre-test 25.23(±3.14), post-test 50.76(±2.29), ADL mean and SD pre-test 23.63(±1.28), post-test 47.03(±1.92), Sports mean and SD pre-test 21.43(±2.27) and post-test 46.28(±2.19), QOL mean pre-test 23.04(±2.83), post-test 47.06(±3.01). As a result, the findings are considered statistically significant when the p-value is <0.0001.

Graph 3: KOOS post-test mean values in Hatha Yoga group for pain was 58.38(±3.59), 42.79(±2.90), Symptom was 61.03(±4.12), 50.76(±2.92), ADL was 57.60(±3.35), 47.03(±1.92), SR was 55.26(±2.31), 46.28(±2.19), QOL was 57.79(±4.89), 47.06(±3.01).

Results suggest that findings are considered to be statistically significant with p-value<0.0001.This demonstrates that Hatha Yoga group received a higher score than Conventional Physiotherapy Management group. Thus Hatha Yoga group is considerably more effective than Conventional Physiotherapy Group among osteoarthritis knee subjects.

Discussion

The purpose of the present study is to compare Hatha Yoga vs Conventional Physiotherapy Management in pain and functional outcome in Osteoarthritis knee subjects. The comparison is demonstrated with a duration of four weeks. The results were measured using KOOS before and after intervention.

Based on the Statistical analysis both groups showed improvement in KOOS beneficial effects were significantly greater in Hatha Yoga group than Conventional Group.

Ai -Min Liu et al., 2021 concluded that asana posture which include squatting and lunges leads to increase in strength of lower extremity. For people with symptomatic knee OA, the Chair yoga asana strengthens the quadriceps.[11] Nilima Bedekar et al., 2012 stated that antagonists are stretched and agonist undergo isometric contraction during Utkatasana and Virabhadrasana. When a slow stretch force is applied to a muscle during yoga, the golgi tendon organ activates and blocks muscle tension allowing the sarcomere to stay lengthened.[12] Bedekar Nilima et al., 2015 suggested that IFT can be used to reduce pain which is caused due to musculoskeletal conditions.[13]

Similarly in our study Hatha Yoga group is more beneficial than the Conventional Physiotherapy Group. It is more effective in reducing pain and improving functional outcome in osteoarthritis knee subjects.

Conclusion

According to this study, Hatha yoga group had better results when compared to the Conventional group, Hatha Yoga is more effective in reducing the pain and improving the functional outcome among osteoarthritis knee subjects.

Ethical Clearance: Taken from Institutional Ethical Committee. ISRB number-03/034/2022/ISRB/SR/SCPT

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Conflict of Interest: Nil

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