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The Impact of Water Shiatsu on Shoulder Range of Motion (ROM) in Frozen shoulder Cases

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ABSTRACT

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Water shiatsu therapy has shown promising results in the field of physical recovery. Water Shiatsu is a water therapy that uses the buoyancy of water to reduce gravitational pressure on joints. This makes it beneficial for individuals who have musculoskeletal injuries or who are recovering from surgery. This study definitively examines the effect of water shiatsu on the range of motion (ROM) of the shoulder joint of frozen shoulder sufferers. The study used a pre-experimental method with a one-group pretest-posttest design. This study focused on clients who attended therapy at Java Sporties Buana Bandung. The sampling technique used purposive sampling with inclusion and exclusion criteria, so that the number of research samples that met the criteria was 7 people. Use a goniometer to measure the range of motion of the shoulder joint. The Paired sample T-test is the data analysis technique used to determine the effect of the water shiatsu method on increasing the Range of Motion (ROM) of the shoulder. The results showed a significant effect of water shiatsu on the range of motion of the shoulder joint of frozen shoulder sufferers. There was an increase in shoulder range of motion in flexion movements by (25.28°), extension by (8.85°), abduction by (26.85°), adduction by (13.85°), external rotation by (14.71°), and internal rotation by (13.14°).

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Kata kunci

Frozen shoulder

Goniometer

Range of motion

Water shiatsu

Abstrak

Dewasa ini terapi menggunakan water shiatsu menunjukkan hasil yang menjanjikan dalam bidang pemulihan fisik. Water Shiatsu merupakan terapi air yang memanfaatkan daya apung air untuk mengurangi tekanan gravitasi pada sendi sehingga bermanfaat bagi individu yang mengalami cedera pada muskuloskeletal atau yang sedang dalam pemulihan pascaoperasi. Penelitian ini bertujuan untuk mengkaji pengaruh water shiatsu terhadap range of motion (ROM) sendi bahu penderita frozen shoulder. Penelitian ini menggunakan metode pre-experimental dengan one group pretest-posttest design. Populasi dalam penelitian ini adalah klien yang menjalani terapi di java sporties buana bandung. Teknik pengambilan sampel menggunakan purposive sampling dengan kriteria inklusi dan eksklusi sehingga jumlah sampel penelitian yang memenuhi kriteria berjumlah 7 orang. Instrumen yang digunakan untuk pengukuran range of motion sendi bahu ialah goniometer. Teknik analisis data yang digunakan yaitu Uji Paired sample T-test untuk mengetahui apakah terdapat pengaruh metode water shiatsu terhadap peningkatan Range of Motion (ROM) bahu. Hasil penelitian menunjukkan adanya pengaruh yang signifikan water shiatsu terhadap range of motion sendi bahu penderita frozen shoulder dengan adanya peningkatan range of motion bahu pada gerakan flexion sebesar (25,28°), extension sebesar (8,85°), abduction sebesar (26,85°), adduction sebesar (13,85°), external rotation sebesar (14,71°), dan internal rotation sebesar (13,14°).

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INTRODUCTION

Water shiatsu therapy has attracted attention recently because of its unique blend of shiatsu and immersion techniques. Watsu is an aquatic massage technique primarily used in therapeutic practice with relaxation. This water shiatsu approach involves personalized sessions in which an experienced practitioner or therapist carefully supports, guides, runs, elongates, and massages an individual in warm, comfortable chest-deep water. As stated by (Schitter et al., 2020) Water shiatsu is a form of aquatic therapy that combines elements of shiatsu massage with gentle movements in warm water. Water shiatsu has many benefits, including improving blood circulation, helping soft tissue contractures, relieving muscle spasms, increasing muscle strength, and the floating effect in water can reduce the possibility of injury and protect against joint degeneration (Dong et al., 2018). The therapeutic techniques include specific point massages, spiraling movements, thrusting, deep breathing, as well as neck and shoulder stretching.

The shoulder is the third most commonly injured part of body after the spine and knee. Most people with shoulder complaints experience pain and difficulty with movement. Among the various conditions affecting the shoulder, frozen shoulder (FS) has been the subject of the most debate, ranging from definition to treatment methods to optimal prognosis. Frozen shoulder is a common shoulder disorder characterized by pain and progressive limitation of all shoulder movements leading to stiffness and disability (Rangan et al., 2015). Frozen shoulder is an inflammatory condition in which the connective tissue around the shoulder joint thickens and tightens, characterized by shoulder stiffness, pain, and loss of maximum range of motion (John M et al., 2020). Frozen shoulder results in limited movement of the shoulder joint and stiffness of the shoulder muscles. Due to the limited joint space, range of motion (ROM) is not maximized, often making shoulder movement difficult and painful. Pain resulting from inflammation of the shoulder joint limits movement in all directions, especially during passive movements of exorotation or external rotation. (Oosterwijk et al., 2018) state that impaired range of motion (ROM) associated with frozen shoulder can have an impact on the patient's ability and activities of daily living to participate in self-care and work activities. Activity problems often experienced by patients with frozen shoulder include being unable to lift their arms, comb their hair, reach for higher loads, lift weights greater than 10 kg, and rub their backs while bathing due to adhesion of the joint capsule and cartilage caused by inflammation of the joint capsule, causing pain when performing the movement in question (Morgan & Potthoff, 2015).

Range of motion (ROM) refers to the ability of a joint to move through a normal range of motion (Pratama et al., 2021). The range of motion of the joints consists of 3, active range of motion, is a movement that can be carried out by one individual independently, passive range of motion is a passive movement assisted by another person according to the range of motion that can be done, as for

the resisted range of motion, namely the range of motion of the joints against the load to assess musculoskeletal health (Wijaya, 2021). (Cohen & Ejnisman, 2015) The etiology of frozen shoulder is uncertain, but can be classified into two categories, namely primary and secondary. Spontaneous idiopathic primary frozen shoulder is characterized by a stiff shoulder that develops without specific trauma or underlying disease, ¹³ secondary frozen shoulder is defined as frozen shoulder associated with trauma; rotator muscle disease and impingement; osteoarthritis, tendinitis; cardiovascular disease; hemiparesis; or diabetes (Pérez Ramírez et al., 2019).

Field data shows that frozen shoulder remains a common complaint among clients seeking therapy, including at Java Sporties, where many patients are elderly. Data from November 2024 indicates that seven clients were diagnosed with frozen shoulder, with the majority reporting shoulder pain and stiffness when performing daily activities such as flexion, rotation, abduction, and adduction movements. Most patients visit Java Sporties based on a doctor's recommendation to undergo physiotherapy, hydrotherapy, or swimming to encourage greater shoulder mobility. The primary treatment options for frozen shoulder are non-surgical and include pharmacological management and physical therapy. Pain and stiffness can be managed through either medication (pharmacological) or non-medication (non-pharmacological) approaches.

One of the non-pharmacological treatments is water therapy, specifically water shiatsu. This technique integrates ¹⁰ elements of myofascial stretching, joint mobilization, massage, and Shiatsu, and it is used to address both physical and mental issues. Water shiatsu is utilized to relieve pain, improve range of motion, enhance circulation, address psychological concerns, promote relaxation, and reduce stress. The effects of water as a medium can be attributed to buoyancy, which is beneficial in both swimming pools and therapy pools, allowing for maximum ¹⁰ flexibility in the positioning of the treated individual (Chandra, 2019). Water shiatsu can help arm movement more freely, reduce pain and joint stiffness, because the buoyancy of the water will support the heavy weight of the arm and help restore the strength of shoulder stability which affects natural movement patterns after injury (Lauren & Turner, 2024). Also water shiatsu utilizes the therapeutic ¹⁶ properties of water, such as buoyancy, hydrostatic pressure, and the relaxing effects of warm water, allowing patients to move their shoulders more comfortably and freely without significant gravitational pressure. This is of particular benefit to those with frozen shoulder, where pain and stiffness often prevent active movement on land (Tufekcioglu et al., 2023).

Therefore, based on previous research and the explanations above, ¹ the researcher is interested in and considers it necessary to study the effects of Water Shiatsu therapy on the range of motion (ROM) of the shoulder joint in individuals with frozen shoulder.

METHOD

The research method used in this study is an experimental method with a one-group pretest-

posttest design. Data were collected from seven clients at Java Sporties who had been diagnosed with frozen shoulder by a doctor. The sample used was only Java Sporties client with frozen shoulder injuries. The research sample underwent a pretest (initial test) to measure the range of motion (ROM) in shoulder movements, including adduction, abduction, flexion, extension, internal rotation, and external rotation. The measurement was conducted using a goniometer, which has a test validity of 0.97 and a reliability of 0.51 (Lo et al., 2021). A goniometer is a measuring tool used to determine the joint angle from the joint axis, as described in the book by (Widi & Widanti, 2024). The treatment involved Water Shiatsu therapy administered twice a week for four weeks (Sekome & Maddocks, 2019). The pool temperature was between 34° C - 35° C degrees (Lauren & Turner, 2024). After the treatment period, the researcher conducted a posttest to measure the shoulder's range of motion again, comparing the pretest and posttest results. The collected data were then processed and analyzed using statistical procedures, specifically the Paired Sample T-test.

RESULT AND DISCUSSION

Result

The results from the seven research samples, based on test findings, indicate that the range of motion (ROM) of the shoulder in individuals with frozen shoulder improved after undergoing Water Shiatsu therapy treatment.

Table 1. Paired Sample T-Test for Range of Motion (ROM) Flexion and Extension

Variabel	Movement	Test	Rerata	Std.Deviasi	T-hitung	Sig.
Shoulder Range of Motion	Flexion	Pre-Test	114.2857	2.98408	-22.419	0.000
		Post-Test	139.5714	2.21467	-12.288	0.000
Shoulder Range of Motion	Extension	Pre-Test	32.8571	5.24177	-13.556	0.000
		Post-Test	41.7143	2.60951	-17.091	0.000

Based on Table 1 above, it is evident that there is a significant difference between the pre-test and post-test in the flexion movement variable, with a Sig. value of ($0.000 < 0.05$). The analysis results also indicate a significant difference between the pre-test and post-test in the extension movement variable, with a Sig. value of ($0.000 < 0.05$).

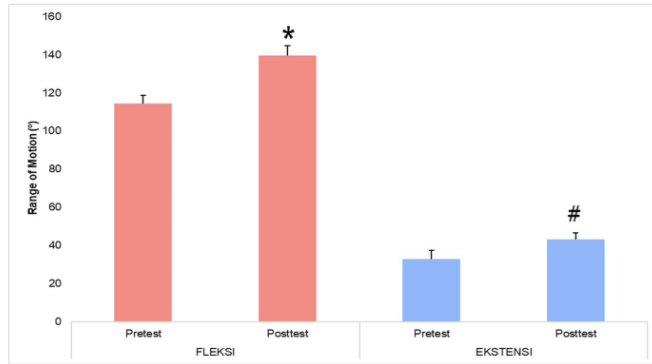


Figure 1. The Results of Shoulder Range of Motion (°) Improvement in Pretest and Posttest for Flexion and Extension Movement Groups

Figure 1. Above shows an increase in the average value of 25.28° in the flexion movement variable, so that the range of motion of shoulder flexion exceeds 120° (red bar chart), indicating that the shoulder joint function has reached the functional limit required to carry out daily activities, such as lifting the arms above the head, combing hair, and performing other self-care tasks independently. In addition, an increase in the average value of 8.85° of shoulder extension reaching 40° (blue bar chart) allows for posterior movements, such as reaching the back pocket of the pants or opening a door from behind.

Table 2. Paired Sample T-Test for Range of Motion (ROM) of Abduction and Adduction

Variabel	Movement	Test	Rerata	Std.Deviasi	T-hitung	Sig.
Shoulder Range of Motion	Abduction	Pre-Test	115.7143	5.67786	-6.857	0.000
		Post-Test	142.5714	3.73529	-9.512	0.000
Shoulder Range of Motion	Adduction	Pre-Test	28.5714	2.98408	-22.419	0.000
		Post-Test	42.4286	2.21467	-12.288	0.000

The table 2 shows the analysis results indicating a significant difference between the pre-test and post-test on the abduction movement variable with a Sig. value of ($0.000 < 0.05$). Then, it was found that there is a significant difference between the pre-test and post-test on the adduction movement variable with a Sig. value of ($0.000 < 0.05$).

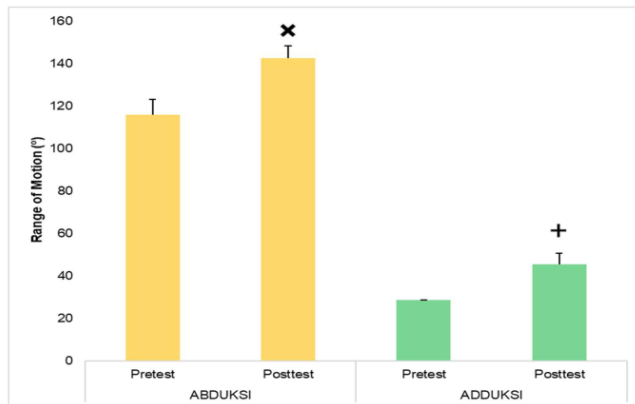


Figure 2. The results of the shoulder range of motion (°) improvement from Pretest to Posttest in the abduction and adduction movement groups.

From Figure 2. shows an increase in the average value of 26.85° so that the abduction ability reaches 140° (yellow bar chart), indicating functional readiness to carry out activities such as reaching for objects on high shelves or lifting the arms to the side. An increase in shoulder adduction range of motion (ROM) of 13.85° to 40° (green bar chart), indicates that the patient has achieved adequate functional range of motion to perform various activities that involve moving the arm to the side of the body, such as reaching for objects around the body, as well as performing self-care such as dressing and completing activities that require shoulder mobility in limited space.

Table 3. Paired Sample T-Test for Range of Motion (ROM) of External Rotation and Internal Rotation

Variabel	Movement	Test	Rerata	Std.Deviasi	T-hitung	Sig.
Range of Motion Bahu	Eks Rotation	Pre-Test	50.4286	5.24177	-13.556	0.000
		Post-Test	65.1429	2.60951	-17.091	0.000
		Pre-Test	47.1429	5.67786	-6.857	0.000

Range of Motion Bahu	Int Rotation	Post-Test	60.5714	3.73529	-9.512	0.000
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From Table 3, it was found that there is a significant difference between the pre-test and post-test on the external rotation movement variable with a Sig. value of (0.000 < 0.05). Furthermore, the analysis showed that there is a significant difference between the pre-test and post-test on the internal rotation movement variable with a Sig. value of (0.000 < 0.05).

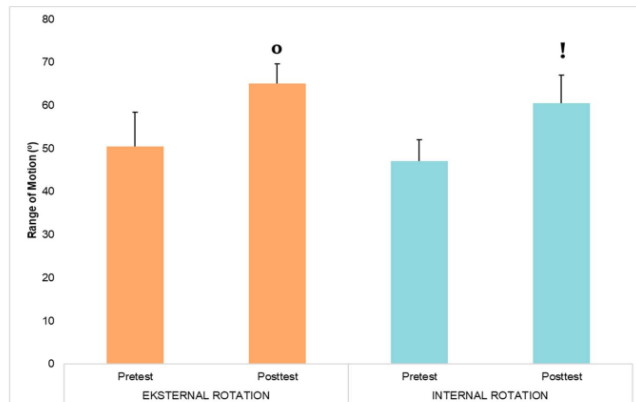


Figure 3. The results of the shoulder range of motion (°) improvement from Pretest to Posttest in the external rotation and internal rotation movement groups.

In Figure 3. An increase of 14.71° in the patient's internal rotation movement has not reached the range of 70° (orange bar chart) and still experiencing limitations in reaching the lower back independently. While an increase of 13.14° in external rotation is less than 90° (blue bar chart) so that the patient still experiences limitations in movements such as reaching the back of the head/back.

Discussion

Based on field observations, patients with frozen shoulder receiving therapy at Java Sporties have reported experiencing shoulder movement difficulties and functional impairments in their arms. In this study, we aim to explain the application of water shiatsu therapy for clients suffering from frozen shoulder. According to (Rangan et al., 2015), frozen shoulder is defined as a condition characterized by shoulder pain accompanied by severe limitations in both active and passive shoulder movements due to joint capsule restrictions. Range of motion (ROM) is a key indicator used to assess joint function.

The findings suggest that water shiatsu therapy has a significant impact on improving the range

of motion (ROM) in individuals with frozen shoulder at Java Sporties. Water shiatsu offers notable benefits in restoring shoulder joint mobility and enhancing the ROM, attributed to a combination of water buoyancy, the warm temperature of the water that relaxes muscles, and passive stretching massage techniques like Watsu. A study by (Tufekcioglu et al., 2023) highlighted that water shiatsu utilizes therapeutic properties of water, such as buoyancy, hydrostatic pressure, and the relaxing effects of warm water, which allow patients to move their shoulders more comfortably and freely, without significant gravitational pressure. This is particularly helpful for those with frozen shoulder, as pain and stiffness often hinder their ability to perform active movements on land. This method has a general relaxation and calming effect that soothes the muscle tension and stimulates all of the body systems and organs by nourishing the energy flow (Schitter et al., 2020).

After undergoing water shiatsu therapy for 4 weeks, there was a significant improvement in ROM, including flexion, extension, abduction, adduction, external rotation, and internal rotation. This resulted in increased shoulder flexibility, improved shoulder mobility, and relaxation of the muscles surrounding the shoulder joint. These improvements can be explained by several physiological mechanisms, including changes in the musculoskeletal system, the nervous system, and increased mobility of soft tissues around the joints, as well as decreased muscle tone, leading to decreased muscle tension (Schoedinger, 2023). Help from warmth the temperature in the pool during water shiatsu therapy (28-35°C) can increase blood circulation, stimulate the soft tissues of muscles that are experiencing spasms, and accelerate the healing process of muscles that are experiencing stiffness/spasms, thereby increasing the range of motion (Torres-Ronda & Del Alcázar, 2014).

Water Shiatsu is highly valued by clients and practitioners claim a large amount of health benefits (Lambeck, 2025) As explained by (Keating et al., 2023) in their book on water shiatsu techniques and their benefits, such as palming, kneading, and joint mobilization, these aim to improve relaxation, release muscle tension, and enhance blood circulation. Some joint mobilization techniques used in therapy include rotational movements at the glenohumeral joint, gentle downward pressure on the humerus, as well as flexion and extension movements of the arm. In addition, swinging the arm in different directions is also part of the technique to improve the range of motion and reduce stiffness in the shoulder joint (Jain & Sharma, 2014). These movements include side-to-side shoulder movement, front-back movement, circular movements, arm swings, as well as rotation movements of the neck and shoulder (Yuhantini, 2017).

CONCLUSIONS

Based on the data analysis results and the hypothesis testing conducted, it can be concluded that water shiatsu has an impact on improving the range of motion (ROM) of the shoulder in patients with frozen shoulder at Java Sporties. Although the sample size is small, the results of this study show positive results in patients with frozen shoulder and further research is needed, as there is considerable

variation worldwide regarding water shiatsu therapy.

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