



Physiotherapy Management of Low Back Pain in Indonesian Para Badminton Athlete: a Case Study

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Abstract

This study aims to determine the role of physiotherapy in the management of low back pain case in Indonesian para badminton athlete. The research method used in this research is a descriptive case study. The sample in this study is Mrs. R, aged 30, who is a professional para badminton athlete. The main complaints were pain and limited range of motion. Assessments were carried out using VDS for pain, Schobers test for ROM and ODI for functional activity ability. The physiotherapy interventions used were US, TENS, and William Flexion Exercise. The research procedure was that the researchers conducted examinations and measurements including physical examinations, specific examinations, and examination of functional activity ability. The researchers provided US, TENS, and William Flexion Exercise interventions, and then the researchers evaluated and processed data. After 6 therapy sessions at the NPC Indonesia clinic, pain assessment showed a decrease in silent pain from T1 score 1 to 0 in T6, in compression pain from T1 score 3 to T6 score 1, and in motion pain from T1 score 5 to T6 score 2. Evaluation of range of motion showed an increase in range of motion in trunk flexion from therapy 1 value of 5 cm to therapy 6 value 8 cm. In trunk extension movements from therapy 1 value of 7 cm to therapy 6 value 9 cm. Evaluation of functional activity showed an increase in functional activity from T1 with a total of 25 indicating severe disability to T6 with a total of 9 indicating mild disability.

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INTRODUCTION

Sport is a physical activity that can provide benefits for the health of the body (Sherly N., 2015). Sports activities are carried out for recreational purposes or more focused for achievement purposes. For sports to be effective, the existing rules must be carried out, this is also to reduce the risk of unwanted things such as sports injuries (Simatupang, 2016). Sports injuries can affect muscles, tendons, ligaments, bones and joints. These injuries are divided into two types, acute injuries and overuse injuries. Sports injuries are caused by many factors, including incorrect training methods, structural abnormalities and physiological weaknesses in the function of supporting tissues and muscles (Bueno et al., 2018).

Professional athletes spend a lot of time training and competing in high-intensity, mechanical activities that place excessive demands on the musculoskeletal system. Basically, the repetitive movements that athletes perform during their sporting activities are a common feature of competitive sports. However, some movements, such as the free rotation of the body in all directions, cause low back injuries. In some sports, the rotation of the body while leaning to one side is often the main cause of low back injuries (Fett, 2019). Approximately 20% of people worldwide are living with a disability. All people should engage in physical activity, including sports, but individuals with disabilities are more likely to be low participants, which increases their risk of developing chronic diseases linked to a sedentary lifestyle (Fagher, DeLuca, Derman, & Blauwet, 2023).

Low back pain, or LBP, is the primary cause of years spent disabled worldwide and has a substantial socioeconomic impact on people as well as health systems across the globe

(Ferreira et al., 2020; Lim et al., 2019; Pocovi et al., 2023; Tomazoni et al., 2020). Low back pain is defined as pain or discomfort located between the costal margin and the gluteal folds, with or without referred pain in the legs (Turci, Nogueira, Nogueira Carrer, & Chaves, 2023). Low back pain (LBP) is one of the sports injuries caused by musculoskeletal disorders, psychological disorders and poor mobility (Octaviany & Prasetyo, 2019).

Low back pain can be caused by several factors (de Campos et al., 2020). Some of the risk factors associated with low back pain are genetics, age, gender, postural abnormalities, physical activity, tenure, and physical factors such as physical stress, frequent weight lifting, and poor work posture (Kaur, 2016). In general, the factors that cause low back pain are lumbar strain, nerve irritation, lumbar radiculopathy, bone abnormalities (spinal stenosis, spondylolisthesis), joint and bone conditions (spondylosis) and congenital bone conditions (spina bifida and scoliosis) (Ligia, 2011; Pasha, 2015). It is estimated that 70-80% of the population in Western countries suffer from low back pain, while in Indonesia, especially in Central Java, approximately 40% of the population aged over 65 years suffer from low back pain, with a prevalence of 18.2% in men and 13.6% in women (Atmaja, 2023).

Low back pain is one of the most common causes of lost time among professional athletes. Low back pain is an important and common cause of athletes missing games. 30% of football players (44 out of 145 college football players) lost playing time due to low back pain. The reported prevalence of low back pain in athletes ranges from 1% to 30%, and 10 to 15% of all sports injuries are low back injuries (Moradi, Memari, ShayestehFar, & Kordi, 2015). Low back pain was higher in the elite sports group than in the control group (79% vs. 38%). The incidence of low back pain in badminton, football, tennis, golf, and powerlifting was reported to be

30-40%, and professional athletes missed at least one tournament due to low back pain (Mortazavi, 2015). Para badminton is divided into 6 classes, namely WH1 (wheelchair/severe impairment), WH2 (wheelchair/mild impairment), SL3 (standing/lower limb/severe), SL4 (standing/lower limb/mild), SU5 (standing/upper limb impairment), SH6 (standing/short stature). Disability types are muscle weakness, athetosis, reduced passive range of movement, hypertonia, limb deficiency, ataxia, leg length difference, or short stature (IPC, 2015).

Physiotherapy impairments experienced by para badminton players with low back injuries are pain and limited joint range of motion. Pain is an unpleasant sensation of damaged tissue (Prasetyo, 2010). A limited range of motion in a joint indicates a problem in that region. These complaints prevent the athlete from competing as a professional (Gerhanawati, 2021). Pain is assessed and measured using the Verbal Descriptive Scale (VDS). The VDS is a pain scale that measures the intensity of pain experienced by a person. The scale ranges from 1 (no pain) to 7 (unbearable pain). When the therapist administers this scale, the meaning of each number will be explained (Dwi S. A. N., 2013; Setiya, 2022).

Evaluation and measurement of ROM (Range of Motion) are performed with the Schobers test, ROM is measured using the midline with the patient standing, and the therapist sets a reference for flexion-extension movements at Vc7 and Vs1. The patient is asked to perform flexion and extension of the trunk and the physiotherapist measures the difference between Vc7-Vs1 in the normal (straight) position. Usually, the difference between the normal position and the flexion or extension position is

about 10 cm (Anita, 2018). Assessment of functional activity utilizes the Oswestry Disability Index (ODI) which is used to measure disability related to low back pain. The ODI includes ten items related to pain intensity, lifting ability, self-care ability, walking ability, sitting ability, sexual function, standing ability, social life, sleep quality, and ability to travel (Octaviany & Prasetyo, 2019).

The physiotherapy interventions utilized are US (ultrasound), TENS (transcutaneous electrical nerve stimulation), and William Flexion Exercise. Ultrasound (US) is a thermal therapy that uses sound waves with a frequency of more than 20,000 Hz to accelerate metabolic processes, reduce muscle spasms, improve circulation, and increase muscle flexibility and elasticity (Fibriani, 2018). TENS is a therapy that uses electrical energy to stimulate the nervous system at the surface of the skin to relieve pain (Eka Y., 2023). The William Flexion Exercise is an exercise therapy used to strengthen the lower back, abdominal, and gluteal muscles, stretch the hip flexors, and mobilize lumbosacral fixation. This exercise aims to reduce back pain and increase joint range of motion by strengthening the lumbosacral flexor and extensor muscle groups (Fibriani, 2018). Based on these issues, researchers conducted scientific research on the physiotherapy management of para badminton players with low back injuries who complained of pain and limited joint range of motion.

METHODS

The research method utilized in this study is the descriptive case study method. Data collection is done through a series of tests and observations. This study was conducted to determine and describe the physiotherapy management of low back pain case in Indonesian para badminton athletes.

A series of tests will be carried out in the form of examination and measurement of the level of pain and range of joint movement in athletes. Measurement of pain used VDS (Verbal Descriptive Scale) and measurement of range of motion used Schobers test.

Participants

The sample in this study is a 30-year-old female with the initials Mrs. R who is a professional para badminton athlete who trains daily at the National Training Centre in preparation for the ASEAN Para Games Hangzhou China 2023.

In para badminton competition, the sample is classified as SH6 with a short stature disability type. Short stature is defined as height $< P3$ or -2 SD of the appropriate curve according to age and sex. Short stature can be caused by pathological or non-pathological conditions (Indonesia, 2017).

Sampling Procedures

The sample in this study was a para badminton athlete who trains daily at the National Training Centre in preparation for the ASIAN Para Games Hangzhou China 2023. The technique used in this study was a total sampling technique where all participants were included as a sample.

The research was conducted at NPC Indonesia Clinic, Sugiyopranoto Street No.20, Kp. Baru, Ps. Kliwon District, Surakarta City, Central Java.

Materials and Apparatus

In this study, data collection techniques were carried out by examination and measurement, which included (i) physical examination: inspection, measurement of pain using the Verbal Descriptive Scale, and measurement of range of motion using the Schobers test. (ii) Specific examination: Laseque test, Neri test,

Bragard test, and palpation of the lumbar region. (iii) Assessment of functional ability using the Oswestry Disability Index (ODI). (iv) Physiotherapy intervention using US, TENS, and William flexion exercise.

Procedures

In this study, the following procedures were used: (i) researchers conducted examinations and measurements including physical examinations, specific examinations, and functional activity ability examinations; (ii) researchers provided US, TENS, and William Flexion Exercise interventions; (iii) researchers classified and processed data; (iv) physiotherapy interventions were conducted 6 times at NPC Indonesia Clinic, Sugiyopranoto Street No.20, Kp. Baru, Ps. Kliwon District, Surakarta City, Central Java.

Design or Data Analysis

This research uses a descriptive case study method. The purpose of this method is to describe a situation by collecting data, examining it, and drawing conclusions. This type of research does not explain the relationship between existing variables, therefore hypothesis testing is not carried out in this study.

This study aims to explain or describe physiotherapy management of low back pain in Indonesian para badminton athlete. This study uses the method of examination and measurement of 1 sample. The examinations and measurements presented are complete so that they can be used for further research if needed.

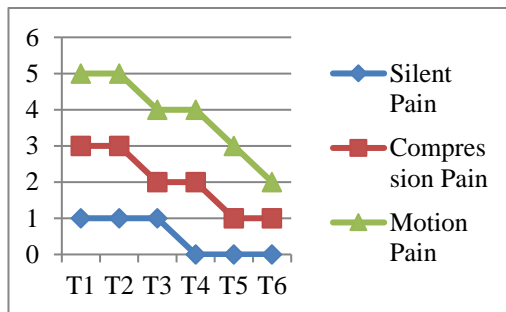
RESULT

1. Results of the physical examination

The examination was carried out on Mrs. R, aged 30 years, a professional badminton athlete whose daily activities are training at the National Training Centre in

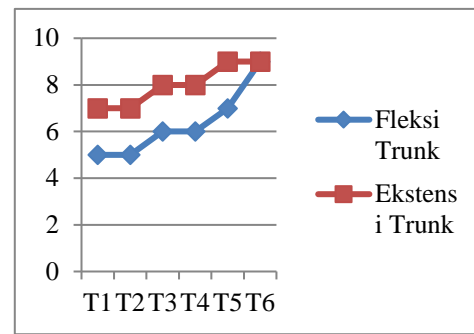
preparation for the ASEAN Para Games Hangzhou China 2023.

The subject complained of low back pain, particularly on the left side, after performing smash movements during routine training. The pain was particularly felt during walking and bending movements. It appeared when the patient came to the physiotherapy clinic walking slowly because he was holding his lower back pain. The line graph shows the results of measurements in three different pain using VDS after 6 sessions of therapy.



Graph 1. Measurement of Pain using VDS

The interpretation of the VDS pain levels is as follows 1) no pain, 2) very mild pain, 3) mild pain, 4) moderate pain, 5) moderate pain, 6) severe pain, and 7) unbearable pain. Overall, from the graph, it can be seen that the pain gradually decreased according to the level of pain on the VDS scale. In silent pain which the result of T1 was 1 slightly decreased after 6 times meetings to 0 in T6. Moreover, in compression pain which T1 was 3 experienced a decline to 1 after 6 sessions. Also movement pain that the result of T1 was 5 dropped significantly to 2 in T6. The results of measuring trunk ROM with the Schobers test after 6 sessions of therapy are shown in the graph 2.



Graph 2. Measurement of ROM using Schobers Test

Overall, as can be seen in the graph that the interpretation was an increase in the range of joint movement in trunk flexion & extension movements. The result of trunk flexion in therapy 1 was 5 cm; however, it significantly increased to 9 cm in therapy 6. In trunk extension movements which therapy 1 was 7 cm slightly increased to 9 cm after 6 sessions.

2. Result of the specific examination

The table below shows the results of the specific examination.

Table 1. Result of the specific examination

| No | Items | Description |
|----|--------------|-------------|
| 1 | Laseque Test | - |
| 2 | Neri Test | - |
| 3 | Bragard Test | - |
| 4 | Palpation | + |

The interpretation of the results of the special examination above that was found was tenderness in the lower back area and spasm of the erector spinal muscles, as well as no tingling feeling that spread from the lower back to the legs.

3. Result of the functional activity examination

The results of the functional activity test using the ODI are described in the table 2.

Table 2. Result of the ODI examination

| No | Items | T1 | T3 | T6 |
|----|---------------|----|----|----|
| 1 | Pain | 3 | 2 | 1 |
| 2 | Personal Care | 3 | 2 | 1 |
| 3 | Lifting | 3 | 2 | 1 |
| 4 | Walking | 3 | 2 | 1 |
| 5 | Sitting | 3 | 2 | 1 |
| 6 | Standing | 3 | 2 | 1 |
| 7 | Sleeping | 1 | 1 | 0 |
| 8 | Social life | 2 | 2 | 1 |
| 9 | Travelling | 2 | 2 | 1 |
| 10 | Employment | 2 | 2 | 1 |
| | Total | 25 | 19 | 9 |

The interpretation of the ODI examination above is: 1) 1-4 no disability, 2) 5-14 mild disability, 3) 15-24 moderate disability, 4) 25-34 severe disability, 5) 35-50 total disability. T1 a total of 25 indicate severe disability, T3 a total of 19 indicates moderate disability, and T6 a total of 9 indicates mild disability.

4. Physiotherapy Interventions

The physiotherapy interventions provided are described in the table 3.

Table 3. Physiotherapy Interventions

| Sessions | 1,2,3,4,5,6 |
|---------------|--|
| Interventions | <ol style="list-style-type: none"> 1. Ultrasound 2. TENS 3. William Flexion Exercise |
| Goals | <ol style="list-style-type: none"> 1. Reduces muscle spasm, improves circulation, increases muscle flexibility and elasticity 2. Reduce pain 3. Increase joint range of motion and improve muscle strength of lumbosacral flexors and extensors |

| Dosages | |
|---------|--|
| 1. | Week 1 0,2Watt/cm ² , 1 MHz, 4 m Week 2 0,4 Watt/cm ² , 1 MHz, 4 m |
| 2. | Week 1 Symetric current, 100 μs, 10 m Week 2 Symetric current, 100 μs, 10 m |
| 3. | Week 1 & 2 F: 3x/week I: 10 reps 3 sets T: 60s/reps E: Pelvic tilt, Double knee to chest, partial sit-up, hamstring stretch, squat, lumbar flexion with rotation |

DISCUSSION

Low back pain (LBP) is one of the sports injuries caused by musculoskeletal disorders, psychological disorders and poor mobility (Octaviany & Prasetyo, 2019). The reported prevalence of low back pain in athletes ranges from 1% to 30%, and 10 to 15% of all sports injuries are low back injuries. Low back pain was higher in the elite sports group than in the control group (79% vs. 38%). The incidence of low back pain in badminton, football, tennis, golf, and powerlifting was reported to be 30-40%, and professional athletes missed at least one tournament due to low back pain (Mortazavi, 2015). The aim of this study is to find out the role of physiotherapy in the management of low back pain case in Indonesian para badminton athlete.

The physiotherapy treatments used to manage low back pain in para badminton athlete are the US, TENS, and William flexion exercises. The selection of these interventions is based on the athletes' complaints in terms of pain and limited

range of motion. The intervention was performed 6 times at the NPC Indonesia Clinic, Sugiyopranoto Street No.20, Kp. Baru, Ps. Kliwon District, Surakarta City, Central Java, with the dosage as shown in Table 3. Pain is an unpleasant sensation of damaged tissue (Prasetyo, 2010). A limited range of motion in a joint indicates a problem in that region. These complaints prevent the athlete from competing as a professional athlete (Gerhanawati, 2021).

The VDS and Schobers test are used to measure pain and limitation of joint movement. The VDS consists of 7 scales with interpretation: 1) no pain, 2) very slight pain, 3) slight pain, 4) moderate pain, 5) moderate pain, 6) severe pain, 7) unbearable pain. In the Schober test, the physiotherapist measures the difference between Vc7-Vs1 in the normal position and flexion and extension. Usually, the normal Vc7-Vs1 difference is about 10 cm.

In graph 1, the pain assessment utilized VDS which after 6 therapy sessions showed a decrease in pain from T1 value 1 to T6 value 0 for silent pain, from T1 value 3 to T6 value 1 for compression pain, and from T1 value 5 to T6 value 2 for motion pain. This indicated the success of the TENS intervention used to reduce pain. TENS is a therapy that uses electrical energy to stimulate the nervous system at the surface of the skin to relieve pain (Eka Y., 2023).

In Graph 2, the evaluation of the range of motion of the joints used Schobers test which after 6 therapy sessions showed an increase in the range of motion of the joints in trunk flexion movements from a therapy 1 value of 5 cm to a therapy 6 value of 8 cm. In the trunk extension movement, from therapy 1 value of 7 cm to therapy 6 value of 9 cm. This was the result of a combination of ultrasound to reduce spasm and William flexion exercise to increase

range of motion by strengthening the lumbosacral flexor and extensor muscle groups (Fibriani, 2018). The specific examination was performed to confirm the findings of the previous physical examination. In table 1, the specific examination gave positive results on palpation with the interpretation of tenderness in the lower back area and spasm of the erector spinal muscles, and there was no tingling sensation radiating from the lower back to the feet.

Pain problems and limited range of motion in the joints will certainly interfere with functional activities. For this reason, functional capacity was assessed using the ODI. The interpretation of the ODI is as follows: 1) 1-4 no disability, 2) 5-14 mild disability, 3) 15-24 moderate disability, 4) 25-34 severe disability, 5) 35-50 total disability. In Table 2 the results showed an increase in functional ability from T1 with a total of 25 indicating severe disability to T6 with a total of 9 indicating mild disability.

CONCLUSION

This study aims to determine the role of physiotherapy in the management of low back pain case in Indonesian para badminton athlete. The research method used in this research is a descriptive case study. Data collection was done through several series of tests and observations. The sample in this study is a woman with the initials Mrs. R, aged 30, who is a professional para badminton athlete who trains daily at the National Training Centre in preparation for the ASEAN Para Games Hangzhou China 2023.

The main complaints were pain and limited range of motion. Assessments were carried out using VDS for pain, Schobers test for ROM and ODI for functional activity ability. The physiotherapy interventions used were US, TENS, and William Flexion Exercise. The intervention was carried out 6 times at the NPC

Indonesia clinic, Sugiyopranoto Street No.20, Kp. Baru, Ps. Kliwon District, Surakarta City, Central Java. After 6 sessions of therapy, the final result was a decrease in pain, an increase in joint range of motion, and an increase in functional activity ability.

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