

Comparing the Effects of Hydrotherapy and Physiotherapy on Pain Intensity and Muscle Function of Women with Knee Osteoarthritis

Mohammad Javad Khataee¹

ABSTRACT

Background: Knee osteoarthritis (KOA) is the most common chronic and progressive joint disease after middle age in the world. This disease begins with the gradual destruction of the joint cartilage and gradually continues with symptoms such as knee joint pain, limited mobility and inability to move, and has a serious impact on the quality of life of sufferers. To alleviate this disease, anti-inflammatory drugs, painkillers and drugs containing glucosamine, are often prescribed. The purpose of this study is to compare the effectiveness of hydrotherapy and physiotherapy on KOA women patients in the elderly.

Materials & Methods: Two groups of 23 participants were randomly selected from 69 KOA patients. At the beginning, they were examined in terms of pain intensity, movement and physical performance using observations and questionnaires. One group participated in hydrotherapy and the other in physiotherapy.

Results: After the necessary investigations and performance evaluation of the patients, the following results were obtained. The intensity of muscle pains and spasms was reduced in both groups, but in the hydrotherapy group, in addition to the significant reduction of pain, participants stated that they were able to do daily activities without the help of others. Also, the results showed that the mental condition of the patients improved significantly.

Conclusion: Therefore, in addition to relieving joint pain, hydrotherapy can also improve muscle function. This method also reduces heart pains and other muscle pains. This is why in recent years; hydrotherapy is known as the best way to prevent and treat knee osteoarthritis.

Keywords: Knee osteoarthritis, glucosamine, hydrotherapy, physiotherapy

1, Mashhad University Medical Sciences,
Mashhad, Iran
Corresponding Author's Email:
mj.khataee@gmail.com
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INTRODUCTION

Osteoarthritis is a degenerative joint disease that causes swelling, pain, and stiffness of the knee. This inflammatory joint disease begins slowly and progresses over time. In this disease, as a result of factors such as doing heavy work, exhausting sports, obesity, etc., as a result of excessive pressure on the knee, the joint cartilage of the knee is eroded and damaged due to abrasion, symptoms such as pain dryness of the joints and its swelling warns the patient that he should avoid various factors that cause damage to his bones and joints and ultimately cause weakness in the function of the knee joints (Bennell & Hinman 2011; Cudejko et al., 2018).

Physiotherapy

Physiotherapy is a treatment program that reduces pain, restores muscle strength, and increases joint range of motion, and plays an important role in the treatment of moderate to severe osteoarthritis. In physiotherapy, it is recommended to teach isometric exercises to strengthen the quadriceps and hamstrings and its continuous repetition (Brandi, 1995; O'Reilly & Muir, 1999; Tan & Balci, 1995).

Hydrotherapy

Hydrotherapy or water therapy was initially performed by placing the injured member in a pool of cold or hot water, and then several sessions of various sports using

some sports equipment is added to it. With the help of the natural properties of water, movements that humans are not capable of on land are possible in water (Fleming et al., 2010). Therefore, training programs are adapted to the pool environment. Today, physical therapists use water exercise to treat many injuries (Ulf Hassan et al., 2023).

METHODOLOGY

The purpose of the present research is to compare the effects of hydrotherapy and physiotherapy on muscle function and pain intensity in patients with knee osteoarthritis.

Participants

First, the necessary data was collected from a hydrotherapy center located in Mashhad and two groups of 23 participants from among 69 female patients who were diagnosed by doctors with different methods, including photos and MRI, as suffering from osteoarthritis of the knee, were randomly selected.

The age of the participants was between 61 and 77 years and their weight were between 70 and 89 kilos, and none of them had respiratory, infectious, skin, or cardiovascular diseases according to the doctor's examination (see Tables 1 & 2). All suffered from dry knees and joints, especially in the morning. The weight, height and characteristics of all of them were recorded. All the participants informed consent for participating in this research.

Characteristics	Hydrotherapy Group	N
Age	63- 75	23
Weight	74- 89 K	23
Height	153- 166 cm	23

Table 1: Demographic data (Hydrotherapy Group)

Characteristics	Physiotherapy Group	N
Age	61- 77	23
Weight	71- 82 K	23
Height	151- 171 cm	23

Table 2: Demographic data (Physiotherapy Group)

Procedures

A group 23 participants were recommended to participate in physiotherapy sessions at a physiotherapy center and the rest were (23 participants) subjected to aquatic activities and hydrotherapy. The number of sessions in the physiotherapy group was the same as the number of sessions in the hydrotherapy group. Both groups used therapy sessions for 16 weeks. Before and after the treatment sessions, Western Ontario and McMaster Universities Osteoarthritis Index questionnaire (WOMAC) was completed for all participants to assess muscle problems and movement limitations and generally, their status of KOA.

The patients' pain level was also measured using the Quebec pain intensity questionnaire (QPIQ). The questionnaire contains twenty 6-choice questions and evaluates the amount and severity level of pain in daily activities. The scoring of QPIQ is based on a five-point Likert rating.

Patients suffering from osteoarthritis of the knee mostly had similar problems. Most of them suffered from dry knees and joint pain, their muscle strength was reduced because the range of motion of their joints was limited, they could no longer walk fast, and sometimes they might even be in danger of falling, and in other words, all of these physical complications made them unable to walk properly and do their daily tasks well.

In some of them, due to a lot of pressure on the knees, the knees were swollen, and this swelling of the knee had limited doing many

things, and some of them had even lost the hope of a good and normal life.

The hydrotherapy group of patients performed exercises three days a week for two hours each time under the supervision of a trainer. In the hydrotherapy pool, 5 exercise machines were installed in the water for the use of patients. There were two bicycles of different heights, a treadmill, a stepper and a fixed seat.

RESULTS

According to the results, a few patients in the hydrotherapy group were able to perform all the exercises at the beginning, and most of them felt tired and weak in the first to third week after performing the exercises. Gradually, by doing most of the exercises in the fifth week onwards, the participants did the exercises well and showed great desire to continue the aquatic exercises. When the participants of the hydrotherapy group were in the water pool, due to weight loss, the pressure on their joints was also reduced and they were able to perform sports movements more easily, and this significantly reduced their pain. This gave them satisfaction and they came to the pool more willingly in the next sessions. At the end of the ninth week and the end of the sixteenth week, almost the vast majority of the patients continued the exercises by themselves even without the direct presence of the trainer.

The second group that was the group of physiotherapy patients participated three days a week in a physiotherapy session in a center. In the first weeks, due to muscle pain and knee swelling, they could hardly tolerate physical therapy exercises, that's why the responsible

person reduced the use of physical therapy devices and also the time of the specified exercises. Gradually and with the passage of time, the maximum tolerance of the patients increased and the trainer started to increase the corrective exercises with the use of the special physiotherapy devices.

Finally, 16 weeks of continuous training ended, and at the end of the last session, the participants were talked to individually and separately and asked for their opinions.

In this research, the intensity level of the knee pain and muscle contractions was investigated in both groups: the group that participated in physiotherapy and the group that participated in the hydrotherapy sessions. The results showed that both treatment methods were associated with reducing muscle pains and muscle contractions. The degree of pain reduction in the hydrotherapy group was associated with a more significant reduction, and the members of this group stated that they were able to perform their daily activities alone and without the help of others at the end of the period. In addition to reducing pain, the results of the research showed that hydrotherapy was able to significantly improve the mental health of patients.

This study indicated that the use of hydrotherapy and physiotherapy not only accelerates the mental recovery and physical performance of patients, but also can create a positive effect on improving the quality of life. One of the advantages of hydrotherapy over physiotherapy is the use of the natural advantages of water. Water as a natural medicinal agent acts to relieve pain. Using hot hydrotherapy, steam therapy and water massage can help reduce pain and improve muscle and joint function. On the other hand, physiotherapy also uses non-drug methods to improve pain and muscle contractions. This method includes strengthening exercises, stretching exercises and balance exercises. Also, physical therapy can make muscles stronger over time and regulate strict physical activity programs. In this study, it was observed that hydrotherapy had more advantages such as faster pain relief, more significant improvement in physical

performance and greater effect on mental relaxation compared to physiotherapy.

DISCUSSION

In the osteoarthritis, the healthy tissues of the knee joint, which smooth the movement between the bones, are attacked. Of course, genetic and environmental factors are also factors of this disease. The diagnosis of this disease is very important and the patient can make his joints less damaged by early treatment.

The patient can alleviate the severity of this disease and knee swelling in different methods. There are different ways that strengthen the muscles protecting the knees and reduce the swelling of the knees and enable the patient to do daily life activities and not been subjected to restrictions.

These factors include:

1. Prevent obesity
2. Prevent from heavy physical activities
3. Changing living conditions and controlling body stress
4. Regular sports
5. Hydrotherapy and physiotherapy
6. Use of protective clothing and shoes
7. Blood sugar control
8. Taking medications containing glucosamine
9. Use of Cortone ampoules
10. Injection of ampoules containing gel
11. PRP method

CONCLUSIONS

In this research, based on the data from questionnaires, interviews, observations, and reports of the patients, after the completion of the hydrotherapy and physiotherapy sessions, the inability to do some tasks such as walking disappeared in most of the patients, and this reduced the mental pressure. Pain, stiffness and dryness of the joints, was also reduced significantly in the patients of both groups.

In general, based on the results of the research, the advantage of using hydrotherapy in patients with knee osteoarthritis is that the body weight in the water is reduced and the load on the knee joint is reduced. This leads to the reduction of pain and inflammation in the joints. Also,

hydrotherapy strengthens the muscles around the joint and improves the range of motion of the knee.

Another benefit of using hydrotherapy in patients with knee osteoarthritis is the reduction of heart pains and other muscle pains. Hydrotherapy can also be useful for increasing mental relaxation of patients, because in the water environment, the amount of stress and mental pressure is reduced.

On the other hand, the use of hydrotherapy in patients with osteoarthritis of the knee can also prevent the recurrence and severity of joint pains. For this reason, hydrotherapy is considered as the best way to prevent and treat knee osteoarthritis. Therefore, it can be concluded that hydrotherapy is an effective method in the treatment of knee osteoarthritis, which improves muscle function and walking in addition to relieving joint pain. On the other hand, by reducing heart pains and other body muscle pains, Hydrotherapy also improves mental relaxation.

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