Published Version

JPPI (Jurnal Penelitian Pendidikan Indonesia)
Volume 12, Number 2 2026



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Publication details, including author guidelines
URL: https://jurnal.iicet.org/index.php/jppi/about/submissions#authorGuidelines

Article History
Received Sep 17th, 2026
Revised Sep 25th, 2026
Accepted Sep 30th, 2026

How to cite this article (APA)
Delano, E.H., Rismayanthi, C. & Shafi, S.H.A. (2026). Effectiveness Of Tepuksorak therapy on pain and lumbar function in cases of nonspecific low back pain. Jurnal Penelitian Pendidikan Indonesia, 12(2), 19-27. https://doi.org/10.29210/020267219

The readers can link to article via https://doi.org/10.29210/020267219

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JPPI (Jurnal Penelitian Pendidikan Indonesia)
ISSN: 2502-8103 (Print) | ISSN: 2477-8524 (Electronic)

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ISSN: 2502-8103 (Print) ISSN: 2477-8524 (Electronic)

Vol. 12, No. 2, 2026, pp. 19-27
DOI: https://doi.org/10.29210/020267219



Effectiveness Of Tepuksorak therapy on pain and lumbar function in cases of nonspecific low back pain

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Article Info

Article history:

Received Sep 17th, 2026
Revised Sep 25th, 2026
Accepted Sep 30th, 2026

Keyword:

Nonspecific low back pain,
Tepuksorak massage,
Lumbar function

ABSTRACT

The purpose of this study was to examine the effectiveness of Tepuksorak massage therapy on pain and lumbar function in cases of nonspecific LBP. The research method used was an experiment with a randomized control group pretest-posttest design. The sample consisted of 40 people with subacute and chronic nonspecific LBP complaints, divided into two treatment groups and a control group, each consisting of 20 people. The variables measured were pain and lumbar function, all of which were measured before treatment for pretest data and after treatment for posttest data, which were measured on day 1 (24 hours), day 2 (48 hours), and day 3 (72 hours) after treatment. The measuring instruments used were the Visual Analogue Scale to measure pain and the Oswestry disability index to measure lumbar function. The results revealed that, for pain variable, the Friedman test presented p-value result of 0.000<0.05 and for function variable was a p-value of 0.000<0.05. These results indicate that Tepuksorak massage therapy is significant in reducing pain and improving lumbar function in cases of nonspecific LBP. The conclusion of this study is that Tepuksorak massage is effective in reducing pain and improving lumbar function in cases of nonspecific LBP.

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Introduction

Low Back Pain is a prevalent musculoskeletal condition characterized by pain localized between the lower rib margin and the inferior gluteal fold, with or without pain radiating to the lower extremities (Martinez et al., 2018). This condition can substantially interfere with daily activities, occupational performance, and functional mobility (Baig et al., 2018). The development of Low Back Pain is multifactorial and is commonly associated with both individual and occupational factors. Individual factors include age, Body Mass Index, sex, exercise habits, and smoking behavior, whereas occupational factors include prolonged working duration and unfavorable working postures. The interaction of these factors indicates that Low Back Pain should not be regarded merely as localized pain but as a

musculoskeletal condition that may compromise an individual's physical function and ability to perform daily and occupational activities.

The burden of Low Back Pain is considerable, particularly among working-age populations. Data from the World Health Organization indicate that approximately 2–5% of workers in industrialized countries experience Low Back Pain annually (Hayati & Devi, 2020). In Indonesia, the reported prevalence ranges from 7.6% to 37%, with a substantial proportion of cases occurring among individuals aged 20–40 years (Putri et al., 2020). Evidence from Central Java further demonstrates differences according to sex, with Low Back Pain reported in 18.2% of men and 13.6% of women, which has been associated with greater exposure to strenuous physical activities among men (Saputra, 2020). These findings indicate that Low Back Pain represents an important health and functional problem because it affects individuals during productive ages and may interfere with their physical and occupational activities.

Clinically, Low Back Pain can be classified as specific or nonspecific according to the underlying pathology. Specific Low Back Pain is associated with identifiable conditions such as vertebral fractures, infections, tumors, or herniated nucleus pulposus (Botov et al., 2018), whereas nonspecific Low Back Pain is characterized by symptoms without a clearly identifiable pathological cause (Ahmed et al., 2021). Soft-tissue disturbances involving muscles and ligaments, including muscle injury, muscle spasm, and fatigue, may contribute to nonspecific symptoms (Delano, Kushartanti, Arovah, Yuniana, et al., 2023). Based on symptom duration, Low Back Pain can also be categorized into acute, subacute, and chronic phases. The acute phase occurs within the first four weeks, the subacute phase extends from four to twelve weeks, and the chronic phase persists for more than twelve weeks (Bernstein et al., 2017). Persistent symptoms may result in pain during physical activity and limitations in Range of Motion (Amajida et al., 2022), while the severity of pain and functional impairment may vary according to the phase and condition experienced by the individual (Delano et al., 2024).

Pain, back-muscle stiffness, reduced Range of Motion, and decreased muscular function are among the major clinical manifestations experienced by individuals with Low Back Pain (M et al., 2020). These manifestations are particularly relevant in nonspecific Low Back Pain because the symptoms cannot be attributed to a clearly identifiable structural pathology (Buttagat et al., 2020). Nonspecific Low Back Pain constitutes approximately 90% of Low Back Pain cases, and diagnostic examinations frequently fail to identify a definitive pathological source despite persistent pain and movement limitations (Bardin et al., 2017). Consequently, therapeutic management should not focus exclusively on reducing pain but should also address the functional limitations that interfere with movement and daily activities. Considering its high prevalence and complex clinical manifestations, nonspecific Low Back Pain requires an intervention capable of addressing both pain and lumbar functional impairment.

Non-pharmacological interventions are recommended as an important initial management approach for nonspecific Low Back Pain (Bonakdar et al., 2019). Among these interventions, massage therapy and stretching can be administered independently or in combination, with combined approaches potentially providing broader clinical benefits than a single therapeutic modality (Leal-Galicia et al., 2019). Tepurak therapy is one previously developed approach that predominantly employs pressure applied to trigger points to reduce pain and muscular tension. However, the predominance of trigger-point pressure may cause discomfort in some individuals, particularly because the intervention provides limited tissue-relaxation manipulation. This limitation indicates an important therapeutic gap: an intervention is required that retains the potential benefits of trigger-point pressure while incorporating additional techniques to promote relaxation, improve patient comfort, and simultaneously address pain and lumbar functional limitations.

To address this therapeutic gap, Tepuksorak therapy was developed as a modified multimodal manual intervention that integrates pressing through trigger-point techniques, tapping through tapotement, rubbing through effleurage, and moving through stretching movements. The incorporation of effleurage is intended to facilitate muscular relaxation, support local circulation, and reduce discomfort following trigger-point pressure, whereas stretching is incorporated to address muscle stiffness and movement limitations. Therefore, the novelty of Tepuksorak therapy lies in the structured integration of pressure, percussion, rubbing, and stretching techniques within a single therapeutic intervention designed to address both pain and lumbar functional limitations. Although

individual and combined manual techniques have previously been investigated for nonspecific Low Back Pain, empirical evidence regarding the short-term effects of this specific integrated therapeutic sequence remains limited. Therefore, this study aimed to determine the effectiveness of Tepuksorak therapy in reducing pain and improving lumbar function in individuals with nonspecific Low Back Pain.

Method

Research Design

It was an experimental study with randomized control group pretest-posttest design. The sample consisted of 40 individuals with complaints of subacute and chronic nonspecific LBP, assigned to one treatment group and one control group (20 individuals/group). The variables measured were pain and lumbar function, all of which were measured before treatment for pretest data and after treatment for posttest data, which were measured on day 1 (24 hours), day 2 (48 hours), and day 3 (72 hours) after treatment. This study has been declared ethically sound by the Research Ethics Committee of Yogyakarta State University with letter number T/64.13/UN34.9/PT.01.04/2025. All respondents signed an informed consent form before treatment.

Participants

The population in this study were nonspecific LBP patients at HSC UNY. The required sample size was 40 people, divided into 2 groups, namely the treatment group and the control group, with 20 people in each group. The sample criteria were based on the following inclusion and exclusion criteria. Inclusion criteria included patients with nonspecific LBP, willingness to be a respondent, male gender, and age above 20 years. Exclusion criteria included anatomical abnormalities in the spine such as fractures, no history of kidney disease, tumors, pancreatitis, peptic ulcers, and no open wounds.

Instruments

The variables measured were pain and back function, all of which were measured before the treatment as pretest data and after the treatment as posttest data, which were measured on day 1 (24 hours), day 2 (48 hours), and day 3 (72 hours) after the treatment. The measuring instruments used in this study included the Visual Analogue Scale (VAS), which is a tool used to measure the degree of pain felt (Chiarotto et al., 2019). The scale used ranges from 0 to 100. The VAS has a validity value of r = 0.941 and reliability of ICC = 0.97, making this instrument valid and reliable for use in the data collection process (Alghadir et al., 2018). Measurements were taken using an easy-to-use Android VAS application. Participants were asked to open the VAS application and then slide the button according to the pain they felt. The more severe the pain felt, the more the patient would slide the button toward the higher end of the scale.

The ODI (Oswestry disability index) is a measurement tool used to determine the functional ability score of the lumbar spine (Cook et al., 2015). This measurement tool is a questionnaire containing ten questions that describe the body's ability to perform daily functions. The results are in the form of an accumulated score calculated using a specific formula. The lower the score obtained, the better the function of the lumbar spine. This instrument has a value of r = 0.947 and a Cronbach's alpha of 0.877, making it valid and reliable for data collection (Joshi et al., 2013). The variables measured were pain and lumbar function, all of which were measured before the treatment as pretest data and after the treatment as posttest data, with measurements taken on day 1 (24 hours), day 2 (48 hours), and day 3 (72 hours) after the treatment.

Treatment

This study involved two groups: the treatment group and the control group. The treatment administered was Tepuksorak massage, which included the "press" technique using stroking on trigger points, the "tap" technique using tapotement, the "rub" technique using effleurage, and the "move" technique using passive stretching assisted by a therapist. Group 2 was the control group without any treatment.

Table 1. Treatment Guidelines Table

Components	Description
Modalities	Tepuksorak Massage
Manipulation	Trigger Point Stroking, Tapping, Effleurage, and Stretching
Time	20 minutes
Number of Treatments	One Time
Emphasis	Customize Muscle Thickness

Data Analysis

The normality test is used to determine whether the data is normally distributed or not. The basis for decision making is based on the p-value. If the p-value is >0.05, then the data is normally distributed. On the other hand, if p-value <0.05, thus data is not normally distributed. This datainwas not normally distributed, and so parametric and nonparametric analyses were performed to test the hypothesis. The Friedman Test was the analysis used to observe the differences in each of two variables pain and pretest function data, and pain and post-test function for 24 hours,48 hours,72 hours. For comparison of treatment group and control group data independent t-test and Mann Whitney test were applied respectively. Statistical difference was defined as p<0.05 using the two-tailed unpaired t-test. If the p-value was greater.

Results and Discussion

Descriptive Statistics

Table 2. Descriptive Statistics of Pain and Function Variables in the Treatment Group

Variable	N	Min	Maximum	Mean	SD
Pre-test of Motor Function	20	28	74	46.40	12.525
Posttest 24-hour function	20	18	58	37.00	12.337
48-hour posttest function	20	18	54	32.50	10,856
72-hour posttest function	20	18	50	28.40	9.659
Pretest Pain Scale	20	40	100	62.65	14.637
Posttest 24-hour pain	20	10	80	33.90	19,950
posttest pain 48 hours	20	10	70	29.05	16.966
posttest pain 72 hours	20	3	70	23.20	17.446

Based on Table 2, an overview of changes in motor function and pain scale in 20 respondents was obtained, measured at pretest, 24 hours, 48 hours, and 72 hours after intervention. For motor function the score at pretest was 46.40 ± 12.525 (min 28; max 74). After 24-hour intervention, the scores reduced at 48 hours to 37.00 ± 12.337 (min :18; max :58) and at point of time at 72 hours was assessed to be lower with score of:32.50 ± 10.856(max:54 min:18), and at`72hours28.40±9.659(min:18, max:50). Pretest average (± SD) on the pain scale was 62.65 ± 14.637 (min; max = 40;100), at 24 hours decreased after intervention to 33.90 ± 19.950 (min, max =10,80), at 48 hours to29.05 ±16.966(min, max=10,70), and at72-hours to23.20 ±17.446(min, max=3,70). There was a steady reduction in disability function and pain scores to 72 hours, demonstrating that this intervention can improve mobility and decrease pain in participants.

Table 3. Descriptive Statistics of Pain and Function Variables in the Control Group

Variable	N	Minimum	Maximum	Mean	SD
Movement Function Pretest	20	20	54	36.80	11.247
Posttest 24-hour function	20	20	58	36.40	11.137
48-hour posttest function	20	22	58	37.60	11,062
72-hour posttest function	20	22	58	38.40	10.555
Pretest Pain Scale	20	20	70	51.50	16.944
Posttest Pain 24 hours	20	20	70	49.30	14.045
posttest pain 48 hours	20	20	70	52.05	14.598
posttest pain 72 hours	20	20	75	54.25	15.160

Based on Table 3, an overview of motor function and pain scale in 20 control group respondents was obtained, measured at pretest, 24 hours, 48 hours, and 72 hours without special treatment. For motor function, the Pretest mean was 36.80 ± 11.247 (min 20; max 54) and remained relatively stable at hour 24 (36.40 ± 11.137 (min 20; max 58), at hour 48 slightly increased to a mean of 37.60 ±11.062 (min22; max 58), and at hour 72: 38.40±10.555 (min 22; max 58). The average for the pretest pain scale was 51.50 ± 16.944 (min 20; max 70), declined almost to normal at 24 hours postoperatively, and then increased again at both 48 hours (preoperative times were significantly lower compared to this point) and even further significant at that of our third follow-up meeting where the patient recorded an average pain value of up to 54.25 ± 15.162 (min 20; max 75). Overall, the control group showed relatively small changes without significant improvement, with a tendency for pain scores to increase again at 48–72 hours.

Normality Test

Table 4. Normality Test of Pain Data

Group	No.	Pain Variable	Shapiro–Wilk Statistic	df	Sig.	Result
Treatment Group	1	Pretest Pain	0.955	20	0.449	Normal
Treatment Group	2	Post-test Pain 24 Hours	0.859	20	0.008	Abnormal
Treatment Group	3	Post-test Pain 48 Hours	0.896	20	0.035	Abnormal
Treatment Group	4	Post-test Pain 72 Hours	0.883	20	0.020	Abnormal
Control Group	1	Pretest Pain	0.868	20	0.011	Abnormal
Control Group	2	Post-test Pain 24 Hours	0.867	20	0.010	Abnormal
Control Group	3	Post-test Pain 48 Hours	0.860	20	0.008	Abnormal
Control Group	4	Post-test Pain 72 Hours	0.891	20	0.029	Abnormal

Based on Table 4, the assessment of the Shapiro–Wilk normality test for pain variable with 20 respondents each at treatment group indicated that pretest data were normally distributed (p = 0.449; statistic = 0.955). The data for the 24 hours posttest (p = 0.008), 48- hours (p = 0.035) and 72 hours (p = 0.020) were not found to be normally distributed (p <0.05). The pain data in the control group were not normally distributed, at pretest (p = 0.011), P = 24-hour posttest (p = 0.010), P = 48-hour posttest (p = 0.008), and P =72-hour posttest (p = 0.029). In general, data were not normally distributed therefore nonparametric tests were used for further analysis.

Table 5. Normality Test of Lumbar Function Data

Group	No.	Function Variable	Shapiro–Wilk Statistic	df	Sig.	Result
Treatment Group	1	Pretest Function	0.959	20	0.527	Normal
Treatment Group	2	24-Hour Posttest Function	0.949	20	0.350	Normal
Treatment Group	3	48-Hour Posttest Function	0.948	20	0.331	Normal
Treatment Group	4	72-Hour Posttest Function	0.875	20	0.015	Not Normal
Control Group	1	Pretest Function	0.901	20	0.044	Not Normal
Control Group	2	24-Hour Posttest Function	0.944	20	0.285	Normal
Control Group	3	48-Hour Posttest Function	0.925	20	0.124	Normal
Control Group	4	72-Hour Posttest Function	0.948	20	0.337	Normal

Based on Table 5. Data Normality Test for Waist Function using the Shapiro–Wilk test with a sample size of 20 respondents in each group, the following results were obtained. In the treatment group, the normality test results showed that most of the waist function data were normally distributed. Where in the pretest function, significance value is 0.527, 24-hour posttest is 0.350 and 48 hour posttest is

0.331, which all values are >0.05 (p > 0.05), it can be said that data distribution has normal distribution. While the significance value of the 72-hour posttest function was 0.015 (p < 0.05), statistical value: 0.875, it means that data at that measurement time did not follow a normal distribution.

On the other hand, in the control group, normality test results showed that pretest function was 0.044 (p < 0.05) which indicates that data is not distributed normally but on the next three measurements, including 24 hours after the test (0.285), 48 hours after the test (0.124) and even 72adfter with a significance above at least two greater than 0.05 it can be said that all this data is normal distribution.

Paired Test

Table 6. Results of the Difference Test

Group	Variable	Analysis	Chi-Square	df	Sig.	Results
Treatment	Pain	Friedman Test	46.855	3	0.000	Significant
Control	Pain	Friedman Test	14,612	3	0.002	Significant
Treatment	Function	Friedman Test	40.446	3	0.000	Significant
Control	Function	Friedman Test	15,121	3	0.002	Significant

Table 6 presents the results of Friedman's test, indicating significant differences in pain and function scores at pretest time (home), 24 hours, 48 hours, and 72 hours from the intervention. In the pain variable of the treatment group, a Chi-Square value of 46.855; df = 3; p = 0.000 was reached in this way it became clear that there is a significant difference between measurement times with respect to their pains. Likewise, a significant difference was also found within the control group (Chi-Square 14.612; df = 3; p = 0.002). For the function variable in treatment group, results of test were Chi-Square = 40.446; df = 3; p = 0.000, indicating that there were significant differences in function between measurement times. On the other hand, chi-square = 15.121; df = 3; p = 0.002 was also obtained in the control group indicating significant difference.

In general, both the treatment and control groups had changes in pain and function over time, but the treatment group demonstrated greater changes than their control counterparts suggesting that they were, indeed, better withe regard to pain and lumbar function because of this intervention.

Independent Test

Table 7. Independent Difference Test for Treatment and Control Groups Pain Variable

Variable	Analysis	Z	Sig	Results
Pretest pain	Mann-Whitney	-1.722	0.085	Not significant
24-hour pain	Mann-Whitney	-3.003	0.003	Significant
48-hour pain	Mann-Whitney	-3.796	0.000	Significant
Pain at 72 hours	Mann-Whitney	-4.378	0.000	Significant

Table 7 shows the results of the independent difference test between the treatment and control groups on the pain variable using the Mann–Whitney test. No difference was found between groups in pretest pain (Z = -1.722; p = 0.085). However, there were significant differences between the treatment and control groups at 24 (Z = -3.003; p = 0.003), 48 (Z = -3.796; p = 0.000), and 72-hour (Z = -4.378; p = 0.000) measurements within that time frame respectively This means that, post-intervention, there was a difference in pain between these two groups.

Table 8. Independent Group Difference Test for Treatment and Control Groups Functional Variables

Variable	Analysis	Z	F	Sig	Results
Pretest function	Mann-Whitney	-2,337		0.019	Significant
24-hour function	Independent Samples Test		0.438	0.873	Not significant
48-hour function	Independent Samples Test		0.054	0.149	Not significant
72-hour function	Mann-Whitney	-2.932		0.003	Significant

Table 8 shows the results of the independent sample t-test between the treatment and control groups on the function variable. There was a significant difference between the two groups of the pretest function (Z = -2.337; p = 0.019) There were no significant differences at 24 and 48 hour

measures using Independent Samples Test (F = 0.438; p = 0.873 & F = 0.054; p = 0.149). However, again at 72 hours a considerable difference was seen when comparing treatment to control groups (Z = -2.932; p = 0.003).

LBP is a condition characterized by pain in the lower back that limits mobility and can interfere with daily activities (Pacheco-Da-costa et al., 2022). The pain occurs in the lower back/waist and, in certain cases, can radiate the legs. LBP is also known as low back pain, which causes pain or discomfort in the area between the lower ribs and above the feet (Martinez et al., 2018).

LBP is an injury or disorder that occurs due to contributing factors. LBP can be caused by two factors, namely individual and occupational factors (Delano et al., 2024). Individual factors include age, body mass index (BMI), gender, exercise habits, and destructive smoking behavior (Fontana Carvalho et al., 2020). Other factors include occupational factors such as work position and working hours. The causes of LBP can be nonspecific or specific. Nonspecific factors include abnormalities in soft tissue in the form of muscle injury, ligament injury, spasm, or muscle fatigue. Specific factors include vertebral fractures, infections, and tumors (Delano, Kushartanti, Arovah, Shafi, Sabillah, et al., 2023).

The condition of LBP can be observed and distinguished based on the phase of LBP. The LBP phase is the duration of the complaint, which includes the acute, subacute, and chronic phases. The acute phase occurs from onset to week 4, during which there is a very high level of pain due to the inflammatory process, resulting in reduced ROM and lumbar function (Perry et al., 2015). The subacute phase of LBP occurs between 4 and 12 weeks, during which the inflammatory pain subsides, and the pain begins to decrease, but ROM and function are still impaired due to muscle spasms. The chronic nonspecific LBP phase is an LBP phase that has lasted more than 12 weeks with moderate pain (Bernstein et al., 2017). In this phase, mild pain is felt during activities and there is mild ROM impairment in certain activities. Each phase is different and requires appropriate treatment according to the condition.

Tepuksorak massage treatment is an alternative solution that can be applied to relieve LBP pain. The first tepuksorak treatment is a pressure technique using pressure on trigger points located on the waist, buttocks, and back of the thighs. This technique aims to relax muscles experiencing spasms, stimulate the sympathetic and parasympathetic nerves, and activate acetylcholine at the motor nerve terminals (Kodama et al., 2019). The tapping technique uses the tapotement technique applied to the trigger point pressure points to eliminate post-pressure pain (Delano et al., 2024). The rubbing technique uses the effleurage technique by gently rubbing the waist area to improve blood circulation and muscle relaxation (Delano et al., 2024). The final technique is movement using the stretching technique to measure stiff muscles so that they can relax again (Delano, Kushartanti, Arovah, Shafi, Nugroho, et al., 2023).

Although this study provides useful results, it has several shortcomings. The drawbacks of this study are the small number of samples available, which limits to generalize the findings; short observation period (72 hours), thus it is not known if the treatment has a long-term efficacy; and other external factors may act (e.g., daily activity or use other drugs). Moreover, pain assessment is subjective, and the study was not performed with blinding of participants or evaluators, thus potentially introducing evaluation bias. Moreover, the study only evaluated pain and lumbar function while neglecting other parameters like quality of life or flexibility.

Conclusions

Based on the results, Tepuksorak massage therapy was significantly effective in reducing pain and improving lumbar function in cases of nonspecific LBP. Future studies should involve a larger sample size, long-term observation, and control of external variables, as well as the addition of other functional measurements. Therefore, the results of this study should be interpreted with caution and cannot yet be generalized to the entire population of nonspecific low back pain patients.

Acknowledgments

This study has been declared ethically sound by the Research Ethics Committee of Yogyakarta State University with letter number T/64.13/UN34.9/PT.01.04/2025. All respondents signed an informed consent form before treatment.

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