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Implementation of Pilates Exercises to Reduce Pain Scale in Low Back Pain Patients

Ade Fitriani[1], Mia Rosmiati[1]

[1] *STIKes Muhammadiyah Ciamis, West Java, Indonesia*

Correspondence author: Mia Rosmiati
Email: miaati146@gmail.com
Address: Jl. KH. Ahmad Dahlan No. 20 Ciamis, 45216, West Java, 085322584706

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ABSTRACT

Introduction: Low back pain or lower back pain is pain that occurs in the waist or buttocks area which usually persists for a long time. Working as a disabled person is the dominant cause of LBP, including the profession as a nurse. LBP is the third disease that often occurs in the world, including in Indonesia. Pain is a problem caused by LBP, so it will interfere with sufferers in carrying out daily activities. Pain is a term for a complex reaction caused by physiological reactions in the nervous system.
Objective: This case study aims to reduce pain intensity in low back pain patients.
Method: This research is in the form of a case study with a descriptive method with a nursing care approach which includes assessment, nursing diagnosis, nursing care plan, nursing implementation and nursing evaluation.
Results: The results of the case study at the assessment stage showed that Ms. M with the problem that emerged was acute pain so the nursing diagnosis was obtained as acute pain related to a physiological injury agent (SDKI), with the criteria for decreased pain results (SLKI). The intervention used uses the Standard Nursing Intervention (SIKI).
Conclusion: The intervention was carried out over four meetings. By using NRS (Numeric Rating Scale) and FPS (Face Pain Scale) measurements, after carrying out Pilates exercises, a decrease in pain was obtained with the result that there was a decrease in pain intensity from initially severe pain with a pain scale of 8 (0-10) to mild pain with a scale of pain 3 (0-10).

Keywords: *Low back pain, Acute Pain, Pilates exercise*

Introduction

Low back pain or lower back pain is pain that occurs in the waist or buttocks area and usually persists for a long time. Working as a disabled person is the main cause of LBP, including the profession as a nurse (Astuti, 2022).

Cording to the World Health Organization (WHO) in 2022, there are 1.71 billion problems with the musculoskeletal system, one of which is low back pain which is the third

health problem in the world with 17.3 million sufferers (Mastuti & Husain, 2023). The prevalence of LBP in Indonesia according to RISKESDAS in 2021 reached 12,914 people or around 3.71%. Then supported by the association of Indonesian neurologists (PERDOSIS) in 14 educational institutions, it is estimated that around 819 patients experienced lower back pain, from a total of 4,456 patient visits (Mastuti & Husain, 2023). Complaints of lower back pain were recorded at around 16% in West Java Province and ranked third on Java Island (Aenia et al., 2023).

Factors that cause lower back pain include: age, BMI or BMI (obesity), length of work, shape or type of chair, wrong sitting position and wrong movement habits or body posture (Habir et al., 2023). Another opinion says that low back pain occurs due to lifting heavy objects, excessive stretching of the lower back muscles, trauma or spinal injury and wrong positions such as bending, tilting the body, and kneeling or reaching for objects in an unergonomic position (Mastuti). & Husain, 2023).

Pain is usually felt in the lower back and spreads to the lower extremities, this is caused by the muscles and nerves in this area being disturbed. Usually pain occurs ranging from mild pain to severe pain, such as sudden pain in the spine and followed by a feeling of heat and weakness in the lower extremities (Habir et al., 2023). Pain is a subjective form of a person's perception and physical condition, as well as the environment which greatly influences pain (Astuti, 2022). The problems caused by low back pain vary greatly, ranging from disturbed comfort to disrupted activities due to pain and weakness (Astuti, 2022).

Health workers can handle lower back pain problems, one of which is with the help of therapeutic exercises as long-term management. However, this therapy requires tools so it cannot be done independently at home. Another alternative that can be done as therapeutic exercise is Pilates exercise, because Pilates is based on core strengthening exercises and muscle posture (Teya et al., 2024). Recurrent LBP sufferers require immediate intervention, but not by giving analgesics because it can cause other problems. Thus, it is very suitable for Pilates exercises to be carried out for immediate treatment of low back pain patients.

Pilates is a type of exercise that targets the core, or pelvis, abdomen and back, with the aim of improving body posture, flexibility and daily endurance, so that the tubules return to normal through postural and muscle control (Trisnowiyanto, 2021). This exercise is carried out with movements with minimal risk of injury, without excessive pressure so it is safe for anyone to do (Trisnowiyanto, 2021).

After research, pain intensity decreased significantly after Pilates training with VAS measurements. Clinically, the reduction in pain intensity decreased in a relevant way, namely around 50% of the total respondents. Some research also suggests that increasing the amount of abdominal exercise during Pilates may be an important factor in helping patients with low back pain achieve positive results (Teya et al., 2024).

Objective

This case study aims to reduce pain intensity in low back pain patients.

Method

This research is in the form of a case study with a descriptive method with a nursing care approach which includes assessment, nursing diagnosis, nursing care plan, nursing implementation and nursing evaluation for clients who experience pain due to low back pain. In establishing a nursing diagnosis and determining the interventions to be implemented, the

author refers to the books Indonesian Nursing Diagnosis Standards, Indonesian Nursing Intervention Standards and Indonesian Nursing Outcome Standards.

This case study was carried out on clients who experienced pain due to low back pain and was carried out for 5 days, starting from May 27 2024 to May 31 2024. Before taking action the author explained first the intervention that would be carried out. After being given an explanation, the client is willing to become a respondent by giving verbal consent in a conscious state.

The measuring instruments used in this case study are FPS (Face Pain Scale) and NRS (Numeric Rating Scale) to measure the pain scale.

Results & Discussion

Assessment

The results of the case study obtained at the assessment stage were client data Ms. M is 20 years old with the status of a student and lives in Rt/Rw 35/10, Winangun Hamlet, Dayeuhluhur Village, Jatinagara District, Ciamis Regency, West Java, Indonesia.

At the time of the assessment on May 27 2024 at 09.45, the client said he had lower back pain with a pain scale of 8 (0-10), radiating to the right leg, felt like being pricked by small needles and felt hot, the pain felt worse when moving or walking and the pain feels mild when rested. The client also said that his right leg felt weak when walking, numbness, tingling and lack of sensitivity, and his whole body felt achy.

The client's general condition is good, consciousness compost mentis, blood pressure 110/70 mmHg, pulse 80x/minute, respiration 20x/minute, temperature 36.10C. The client's elimination pattern after illness can be BAK 14 - 15 times a day and CHAPTER 4 - 6 times a day. Before getting sick the client defecated 1 - 2 times a day and defecated 7 - 8 times a day. Physical examination showed that the nervous system of the right leg was weak, tingling, numb, lack of sensitivity, fever and more frequent urination and defecation. Physical examination of the musculoskeletal system of the right lower extremity was weak with muscle strength of 4 and ROM of the pelvis (Flexion: moving the leg forward and up less than optimally, Extension: moving the leg to the side of the other leg less than optimally, Hyperextension: being able to move leg to the back of the body, Abduction: moving the leg to the side away from the body less than optimally, Adduction: being able to move the leg back to its original position, Internal rotation: being able to turn the foot and leg in the opposite direction, Outward rotation: being able to turn the foot and leg away from the leg others, Circumduction: moving the limbs around less than optimally).

Table 1. Data Analysis

Symptome	Etiologi	Problem
Subjective Data ▪ The client states that lower back pain radiates to the right leg ▪ The client complains of soreness ▪ The client complains of weakness in the right leg, tingling, numbness and loss of sensitivity **Objective Data** • Pain scale 8 • The client appears to be grimacing • The client appears restless • X-ray results of narrowing L1-L2, L3-L4, L4-L5 • MRI results of intervertebral discbuliging L2-3, L3-4, L4-5 and L5-S1 accompanied by stretching of the intact annular ligament • TTV BP: 110/70 mmHg P: 80 x/minute R: 20x/minute S:36.1℃ SpO2 :96%	HNP ↓ Lumbal ↓ Pressing nerves ↓ Syok spinal ↓ Lower back pain sciatica and radiculopathy ↓ Acute Pain	Acute pain: related to physiological injurious agents (D.0077)

Diagnosis

The results of pain measurements carried out on Ms. M, by using NRS (Numeric Rating Scale) and FPS (Facial Pain Scale), it was found that the nursing problem that arose was severe pain, so that a nursing diagnosis of acute pain related to a physiological injurious agent was obtained.

According to Yusmanisari et al., 2023, low back pain due to HNP (Hernia Nucleus Pulpusus) will experience flaccid paraparesis, paresthesia and urinary retention. There is a gap between theory and the results of the studies carried out, namely that clients experience frequent urination and defecation after experiencing low back pain, clients can defecate 14 - 15 times a day and defecate 4 - 6 times a day. Before low back pain the client defecated 1 - 2 times a day and urinated 7 - 8 times a day, and the client's GDS result was 80 mg/dl. Meanwhile, in theory it is stated that clients with low back pain will experience urinary retention.

Intervention, Implementation and Evaluation

After carrying out the examination, data collection and enforcing the nursing diagnosis, it is continued with nursing intervention which refers to the 2017 Indonesian Nursing Intervention Standards II Edition 2017.

Table 2. Nursing Interventions

Diagnosis and Outcome Criteria	Intervention	Rational
Acute pain is related to physiological injurious agents **Outcome Criteria :** After carrying out nursing actions for 3 meetings, it is hoped that the problem of acute pain can be resolved with the following criteria: 1. Pain complaints have decreased 2. Grimace decreases 3. Restlessness decreases 4. Pain scale decreases	**Observation :** 1. Identify the location, nature, characteristics, frequency, quality and intensity of pain 2. Identify the pain scale 3. Identify verbal, non-verbal responses to pain 4. Identify factors that aggravate and relieve pain **Therapeutic:** 5. Provide non-pharmacological techniques to reduce pain (pilates exercise) 6. Facilitate sleep breaks **Education:** 7. Explain the causes, periods and triggers of pain **Colaborative :** 8. Collaborative administration of analgesics, if necessary	1. To determine the location, duration, characteristics, frequency, quality and intensity of pain 2. To find out the actual level of pain 3. To find out the client's non-verbal response to the pain 4. To find out factors that aggravate and relieve pain 5. To reduce the intensity of the client's pain 6. To calm and help clients rest 7. So that clients know about the causes, periods and triggers of pain 8. To reduce the intensity of the client's pain

Source: SDKI, SLKI, SIKI Edition II (2017)

The intervention was carried out for 4 days, namely from May 28 2024 to May 31 2024 and the author focused more on Pilates exercises. Pilates is a strengthening and stretching exercise in the core area, namely the pelvic area, abdomen and back with the aim of increasing muscle tone, flexibility and muscle endurance, so that body posture remains normal through body and posture control. This exercise is carried out with movements that minimize the risk of injury, without excessive pressure so it is safe for anyone to do (Trisnowiyanto, 2021). Pilates exercises can be done by young people, adults or the elderly because the movements are simple and easy to do anywhere at any time, and can be done using or without a mat. Pilates exercises can be an alternative to low back pain therapy that can be done at home by clients independently. Other therapies carried out by physiotherapists in hospitals, such as infrared rays or traction, require equipment and must be carried out in the hospital, therefore Pilates exercises are very suitable as another alternative.

Pilates exercises can be done when the client has a relapse, but it is better to do it every day at least once a day to prevent recurrence. The main clinical manifestation that appears is pain in the lower back accompanied by muscles around the lesion and tenderness (Yusmanisari et al., 2023). The effect that can be felt by the client can reduce the scale of pain and stiffness because with this exercise the muscles will stretch. Stretching these

muscles will reduce pain and increase the client's sense of comfort. The most disturbing thing for clients with low back pain is a feeling of soreness throughout the body, therefore it is necessary to do Pilates exercises every day even if they are not experiencing a recurrence.

The intervention carried out on Ms. M for the past 4 days without collaboration with analgesics, but only with Pilates exercises. This experiment without administering analgesics was carried out with the aim of ensuring whether the effects of Pilates exercise were significant or not. Several movements performed from Pilates exercises can provide a feeling of comfort to clients. Clients who at any time feel pain throughout the body accompanied by aches, especially in the upper back area will improve with this exercise, because the tense muscles will become flexible again. This usually disrupts client activities so that client activities are limited. Clients need to know the factors that worsen their condition so that clients can minimize recurrence. However, with Pilates exercise the client can be helped, after doing the activity the client can do the exercise, especially if his body starts to feel things that are approaching a relapse.

Obstacles in implementing nursing care in assessing progress records are not perfect 24 hours. This is due to time constraints. In this case, researchers collaborate with clients and families to participate in carrying out nursing actions.

Table 3. Nursing Evaluation

Date	Evaluaton
28 May 2024	S: The client said the lower back pain had decreased, which initially felt like small pin pricks, especially when moving or walking the pain got worse. However, the pain scale decreased to 6 (0-10). O: The client looks relaxed and looks comfortable, grimacing has decreased, the pain scale is 6 (0-10) with the FPS measuring instrument. A: Acute pain problems P: Perform interventions 1, 2, 3, 4, 5, 6, 7, 8 I: 1) Identify the location, characteristics and duration of pain. Response: The location of the pain is in the lower back which spreads to the right leg, the characteristics of the pain are like being pricked by a small needle and feels hot, the duration of the pain will get worse when moved or with a lot of activity such as lifting heavy objects 2) Identify the pain scale Response: Pain scale 6 (0-10) 3) Identify verbal and non-verbal responses to pain Response: The client appears to grimace and express pain 4) Identify factors that aggravate and relieve pain Response: Pain decreases when resting and gets worse when walking or moving 5) Providing non-pharacological techniques to relieve pain (Pilates exercises) Response: Pain decreased from 8 to 6 (0-10) 6) Educate on the importance of adequate rest and sleep and encourage sleeping on a hard and flat bed. Response: The client appears to listen, pay attention and understand. 7) Explain the causes, periods and triggers of pain. Response: Client understands 8) Collaborative administration of analgesics that the client has as a prescription from an orthopedic doctor (Etorvel 120 mg, mloxicam 7.5 mg and mecobalamin 500 mg) orally. Response: The client takes the medication orally. E: The acute pain problem is partially resolved R: Continue interventions 2, 5 and 6

29 May 2024	S: The client said the pain had decreased from a pain scale of 6 to 5 (0-10). O: The client looks relaxed and looks comfortable, grimacing has decreased, the pain scale is 5 (0-10) with the FPS measuring instrument. A: The problem is acute pain P: Carry out interventions 2, 5 and 6 as a reference from May 28 2024 I: 2) Identify the pain scale Response: pain scale 6 (0-10) 5) Providing non-pharacological techniques to relieve pain (Pilates exercises) Response: pain decreased from pain scale 6 to 5 (0-10) E: The acute pain problem is partially resolved R: Continue interventions 2 5 and 6
30 May 2024	S: The client said the pain had decreased from a pain scale of 5 to 4 (0-10). O: The client looks relaxed and looks comfortable, grimacing has decreased, the pain scale is 4 (0-10) with the FPS measuring instrument. A: Acute pain problem P: Carry out interventions 2, 5 and 6 as a reference for the intervention on May 29 2024 I: 2) Identify the pain scale Response: pain scale 5 (0-10) 5) Providing non-pharacological techniques to relieve pain (Pilates exercises) Response: pain decreased from pain scale 5 to 4 (0-10) 6) Encourage the client to sleep on a hard and flat mattress (kapok mattress) to provide comfort in the client's sleep. Response: The client understands the author's recommendations. E: The acute pain problem is partially resolved R: Continue interventions 2, 5 and 6
31 May 2024	S: The client said the pain had decreased from a pain scale of 4 to 3 (0-10). O: The client looks relaxed and looks comfortable, grimacing has decreased, pain scale is 3 (0-10) with the FPS measuring instrument. A: Acute pain problem P: Continue interventions 2, 5 and 6 I: 2) Identify the pain scale Response: pain scale 5 (0-10) 5) Providing non-pharacological techniques to relieve pain (Pilates exercises) Response: pain decreased from pain scale 5 to 4 (0-10) 6) Encourage the client to sleep on a hard and flat mattress (kapok mattress) to provide comfort in the client's sleep. Response: The client understands the author's recommendations E: The acute pain problem is partially resolved R : Continue and patent intervention 5 Perform non-pharmacological techniques to relieve pain (Pilates exercises) independently and with the help of your family

The evaluation results from Pilates exercise were decreased pain. Pain is a subjective form of a person's perception and physical condition, as well as the environment which greatly influences pain (Astuti, 2022). During the four intervention meetings, there was a positive change in the client's pain by doing Pilates exercises. When measuring pain after doing Pilates exercises using NRS (Numeric Rating Scale) and FPS (Face Pain Scale), the results showed a decrease in pain intensity from initially severe pain with a pain scale of 8 (0-10) to mild pain with a pain scale 3 (0-10). At the first meeting, measurements were carried out after the Piates exercise and the results showed that the pain decreased to 6 (0-10), initially the pain scale was 8 (0-10), at the second meeting, measurements were carried out, the results of the pain scale decreased to 5 (0-10) on the pain scale. 6 (0-10), the third meeting carried out measurements with the results of the pain scale decreasing to 4 (0-10) from the pain scale

of 5 (0-10) and the fourth meeting after the measurements took the results of the pain scale 3 (0-10) from the scale pain 4 (0-10).

The results of the evaluation on the last day by monitoring the latest progress notes showed better results after this action was carried out, the client also said that the pain was reduced and he felt relaxed.

Conclusion

The intervention was carried out over four meetings. By using NRS (Numeric Rating Scale) and FPS (Face Pain Scale) measurements, after carrying out Pilates exercises, a decrease in pain was obtained with the result that there was a decrease in pain intensity from initially severe pain with a pain scale of 8 (0-10) to mild pain with a scale of pain 3 (0-10).

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