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The Effect of the Combination of William Flexion Exercise and Kinesio Taping on the Reduction of Non-Specific Low Back Pain

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A R T I C L E I N F O

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A B S T R A C T

Non-specific Low Back Pain (LBP) is a musculoskeletal disorder that is not accompanied by neurological impairment. Purspose this study to prove that the combination of William flexion exercise and kinesio taping can reduce pain in non-specific LBP at Inggit Medical Center. This study employs a quasi-experimental method with a pretest-posttest one-group control design. The combination of William flexion exercise and kinesio taping was applied to a sample of 30 participants, who underwent training three times a week for six weeks. Pain measurement was conducted using the Visual Analog Scale (VAS). The study results showed a reduction in pain, with the mean pre-test score decreasing from 64±11.81 mm to 32±11.66 mm in the post-test, with a p-value of <0.001, indicating a significant reduction in pain in cases of non-specific LBP. Based on these findings, it can be concluded that the combination of William flexion exercise and kinesio taping can reduce pain in non-specific LBP at Inggit Medical Center

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INTRODUCTION

In this modern era, job demands still involve both physical and psychological activities for workers. Many occupations pose risks and even work-related illnesses, leading to various complaints, especially pain-related issues among workers.

Low back pain is defined as pain localized between the 12th rib and the inferior gluteal fold, with or without pain radiating to the legs. It can be caused by non-ergonomic body positions while working, as well as inadequate or imbalanced muscle activity. Initially, this pain is mild and decreases with rest, but if it becomes chronic, it can develop into a serious issue (Zuhri & Suwarni, 2024). Non-specific LBP is caused by muscle spasms, which can lead to pain in affected individuals. Prolonged spasms may result in vasoconstriction of blood vessels, causing ischemia. Consequently, the individual begins to limit movements that may trigger the pain (Hartinah, Rahmawati & Putri, 2023).

Low Back Pain (LBP), particularly non-specific LBP, accounts for approximately 90% of all LBP cases and is the leading cause of years lived with disability worldwide. In clinical trials, LBP is often difficult to classify as either specific or non-specific pain. However, a better understanding of the underlying pain mechanisms may improve research outcomes and reduce the number of non-specific LBP cases (Wirth & Schweinhardt, 2024). The prevalence of activity limitations due to LBP increases with age, affecting around 60% of women and 40% of men. LBP is a common musculoskeletal disorder experienced by both young and adult populations. Approximately 50% of all individuals with musculoskeletal disorders suffer from lower back pain. The prevalence of activity limitations due to LBP continues to rise with age, affecting about 60% of women and 40% of men.

Among the disorders that cause LBP, non-specific LBP is one of the most commonly experienced by the public, making it a frequent issue encountered in physiotherapy practice. Most cases are non-specific; however, around 10% of cases have identifiable specific causes (Zuhri & Suwarni, 2024). Physiotherapy is a form of healthcare service aimed at individuals and/or groups to develop, maintain, and restore body movement and function throughout the lifespan using manual interventions, movement enhancement, equipment (physical, electrotherapeutic, and mechanical), functional training, and communication. Physiotherapy modalities applied to LBP patients include electrotherapy, manual therapy, kinesitherapy, and specific exercise therapy (Halimah, Praditia & Jamil, 2022).

Given the high prevalence of non-specific LBP impact on people's activities, serious management is needed for such cases. If neglected, it can worsen functional activity levels and even impact the economic burden due to the inability to perform tasks optimally. This research topic was chosen due to the numerous complaints about lower back pain caused by improper posture during activities. Physiotherapy plays an important role in both prevention and management of non-specific LBP cases. The interventions chosen for this study are William flexion exercises and kinesio taping. These interventions were selected because of their muscle stretching effect during each movement and muscle strengthening, which can reduce pain experienced by individuals. The exercises are simple to perform and can be done independently. Additionally, kinesio taping is used in this study because it can limit or minimize undesirable movements during activity, while providing support to ligaments, tendons, and muscles, thus helping in pain reduction.

In the study by Kumar (2015), the effect of William flexion exercise given for 4 weeks to 30 subjects aged 18-45 years with non-specific LBP showed significant improvements in functional ability, measured by the ODI and VAS. A previous study by Kurniyawati (2016) demonstrated the influence of adding kinesio taping to William flexion exercise, leading to improved functional activity in LBP patients. In the study by Deni Hartinah et al. (2023), which investigated the differences between the effects of kinesio taping and William flexion exercise on pain reduction in patients with myogenic low back pain using a two-group pre-test and post-test design, 30 PKK mothers were randomly divided into two groups. Group I (n=15) received kinesio taping, while Group II (n=15) received William flexion exercise. The results showed an impact on pain reduction, with a mean difference of 16.66 in Group I and 25.853 in Group II. Therefore, this study investigates the effect of the combination of William flexion exercise and kinesio taping in reducing pain in non-specific low back pain patients at Inggit Medical Center.

LITERATURE REVIEW

Non-specific Low Back Pain (LBP) is initially experienced by sufferers after engaging in certain activities, but over time, it begins to interfere with their daily routines. Many patients complain that pain reoccurs when triggered by excessive activity later on. The International Association for the Study of Pain (IASP) defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage (Sandy & Pratama, 2023). Pain, in this context, affects the quality of life and reduces social and economic productivity. A study conducted by the pain study group PERDOSSI (Indonesian Neurologists Association) at the neurology clinic of Cipto Mangunkusumo Hospital (RSCM) in 2002 found that the proportion of LBP sufferers was 15.6% in the age group of 18-78 years. This figure was the second highest after headache and migraines, which reached 34.8%. A national report from a pain study group in 14 cities across Indonesia also found 18.13% of individuals suffered from LBP (Ikun, Nurina & Kareri, 2023). According to data from Indonesia's Central Bureau of Statistics (BPS), the number of workers increased by 2.29 million in 2019 compared to 2018. This rise in the workforce can lead to an increased risk of work-related illnesses (PAK). According to the 2012 European Working Condition Survey (EWCS) on working conditions, almost half of European workers (46% of men and 47% of women) reported low back pain. A study conducted in the United States ranked low back pain as the second leading cause of lost time due to illness, after upper respiratory diseases.

Non-specific Low Back Pain (LBP) can occur due to muscle strain or inadequate movement of the spine, which causes the muscles in the lower back to weaken or even become tense. The pain felt is localized below the last rib and above the lower gluteal fold, and it can be either localized or radiating (Aras D, 2019). Non-specific LBP generally does not have a clear identifiable cause, but it can result from excessive muscle use. This often happens when the body is held in a static position or an improper posture for an extended period, where the muscles in the back contract to maintain a normal body posture. Additionally, activities that impose excessive load on the lower back muscles can lead to spasms or tightness in the erector spinae muscles, restricting movement. Overuse of these muscles causes increased sensitivity, which exacerbates muscle spasms and leads to muscle imbalance between the abdominal and paravertebral muscles (Karim et al., 2020).

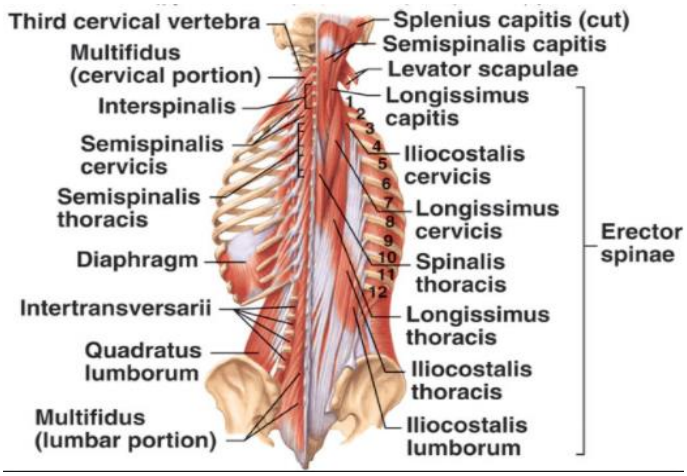

Figure 1. Back Muscle

In this study, one of the measurement tools used to assess the pain scale is the Visual Analog Scale (VAS), which is a straight line typically 10 cm (or 100 mm) long, with verbal descriptions at each end, such as 0 mm (no pain) to 100 mm (severe pain).

The intervention used in this study is the combination of William Flexion Exercise and Kinesio Taping to reduce pain in non-specific Low Back Pain. William Flexion Exercise is a form of physical exercise designed to reduce pressure on the posterior elements of the spine, and it helps maintain proper balance between the flexor and extensor muscle groups. William Flexion Exercise provides elastic and contractile effects on muscles during activities in a synergistic manner, involving the abdominal and lower back muscles. When the abdominal muscles contract, the antagonistic muscles, such as the lower back muscles, will relax (reducing pain) (Sari, Ismaningsih & Zein, 2019).

The kinesio taping method is a technique developed by Dr. Kenzo Kase in Japan in 1973, which uses elastic tape applied directly to the skin. The functions of kinesio taping include activating the endogenous analgesic system, improving fluid flow in the body, correcting joint problems, and reducing pain through pressure (Suharto, Durahim & Leksonowati, 2021). The hypothesis proposed in this study is that the combination of William Flexion Exercise and kinesio taping can reduce pain in non-specific LBP patients at Inggit Medical Center.

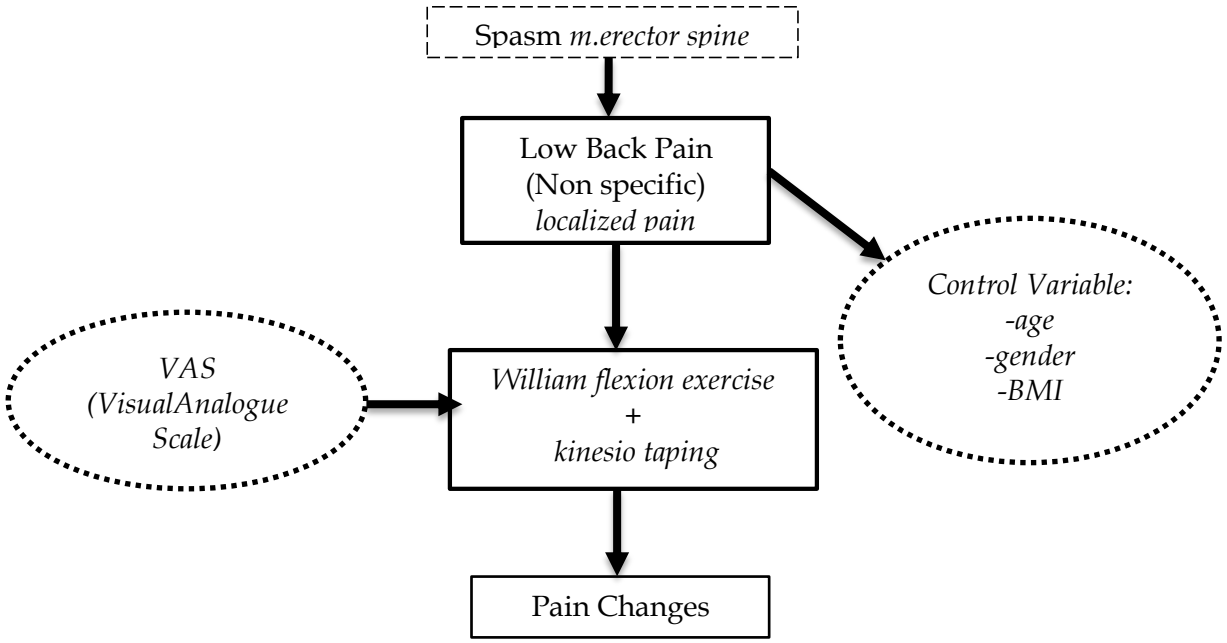

Figure 2. Conceptual Framework

Desc : : Studied Variables
: Variables not studied

METHODOLOGY

This type of research is a quasi-experimental study with a pretest-posttest one group control design. The method used in this study is a quasi-experimental approach with a quantitative analysis. The sample for this study was drawn from a population of 100 individuals at Inggit Medical Center and selected using consecutive sampling, where all subjects who came and met the selection criteria were included in the study until the required sample size was reached, which met the inclusion criteria. Based on the Pocock formula, the sample size was determined to be 30 participants, aged 20-50 years.

The study began by conducting a pretest on the samples by measuring pain using the Visual Analogue Scale (VAS). After that treatment was given, namely William Flexion Exercise 3 times a week for 6 weeks, and the application of Kinesio Taping 2 times a week for 6 weeks. After the intervention, a posttest was conducted by measuring pain using the VAS. This study was conducted to assess the difference in pain levels before and after the intervention, in order to determine whether the combination of William Flexion Exercise and Kinesio Taping can reduce pain in non-specific low back pain (LBP).

Data analysis includes descriptive statistical tests for analyzing sample characteristics such as age, gender, and BMI. The normality of the data was tested using the Shapiro-Wilk test. Comparison of data before and after the intervention on pain intensity in the group (combination of William flexion exercise and kinesio taping) was conducted using a paired-sample t-test, as the data distribution was normal.

RESULTS

Respondent Characteristics

Table 1. Distribution of Research Respondents' Characteristics Based on Gender, Age, Body Mass Index, and VAS Score

Sample characteristics	Group
Gender (%)	
Male	19 (63,3)
Female	11 (36,7)
Age (year)	
mean±SD	37±9,65
Min-Max	20-50
Body Mass Index (kg/m^2)	
mean±SD	20,98±0,92
Min-Max	19,59-23,88
Pain (VAS) (mm)	
Pre-test (mean±SD)	64±11,81
Post-test (mean±SD)	32±11,66
Difference (mean±SD)	32±7,54

Results of the Combination of William Flexion Exercise and Kinesio Taping

Table 2. Test Result *Pre-Test* and *Post-Test* Pain Reduction from the Combination of William Flexion Exercise and Kinesio Taping

Pain	N	*Pre-test* *Mean*±SD	*Post-test* *Mean*±SD	*p-value*
Group (mm)	30	64±11,81	32±11,66	<0,001

DISCUSSION

In this study, the sample was determined based on inclusion criteria. The inclusion criteria include the physical characteristics of the research subjects, such as gender, age, and BMI. The results showed that there were more male participants than female participants. In terms of the global standard prevalence of LBP (ranging from 0 to 100 years), it is estimated that 9.4% is higher in men (average: 10.1%; 95%) compared to women (average: 8.7%; 95%). LBP is experienced by both young and older individuals, but it becomes more severe between the ages of 30 and 60 years and older (Pristianto,Wardani, Ervianta & Santoso, 2021).

As a person ages, there is a decline in physical capacity and functional ability. One of the symptoms of the aging process is degeneration, which can increase the risk of LBP. In theory, at the age of 30, degeneration can occur in the form of tissue damage, muscle strength reduction, along with changes in posture. The highest incidence of LBP occurs between the ages of 35-55 years and continues to increase as age advances (Harwanti, Ulfah & Nurcahyo, 2018).

The BMI obtained from the direct measurement of weight and height falls within the normal range, as it is between the normal limits of 18.5-25.0. BMI can also influence the occurrence of LBP in an individual, such as weight gain. According to Septiawan (2013), a person with a BMI categorized as obese has a 2.5 times higher risk compared to someone with a BMI categorized as underweight. BMI not only directly causes LBP, but it can also do so indirectly. The indirect causes are related to a combination of other factors that can contribute to the occurrence of LBP. These other factors include unmodifiable factors, as well as daily habits that can exacerbate the development of LBP. The unmodifiable factors include age and gender, while daily habits include smoking, body posture during activities, and exercise habits (Negara et al., 2014).

In the pain assessment using VAS for non-specific LBP, the pre-test for the group receiving the combination of William Flexion Exercise and Kinesio Taping showed an average score of 64 mm, indicating moderate pain with complaints of cramps, stiffness, burning sensations, and sharp or stabbing pains. After the intervention, the post-test score decreased to an average of 32 mm, indicating mild pain with complaints of itching, throbbing, and slight discomfort.

The statistical analysis using the paired sample t-test showed a p-value of <0.001. Since the p-value is <0.05, it can be concluded that there is a significant difference in the mean pain reduction before and after the combination of William Flexion Exercise and Kinesio Taping. This result is consistent with previous research by Aditama et al. (2021), which found that William Flexion Exercise performed over 2 weeks with a frequency of 3 times per week resulted in a p-value of <0.005. The findings concluded that the William Flexion Exercise causes stretching of the hip flexor muscles (M. Iliopsoas and M. Rectus femoris) and the lower back muscles (M. Sacrospinalis), leading to a balance between the postural flexor and extensor muscles, which reduces pain.

In this study, the 6-week duration with a training frequency of 3 times per week significantly reduced pain in cases of non-specific LBP, shifting the pain category from moderate pain to mild pain.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of research and discussion, it can be concluded as follows : The combination of William Flexion Exercise and Kinesio Taping can significantly reduce pain in patients with non-specific LBP at Inggit Medical Center.

FURTHER STUDY

Based on the results of this study, it is hoped that future research will involve other factors that influence the reduction of pain levels in non-specific low back pain.

ACKNOWLEDGMENT

Based on the results of this study, it is expected that researchers can apply these findings to patients with non-specific low back pain.

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