PHYSIOTHERAPY MANAGEMENT IN CASES OF MYOGENIC LOW BACK PAIN USING INFRA RED MODALITY AND EXERCISE THERAPY AT BANDUNG KIWARI HOSPITAL

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Abstract

Background : *Myogenic Low Back Pain* is a condition related to stress/strain of the back muscles, tendons, ligaments which usually occurs when doing excessive daily activities and there is no parasthesia.

Objective : To determine the implementation of Physiotherapy in reducing pain, increasing muscle strength and increasing functional activity abilities in cases of *Myogenic Low Back Pain using Infra Red* modalities and Exercise Therapy.

Results: After 4 treatments, the assessment results showed a reduction in tenderness from T1:3 to T4: 2, movement pain from T1:5 to T4: 4. Increased trunk extension muscle strength from T1:4 to T4: 5. Increased ability for functional activities. can be seen from the reduction in the ODI score, namely, T1: 30% to T4: 20%.

Conclusion : *Infrared* can help reduce pain and exercise therapy can increase muscle strength and functional activity abilities.

Kata Kunci: Fisioterapi, *Low Back Pain Miogenik, Infra Red* dan Terapi Latihan.

Abstract

Background: Myogenic Low Back Pain is a condition associated with stress/strain of the back muscles, tendons, ligaments that usually exists when doing excessive daily activities and no parasthesia.

***Objective**:To determine the implementation of Physiotherapy in reducing pain, increasing muscle strength and improving functional activity abilities in cases of Myogenic Low Back Pain with Infra Red modalities and Exercise Therapy.*

***Results**: After 4 times of therapy, the results of the assessment of decreased tenderness T1: 3 to T4: 2, motion pain T1: 5 to T4: 4. Increased trunk extension muscle strength T1: 4 to T4: 5. Increased functional activity ability which can be seen from the reduction in ODI scores, namely, T1: 30% to T4: 20%.*

***Conclusion**: Infra Red can help reduce pain and Exercise Therapy can increase muscle strength and functional activity ability.*

***Keywords**: Physiotherapy, Myogenic Low Back Pain, Infra Red and Exercise Therapy.*

PENDAHULUAN

Latar Belakang Penulisan

Health is a state of complete physical, mental and social well-being and not just the absence of disease or infirmity. *(WHO) World Health Organization 2020.* Meanwhile, health according to Law of the Republic of Indonesia Number 17 of 2023 concerning health, namely, health is a person's healthy state, both physically, mentally and socially and even simply being free from disease to enable him to live a productive life.

According to the Word Health Organization (WHO), low back pain (LBP) is the most common musculoskeletal problem, affecting 570 million cases worldwide. The International Labor Organization (ILO) reports that musculoskeletal disorders are currently experiencing an increase in cases in many countries. The incidence in Korea of musculoskeletal disorders has increased by around 4,000 cases. According to the Directorate General of Health Services, Ministry of Health of the Republic of Indonesia (Kemenkes RI), the prevalence of Low Back Pain (LBP) in Indonesia is 18%. The incidence rate in Indonesia based on patient visits from several hospitals is around 3-17% of complaints of Low Back Pain (LBP). Low Back Pain (LBP) or lower back pain is caused by several risk factors. Risk factors for lower back pain are: age, body mass index, length of work, office chair, sitting position and movement habits. Back pain affects both young and old people, but gets worse between the ages of 30 and 60 and above. Lower back pain is also caused by excess weight (Hasby , Baharuddin, & Sani, 2023).

Many people assume that lower back pain is the same as kidney disease or a cold. This results in treatment efforts being inappropriate and too late. Low back pain is muscle tension, local stiffness below the costal margin and above the inferior

gluteus crease with or without aches and pains, and is said to be chronic if it lasts twelve weeks or more. The incidence of lower back pain is more than 70% of people in developed countries will experience lower back pain at some time in their lives each year between 15 and 45% of adults experience lower back pain. Low back pain (LBP) is a manifestation of a pathological condition experienced by tissues or organs in the body that are part of the waist or near the waist. In dealing with low back pain, in addition to eliminating the pain as far as possible, it also eliminates the pathological condition, so that even though the etiology of Low Back Pain (LBP) can vary from the lightest (for example: muscle fatigue) to the most severe (for example: malignant tumor) However, the majority of low back pain (LBP) in society is the result of mechanical factors that do not benefit the lower spine in its function of maintaining an upright position of the body (statics) (Saputra, Siregar, & Butarbutar, 2023).

Physiologically, myogenic low back pain causes changes in muscle activity surrounding localized pain. The pattern of trunk muscle activation in patients with myogenic low back pain (where the pain arises from the muscular structures) of the vertebrae including bones, ligaments, discs, joints, nerves and meninges is different from that of the healthy population. Changes in muscle activity in patients with myogenic low back pain should be considered a functional adaptation for spinal stabilization. This vertebral stabilization results from dysfunction of passive spinal (non-contractile) or active structures (muscles) of the vertebra or the effects of nerve fiber impulses (Shamsi, Mirzaei, & HamediRad, 2020).

Physiotherapy is a form of health service aimed at individuals and/or groups to develop, maintain and restore body movement and function throughout the life span by using manual treatment, movement enhancement, equipment (physical, electrotherapeutic and mechanical), functional training, and communication (Permenkes , No. 65 of 2015). Physiotherapy in cases of Low Back Pain has an important role in recovery and restoring the patient's

functional ability. With physiotherapy problems, the modality used is *Infra Red.*

InfraRed (IR) is a physiotherapy device that emits red light to improve blood circulation and reduce muscle tension. IR has a wavelength of 1.5-5.6 microns and has radiation reaching 5.6-1000 microns and penetration of 3.75 cm. This electrotherapy modality is most common because it provides a thermal effect which aims to relieve pain, help improve blood circulation and reduce inflammation (Halimah, Pradita, & Jamil, 2022). Apart from using Infra Red modalities, physiotherapy also provides exercise therapy, namely *William flexion, Core stability.*

William flexion is exercise therapy or physical training used by physiotherapy to maintain and restore physical health and to keep joints and muscles moving. This exercise can reduce lower back pain and is a form of physical exercise to reduce stress on the posterior elements of the spine, so as to maintain proper balance between the postural flexor and extensor muscle groups. The William flexion exercise is believed to be an exercise to increase the lumbar curve and increase muscle flexibility (Halimah, Pradita, & Jamil, 2022).

Core Stability Exercise has the ability to control position and movement in the center of the body because the main target of this exercise is the abdominal muscles, which are connected to the spine, pelvis and shoulders. When the core muscles are weak or there is no balance (muscle imbalance), what occurs is pain in the lower back area which results in decreased lumbar flexibility. With core stability exercise, the balance of the abdominal and paravertebral muscles will form a better relationship because there is coactivity of the deep muscles of the lumbar so that they can control movement during movement. (Irawan, Nurhikmawaty, & Irianto, 2020). William flexion and core stability exercises function to increase muscle flexibility and restore the patient's functional activities.

A. At issue

Based on the background that the author has explained, it can be concluded that the main problems in this research are as follows:

1. Can *Infra Red* help reduce pain and muscle spasms in cases of *Myogenic Low Back Pain* ?
2. Can Exercise Therapy help increase muscle strength in cases of *Myogenic Low Back Pain* ?
3. Can Exercise Therapy help restore functional ability in cases of *Myogenic Low Back Pain* ?
4. How do you prepare a physiotherapy action plan in cases of *Myogenic Low Back Pain* ?
5. How do you provide action and evaluation to patients with cases of *Myogenic Low Back Pain* ?

B. Research purposes

Based on the questions above, the purpose of this writing is as follows:

1. Find out the benefits of *Infra Red* to reduce pain and muscle spasms in cases of *Myogenic Low Back Pain* .
2. Find out the benefits of Exercise Therapy to help increase muscle strength in cases of *Myogenic Low Back Pain* .
3. Find out the benefits of exercise therapy to help restore functional abilities in cases of *Myogenic Low Back Pain* .
4. Know how to plan physiotherapy procedures for cases of *Myogenic Low Back Pain* .
5. Know how to provide action and evaluation to patients with cases of *Myogenic Low Back Pain* .

C. Uses of Writing

Based on the research objectives above, the usefulness of writing this final assignment is as follows:

1. For Patients

So that patients and their families know the importance of an overview of *Myogenic Low Back Pain cases* along with exercises that can be done at home to help reduce pain, muscle spasms, increase muscle strength, and restore functional activities.

2. For Hospitals

Useful for improving hospital health services as well as more information on physiotherapy management in cases of *Myogenic Low Back Pain* using Infra Red and Exercise Therapy.

3. For Writers

From the results of this research, it is hoped that the author will be able to increase and expand knowledge and be able to determine appropriate modalities in cases of *Myogenic Low Back Pain* .

4. For Institutions

From the results of this writing, it is hoped that institutions can use this writing as learning material and reference to develop knowledge in cases of *Myogenic Low Back Pain* using Infra Red modalities and Exercise Therapy.

LITERATURE REVIEW

A. Definition

Myogenic Low Back Pain is myogenic low back pain related to stress/strain of the back muscles, tendons, ligaments which usually occurs when doing excessive daily activities. The pain is dull, varies in intensity, often becomes chronic, can be localized or can spread around the glutea. This pain is not accompanied by hypertension, paresthesias, weakness or neurological deficits. if the cough or sneeze does not spread to the legs. There are several risk factors that can cause Myogenic Low Back Pain, including age and gender. without feeling tingling or interference with the nerves, when coughing or sneezing without spreading to the feet. Myogenic Low Back Pain is caused by static factors and stiffness of the surrounding muscles. These two factors can cause the abdominal and lower back muscles to become less stable and limited lumbar mobility, this causes disruption to activities carried out every day, namely bending and twisting the body (Maysaroh, Israwan , Zakaria, & Hargiani, 2021).

A. Anatomy

a. Spinal Vertebrae

The spine is a pillar or pole that functions as a support for the body. The spine consists of 33 vertebrae arranged segmentally. Consists of 7 cervical vertebrae, 12 thoracic vertebrae, 5 lumbar vertebrae, 5 fused sacral vertebrae, and 4 coccygeal vertebrae(Untari, Susanti, Khodiyah, & Himawati, 2023)

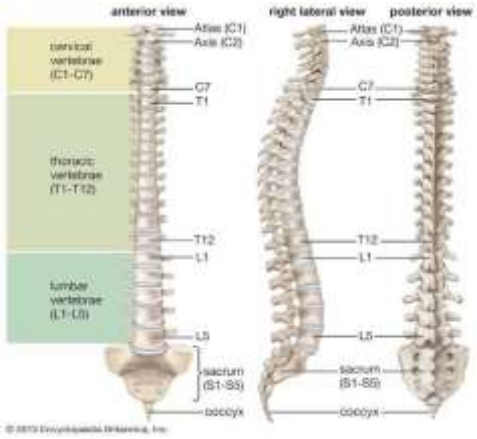


Figure 2.1 Vertebral Column(Untari, Susanti, Khodiyah, & Himawati, 2023)

Each vertebra consists of a corpus in front and a neural arch in the back which has a pair of pedicles on the right and left. A pair of laminae, two joints, one spinous process, and two transverse processes. Each vertebra is connected by cartilage tissue called the intervertebral disc. The intervertebral disc functions as an absorber, and 10 stabilizes the movement of the vertebral bodies. Each disc is also composed of layers of cartilage.

The greatest pressure is in the spine, especially in the lumbar or lower back area. The spine in the lumbar area is an area where low back pain often occurs. The lumbar vertebrae are the largest vertebrae in the spine. The spinous processes are wide and have the shape of a small axle, the transverse processes are long and small, the lumbar vertebrae form joints with the sacrum bone at the lumbosacral joint.

b. Muscular system

The spine muscles consist of intrinsic and extrinsic muscles which function as movers and stabilizers of the vertebrae, muscle groups in the lumbar region and their respective functions for movements that occur in the lumbar region.

1. M. Rectus abdominis, for flexion and lateral flexion.
2. M. Obliqus externus abdominis, for slight flexion and lateral flexion
3. M. oblique internus abdominis, for flexion and lateral flexion.
4. M. Semispinalis (thoracic), when contracted bilaterally functions to extend the spinal column and when contracted unilaterally functions to rotate on the opposite side.
5. M. Quadratus lumborum, when contracted bilaterally for lumbar spine extension and pelvic elevation.

6. M. Multifudus, when it contracts bilaterally for the vertebral column and when it contracts unilaterally for flexion and rotation.

7. M. Erector spine which consists of:

a) M. Illiacostalis thoracic, contracts trunk extension for lateral flexion and rotation.

b) M. Illiacus lumborum contracts uni-laterally for flexion and elevation of the pelvis.

c) M. Longisimus thoracis, contracts for trunk extension and lateral flexion.

d) M. Spinal thoracis, for trunk extension

B. Etiology

Myogenic LBP is a form of disorder in the back muscle structure that generally occurs due to trauma. Trauma can include strains, muscle spasms and ligament sprains in the lower back. Myogenic LBP can occur due to direct muscle problems and indirect muscle problems. This can result in prolonged muscle spasm which can cause blood vessels to become clamped which results in ischemia which can cause pain. Myogenic LBP due to indirect muscle problems is influenced by the patient's posture. Conditions that last a long time can cause muscle contractures, causing trauma that causes changes in posture (Purwasih, Prodyanatasari, & Salam, 2020).

A strain occurs when a muscle is stretched too far and tears, damaging the muscle itself. In addition, it can also be due to sprains which occur when excessive stretching and tearing affects the ligaments, which connect the bones together. Sprains and strains that trigger lower back pain can be caused by a number of factors such as:

1. Lifting heavy objects, or twisting the spine when lifting
2. Sudden movements that put too much pressure on the lower back, such as falling
3. Poor posture over time
4. Sports injuries, especially in sports involving twisting or large impact forces. In addition, pain is considered chronic once it lasts more than three months and exceeds the body's natural healing process.

Additionally, pain is considered chronic once it lasts more than three months and exceeds the body's natural

healing process. Chronic pain in the lower back often involves disc problems, joint problems, and/or irritated nerve roots. A number of conditions that cause include:

1. Lumbar disc herniation
2. Degenerative disc disease
3. Joint dysfunction
4. Spinal stenosis.
5. Spondylolisthesis
6. Osteoarthritis
7. Deformity
8. Trauma
9. Compress fracture
10. Infection
11. Tumor
12. Autoimmune disease

(Agustina & Khiong, 2023).

C. Pathophysiology

In low back pain conditions, the lumbar extensor muscles are usually weaker than the flexor muscles. As a result, you cannot lift weights strongly. Although pain does not always originate in the muscles, muscle spindles clearly irritate the sympathetic nervous system. With chronic hyperactivity, muscle spindles spasm, causing tenderness. Incorrect muscle attachment causes pain and inhibits muscle activity. If peripheral sensory nerves called nociceptors are affected by mechanical, chemical, or thermal stimuli, then pain impulses are sent to the afferent fibers of the spinal branch. Impulses are sent to the brain via collateral spinothalamic tracts from the spinal cord. Next, it will provide a nerve impulse response. To reduce pain, endogenous peptides that function as analgesics, endorphins, are released.

D. Epidemiology

The World Health Organization (WHO) reported that the prevalence of non-specific LBP in industrialized countries in 2013 was quite high, ranging from 60%-70%, with a prevalence of 15%-45% per year. The incidence rate in the elderly is 5% per year, children and adolescents have a lower incidence rate than adults. Based on the Association of Indonesian Neurologists (PERDOSSI) in 2016, it showed that the prevalence of lower back pain was 35.86%.

E. Signs and symptoms

Depending on the underlying cause of the pain, symptoms can be experienced in various ways, such as:

1. Pain or soreness in the lower back area
2. The pain is stinging and burning, felt radiating from the lower back to the back of the thigh, sometimes to the lower leg or foot; may include numbness or tingling (rheumatic pain)
3. Muscle spasms and tightness in the lower back, pelvis, and hips
4. Pain that worsens after prolonged sitting or standing
5. Difficulty standing up straight, walking, or moving from standing to sitting

Apart from that, the symptoms of lower back pain also differ according to the level of severity, namely:

1. Acute low back pain: usually comes on suddenly and lasts for several days or weeks. This condition is considered the body's normal response to injury or tissue damage. The pain gradually subsides as the body heals.
2. Subacute low back pain: generally lasts between 6 weeks and 3 months and is usually mechanical (such as muscle tension or joint pain) but prolonged. At this point, a medical examination may be considered, and is recommended if the pain is severe and interferes with activities.
3. Chronic low back pain: lasting more than 3 months, this type of pain is usually severe, does not respond to initial treatment, and requires a thorough medical examination to determine the exact source of the pain.

F. Risk factor

There are many factors that influence the incidence of LBP, including age, gender, body mass index, length of work, work position, work period, repetition, workload, smoking, stress, physical activity, and history of illness.

Increasing age will cause degeneration of the bones and a situation like this will occur when a person is 30 years old. At the age of 30 years degeneration occurs in the form of tissue damage, tissue replacement into scar tissue, and fluid reduction. This causes the stability of the bones and muscles to decrease. The older a person is, the higher the risk of that person experiencing a decrease in bone elasticity which

triggers LBP symptoms (Sahara & Pristya, 2020).

G. Complications

Scoliosis is the most common complication found in sufferers of lower back pain due to spondylosis. This happens because the patient always positions his body in a more comfortable direction without paying attention to normal body posture. This is supported by muscle tension on the side of the affected vertebra (Permatasari, 2022).

METHOD

A. Physiotherapy Intervention Technology

1. Infrared

a) Definition

InfraRed (IR) is a physiotherapy device that emits red light to improve blood circulation and reduce muscle tension. IR has a wavelength of 1.5-5.6 microns and has radiation reaching 5.6-1000 microns and penetration of 3.75 cm. This electrotherapy modality is most common because it provides a thermal effect which aims to relieve pain, help improve blood circulation and reduce inflammation (Halimah, Pradita, & Jamil, 2022).

b) Indication

1) Inflammatory condition of soft tissues, joints and nerves that has passed the acute phase.

2) Lack of local blood circulation .

3) Diseases of the skin.

4) Pre-massage and pre-exercise.

c) Contraindications

1) If there is a disturbance in skin sensitivity in the area of the body that will be irradiated.

2) The presence of new tissue (burns).

3) If the area of the body to be irradiated has a tendency to bleed.

4) Fever, and acute infections (TB, cancer/tumor).

2. Exercise Therapy

a) William Flexion

William flexion is exercise therapy or physical training used by physiotherapy to maintain and restore physical health and to keep joints and muscles moving. This exercise can reduce lower back pain and is a form of physical exercise to reduce stress on the posterior elements of the spine, so as to maintain proper balance between the postural flexor and

extensor muscle groups. The William flexion exercise is believed to be an exercise to increase the lumbar curve and increase muscle flexibility (Halimah, Pradita, & Jamil, 2022). The exercise consists of seven movements that function to reduce the lumbar curve, namely: Pelvic Tilt Exercise, Partial Sit-ups, Single Knee To Chest, Double Knee To Chest, Hamstring Stretch, Hip Flexor Stretch, Squat.

b) Core Stability Exercises

Core stability exercise is an important component in efficient athletic function movements, a function often referred to as the kinetic chain, coordination and a series of activations of body segments located in the distal segments in optimal positions, in optimal positions that can produce athletic movements. Core muscles are very important for providing local strength, balance and reducing the risk of injury. This is because when a muscle contracts, there is stretching or stretching of the antagonist muscles (Jehanam, Yanto, & Tantangan, 2023). The exercise given is bridging with the patient in a supine lying position then bend both knees and lift the hips and hold for a count of 1-8.

B. Physiotherapy Problems

Physiotherapy problems occur according to the WHO classification known as *the International Classification of Function and Disability* (ICF) which consists of 3 levels, namely Impairment, Functional Limitation, and Participation Restriction.

1. Impairments

Impairment is a direct disturbance at network level or can also be related to complaints felt by the patient regarding the disease they are suffering from. For example, movement and pressure pain, decreased muscle strength, LGS limitations.

2. *Functional Limitations*

Functional Limitation is a problem in the form of a decrease or limitation when carrying out functional activities as a result of existing impairments. Examples of difficulties when carrying out activities include sitting in a cross-legged position, standing for a long time and lifting heavy objects.

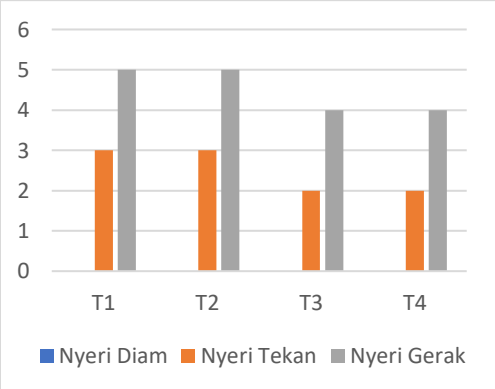
3. *Participation Restrictions*

Participation Restriction is a problem in the form of the sufferer's inability to resume activities related to their original job and socialization activities with the community as a result of impairment and functional limitation. For example, patients are still able to do housework, but sometimes patients do not attend recitation because of pain.

RESULTS AND DISCUSSION

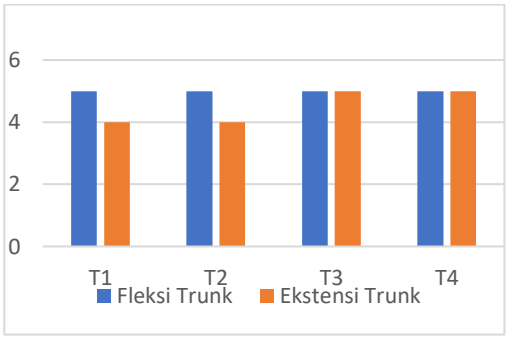
Specific inspections are carried out as a follow-up to previous inspections which require data accuracy. This inspection includes:

A. Results of pain measurement using VAS



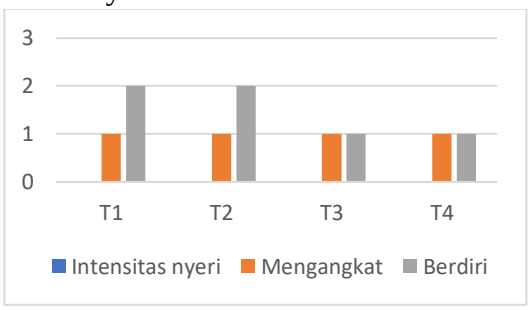
Evaluation of the pain value measured using VAS after undergoing therapy 4 times stated that the patient did not experience silent pain from the start of therapy, however, there was a decrease in movement pain from a value of 5 to a value of 4, tender pain from a value of 3 to 2.

B. Results of measuring muscle strength with MMT



Evaluation of the results of muscle strength measured using MMT after therapy for 4 times stated that the patient did not experience a decrease in muscle strength in trunk flexion movements from the start of therapy, however, there was an increase in muscle strength in trunk extension movements from a value of 4 to a value of 5.

C. Results of measuring functional activity abilities with the ODI Scale



Evaluation of functional activity ability using the ODI scale after undergoing therapy 4 times showed an increase in functional ability with T1 results: 30%. Become T4: 20%

CLOSING

A. Conclusion

Based on examinations that have been carried out 4 times, it can be concluded that patients experiencing

myogenic low back pain can be treated using IR modalities and exercise therapy. Based on this treatment, the following results were obtained:

1. After administering IR, it was found that there was a decrease in pain scores, this was proven by examination and evaluation using VAS. After 4 treatments, it was stated that there was a decrease in pressure pain from a value of T1: 3 to T4: 2, movement pain from a value of T1: 5 to T4: 4
2. After giving William flexion exercise therapy and Core stability exercise, it was found that there was an increase in muscle strength, this was proven by examination and evaluation using MMT. After 4 treatments, there was an increase in muscle strength with trunk extension results from a value of 4 to a value of 5.
3. After administering William flexion exercise therapy and Core stability exercise, it was found that the patient's functional activity abilities increased, this was proven by examination and evaluation using the Oswestry Disability Index scale. After 4 treatments, there was an increase in functional activity ability with results of T1: 30% to T4: 20%.
4. Complaints that occur in patients during the first therapy include: movement pain and tenderness, which causes a decrease in muscle strength. After five rounds of therapy, the results showed that there was a reduction in pain, an increase in muscle strength and an increase in functional activity.
5. Actions given to patients with cases of Myogenic Low Back Pain can be given modalities such as IR to help reduce pain by evaluation using VAS and exercise therapy to help increase muscle strength using MMT and increase functional activity ability by evaluation using the Oswestry Disability Index.

B. Suggestion

1. For patients

It is recommended for patients to remain careful in carrying out activities and not carry out activities that could worsen the patient's condition. And it is recommended to continue practicing at home according to what the therapist gives.

2. For hospitals

The author advises hospital agencies to improve services for patients with cases of low back pain to immediately refer them to the medical physiotherapy rehabilitation clinic to receive immediate treatment to prevent further problems.

3. For writers

It is recommended to read more references from various sources such as journals, scientific books, and develop the knowledge gained during college, especially in cases of low back pain.

4. For institutions

It is recommended that institutions use this writing as learning material and reference to develop knowledge on low back pain cases.

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