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Effectiveness of Conventional Physical Therapy Treatment With or Without Sciatic Nerve Mobilization in Patients With Sciatic Nerve Related Para Spinal Muscle Spasms

Dr. Mamona Ansari
Physiotherapist at Children Complex Hospital Multan, Pakistan
malikhadifarooq@gmail.com

***Dr. Asma Sattar (Corresponding Author)**
Head of Department of Physical Therapy, KAIMS International Institute Multan, Pakistan.
asmatalat23@yahoo.com

Dr. Ayeza Binte Arshad
Physical Therapist at KAIMS Physiotherapy & Rehabilitation Center Multan, Pakistan
ayezabintearshad@gmail.com

Author Details

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Corresponding E-mail & Author*:

Dr Asma Sattar
Head of Department of Physical Therapy, KAIMS International Institute Multan, Pakistan. Email: asmatalat23@yahoo.com

Abstract

Background: Sciatica is a persistent ailment that causes excruciating low back pain that radiates down to the posterior thigh, where the sciatic nerve is innervated. It continues to be a huge global public health issue with serious socioeconomic, physical, and psychological consequences. Between the lower 12th rib borders and the lower gluteal folds is where low back pain (LBP) is felt. With 37% of patients reporting at least monthly experiences or recurrent episodes of back pain, LBP is one of the major causes of disability globally. Similar findings were found in earlier surveys carried out in Malaysia, where the incidence of LBP was found to be about 12% in a semi-rural community and to be high at 60% and 68%, respectively, among commercial vehicle drivers and medical students (Zafarani & Almeheyawi, 2024). LBP patients may concurrently experience PS, or piriformis syndrome (PS). The frequency of PS ranges greatly from 0.3% to 36% (Arshad, Raza, Naseem, Waheed, & Rasheed, 2025).

Objective: To compare the efficacy of nerve mobilization and conventional physical therapy in patients with nerve related para spinal muscle spasm.

Rationale

Nerve related Para spinal muscle spasm is the most common health issue in today's practice. There are many reasons for spasm. But in countries like Pakistan the socioeconomic conditions of people play a vital role to produce ailments like backache

and other musculoskeletal disorders. In this study the main outcome is to give best way of treatment to the people which is cost effective and beneficial for health.

Methodology: It was a randomized control trial study. Data was collected from physiotherapy department, Nishter Hospital Multan, sample size was 124 patients which were selected through purposive random sampling.

Numeric pain rating scale (NPRS) was used to find out the frequency. Sample selection was computed through Cochran's formula, and level of significance of 5%. (Vijayalakshmi, Lokesh, Kanthanathan, Aseer, & Ramachandran, 2022).

$$n_0 = \frac{Z^2 p(1-p)}{e^2}$$

The data was analyzed by SPSS 26.0 Version.

Results: Total 124 patients were allocated in two groups; named group A and group B according to inclusion and exclusion criterion. Then almost 6 patients were drop out from the study, in which two were drop out from the group A and four were drop out from the group B. Group A received straight leg raising technique along with the baseline conventional treatment for a time period of 6 times per week in total 6 sessions. Group B received slump stretching technique along with the conventional as same for the group A. NPRS was used for assessment of pain and modified Oswestry disability index was used for assessment of issues in daily activities caused by Low back pain. Study was completed within duration of 3 months**.** Data from both groups was gathered and the mean score for all the outcome measures was investigated.

Outcome of this trial reveals that both treatments are positive in improving pain and reducing spasm of para spinal muscle caused by sciatic nerve; but sciatic nerve mobilization showed more improvement as compared to simple conventional physical therapy treatment along with straight leg raise. Many clinical trials have been escorted by different researchers to investigate the effects of sciatica nerve mobilization and straight leg raise on para spinal muscle spasm caused by sciatic nerve. The majority of the studies supported the use of sciatic nerve mobilization on the para spinal muscle spam and pain related to sciatica nerve entrapment.

Conclusion: This randomized controlled trial evaluated the effects of conventional physical therapy with or without sciatic nerve mobilization on para spinal muscle spasm caused by sciatica. A total of 124 patients were divided into two groups (A and B) with 6 dropouts during the study. Group A received straight leg raise exercises with conventional therapy, while group B received slum stretching along with the same therapy. Pain and disability were assessed using NPRS and the modified Oswestry Disability Index over a three-month period. Both groups showed improvement, but group B demonstrated greater reduction in pain and spasm, aligning with previous research favoring nerve mobilization.

Introduction

Low Back Pain, Sciatica, and Muscle Spasm: Low back pain (LBP) is a leading global cause of disability, typically felt between the lower 12th rib and the gluteal folds. Affecting up to 80% of adults at some point in life, it has a significant socioeconomic and public health impact. In Malaysia, studies have shown LBP prevalence ranging from 12% in rural communities to over 60% among vehicle drivers and medical

students. {DePalma, 2020 #3}.

LBP often overlaps with piriformis syndrome (PS), a condition resulting from sciatic nerve compression that can mimic or coexist with other spinal disorders. Sciatica, another frequent clinical complaint, is a symptom rather than a diagnosis and presents as sharp, radiating pain from the lower back down the leg due to nerve root compression, commonly from disc herniation{Othman, 2023 #8}.

The spine's lumbosacral region includes vertebrae, intervertebral discs, and muscles like the paraspinals, which provide stability and movement. Nonspecific LBP, often without identifiable cause, may result from muscle strain, ligament injury, or minor disc/facet joint dysfunction. Muscle spasms—sudden, involuntary contractions—are common, especially after microtrauma and inflammation sensitizing nerves. Causes include disc herniation, poor posture, injury, nerve impingement (radiculopathy), age-related degeneration, obesity, pregnancy, and sedentary lifestyle. Sciatic nerve involvement typically leads to pain radiating below the knee, sometimes accompanied by numbness or weakness {Fairag, 2022 #10}.

Piriformis syndrome can compress the sciatic nerve, causing pain in the buttocks and leg. Management includes conservative therapies like NSAID, muscle relaxants {Imtiaz, 2020 # 10}, stretching (e.g., the FAIR test), and manual therapy (e.g., myofascial release). {Nisargandha, 2020 #9}

Regular stretching, postural awareness, and deep friction massage help relieve muscle tension and prevent recurrence. Neural mobilization, including nerve gliding and tensioning, is a valuable intervention for reducing nerve irritation and restoring functional movement. Early diagnosis and non-invasive interventions are key to preventing chronic disability from LBP and sciatic-related disorders {Urits, 2019 #10} {Jeong, 2016 #1}.

A clinical ailment known as sciatica is characterized by excruciating pain that begins in the low back area and travels down the length of the leg. This is a frequent entity in clinical practice. The most frequent cause of this is lumbar disc prolapse. Heavy lifting, spinal column injuries, and other diseases of the vertebral column can all contribute to this. The most significant sign of sciatica is lumbosacral radicular leg pain that radiates below the knee and into the foot and toes in a dermatomal pattern. {Nisargandha, 2020 #9}

The fifth most frequent reason for doctor visits is low back pain (LBP), which affects 60 to 80 percent of adults at some point in their lifetime. According to some research, up to 23% of persons worldwide experience chronic low back discomfort. Additionally, this cohort has demonstrated a 24% to 80% one-year recurrence rate. In the adult population, some estimates of lifetime prevalence reach 84%. A thorough research revealed that 11.8% to 33% of teenagers experience back discomfort annually. 11–12% of people who are incapacitated due to low back pain. Axial lumbosacral, radicular, and referred pain are the three main sources of low back pain, which affects 10 to 30% of US individuals on an annual basis and 65 to 80% of US adults over their lifetime.{Urits, 2019 #10}

METHODOLOGY:

It was a randomized control trial study. Data was collected from LBP (sciatica) patients, from Nishtar Hospital Multan. Data collection period was May 2023 to August 2023 The sample size was 124 patients which were selected.

Through Purposive sampling. Sample selection was done by following inclusion and exclusion criteria. Male and female population of age 18-60 years were included, referred pain distal to buttock, SLR positive, having mild to moderate pain 2-6 on NPRS, paraspinal muscle tension, Exclusion criteria**,** Infection, tumor osteoporosis SLR negative, Lumbar spine arthropathies.

The data underwent analysis using SPSS Version 26.0. The duration of this study was six months from March 2023 to September, 2023. The data in the study were collected using the (NPRS) as the assessment tool.

RESULTS:

Age of the Participants

	Frequency		Percent	Valid Percent	Cumulative Percent
Valid	18-25	4	6.5	6.5	6.5
	26-33	10	16.1	16.1	22.6
	34-41	11	17.7	17.7	40.3
	41-48	9	14.5	14.5	54.8
	49-56	24	38.7	38.7	93.5
	57+	4	6.5	6.5	100.0
	Total	62	100.0	100.0	

The mean±*S*. *D* was 3.8226±1.43177 and value of median was 4.0000. this table shows the age distribution of first group according to this table there were 4 participants between the age of 18-25 year, there were 10 participants between the age of 26-33 year, there were 11 participants between the age of 34-41 year, there were 9 participants between the age of 41-48 year, there were 24 participants between the age of 49-56 year as well as 4 participants belonging to 57+ years of age

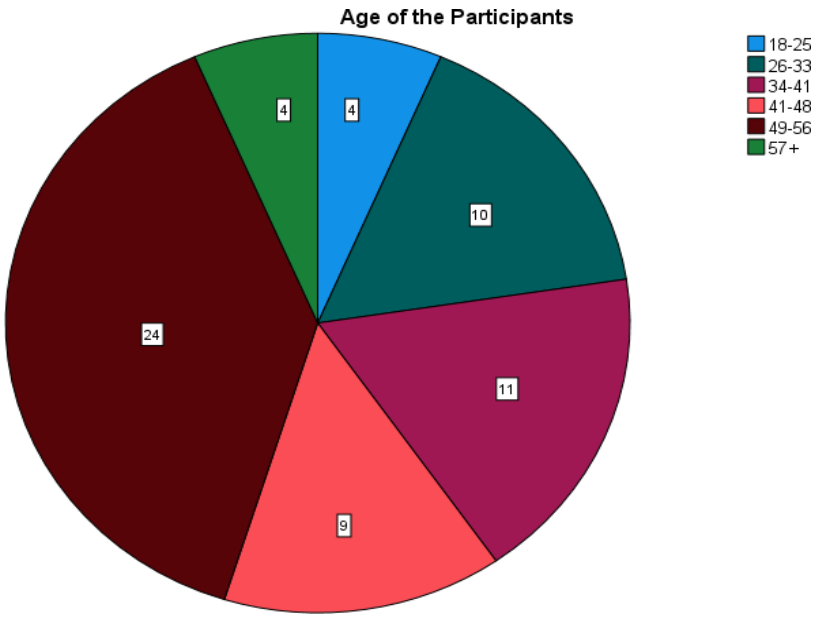

Figure 1: Age of the participants

The mean±*S*. *D* was 3.8226±1.43177 and value of median was 4.0000. This pie chart shows the age distribution of first group according to this pie chart there were 4 participants between the age of 18-25 year, there were 10 participants between the age of 26-33 year, there were 11 participants between the age of 34-41 year, there were 9 participants between the age of 41-48 year, there were 24 participants between the age of 49-56 year as well as 4 participants belonging to 57+ years of age.

DISABILITY INDEX GROUP 1

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Disability Index before treatment	60	39.1774	6.69603	33.00	55.00
Disability index after treatment	60	15.2742	5.97857	2.00	22.00

This table shows that mean±*S*. *D* value of disability index for group before treatment was 39.1774±6.69603 and mean±*S*. *D* value of disability index for group after treatment was 15.2742±5.97857, which means that there was a decrease in disability after the treatment.

Test Statistics[a]

N	62
Chi-Square	60.000
df	1
Asymp. Sig.	.000

a. Friedman Test

Friedman test shows that there were, a significant difference in pre and post treatment effects.

DISABILITY INDEX GROUP 2

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Disability Index before treatment	58	38.4310	6.21010	33.00	55.00
Disability index after treatment	58	16.9138	5.36815	10.00	22.00

This table shows that mean±$S.D$ value of disability index for group before treatment was 38.4310±6.21 and mean±$S.D$ value of disability index for group after treatment was 16.91±5.36, which means that there was a decrease in disability

Discussion:

This randomized controlled trial was designed to find out effect of conventional physical therapy treatment with or without sciatic nerve mobilization in patients with sciatica nerve related para spinal muscle spasm. Total 124 patients were allocated in two groups; named group A and group B according to inclusion and exclusion criterion. Then almost 6 patients were drop out from the study, in which two were drop out from the group A and four were drop out from the group B. Group A received straight leg raising technique along with the baseline conventional treatment for a time period of 6 times per week in total 6 sessions. Group B received slump stretching technique along with the conventional as same for the group A. NPRS was used for assessment of pain and modified Oswestry disability index was used for assessment of issues in daily activities caused by Low back pain. Study was completed within duration of 3 months. Data from both groups was gathered and the mean score for all the outcome measures was investigated.

Outcome of this trial reveals that both treatments are positive in improving pain and reducing spasm of para spinal muscle caused by sciatic nerve; but sciatic nerve mobilization showed more improvement as compared to simple conventional physical therapy treatment along with straight leg raise. Many clinical trials have been escorted by different researchers to investigate the effects of sciatica nerve mobilization and straight leg raise on para spinal muscle spasm caused by sciatic nerve. The majority of the studies supported the use of sciatic nerve mobilization on the para spinal muscle spam and pain related to sciatica nerve entrapment.

Ui- Cheol Jeong et al (18) conducted the study in 2016 shows that applying mobilization to the sciatic nerve dominantly promote soft tissue healing and ease pain which is in accordance with the present study which also shows the significant results

on spinal mobilization. The study shows the benefits of sciatic nerve self-mobility procedures upon the physical well-being and wellness of backache sufferers with radiating pain into their lower limbs. The subjects were split into two groups: one group, consisting of 8 men and 7 women, received training in lumbar segmental stabilization exercises along with sciatic nerve mobilization approaches, and the other group, consisting of 8 men and 7 women, received training in the lumbar segmental stabilization exercises alone. Comparing measurement data between the groups before and after the intervention revealed statistically significant differences. By activating the nervous system's activities to increase nervous system adaptability and reduce sensitivity, applying mobilization techniques to the sciatica nerve can encourage recovery of soft tissue and relieve discomfort {Jeong, 2016 #5}.

Researchers Sneha Pradeep, Anand Heggannavar, and Santosh Metgud wanted to see how people with symptomatic pelvic crossed syndrome (PCS), a common risk factor for low back pain, responded to sciatic nerve neuro-dynamic sustained natural apophyseal glides (SNAGs) and a stretching-strengthening protocol.42 people were participated in the study, which had a randomized controlled trial design. people were assigned at random to either the experimental group, which received sciatic nerve neuro-dynamic SNAGs in addition to traditional physical therapy, or the control group, which received conventional physical therapy. On day 1 and day 6, both before and after treatment, outcome measures such as pressure pain threshold, degree of lumbar lordosis, modified Thomas test, finger-to-floor test, and the Modified Oswestry Disability Questionnaire were evaluated. For six days straight, each group received treatment for 45 minutes every session. The statistical analysis used parametric dependent t-tests. The intra-group analysis revealed statistically significant changes in all outcome measures for both the control and experimental groups. In the inter-group analysis, statistically significant changes were observed in all outcome measures in favor of the experimental group. Based on the findings, the study concluded that patients with symptomatic PCS showed a significant and superior improvement in terms of pain sensitivity and flexibility when sciatic nerve neuro-dynamic SNAGs were given in addition to conventional therapy compared to conventional therapy alone{Rehman, 2022 #6}. It is significant to remember that this study includes a number of restrictions. The study did not examine long-term impacts; it solely evaluated short-term results. To support the findings and determine the intervention's long-term effectiveness for people with symptomatic PCS, future study with bigger sample numbers, longer follow-up periods, and other outcome measures would be helpful. (09)

The study conducted by Kiran Satpute, concluded that the addition of Spinal Mobilization with Leg Movement provided significantly improved benefits in leg pain, back pain and disability, which is not in accordance with the present study where sciatic nerve mobilization showed more improvement as compared to simple conventional physical therapy treatment along with straight leg raise in para spinal muscle spasm (10).

The purpose of the study was to assess the impact of spinal mobilization with leg mobility on lumbar radiculopathy patients' levels of low back and leg pain, disability, pain centralization, and patient satisfaction. The SMWLM group (receiving SMWLM, exercise, and electrotherapy) and the control group (receiving exercise and electrotherapy alone) were assigned to the participants at random. Six sessions were given to each participant over the course of two weeks. All outcome indicators

improved significantly and clinically meaningfully, according to the findings. Leg pain and impairment had dramatically improved in the SMWLM group after 2 weeks compared to the control group. Similarly, compared to the control group, the SMWLM group showed a statistically significant improvement in leg pain and impairment after 6 months. According to the study's findings, adding SMWLM considerably enhanced the short- and long-term advantages for people with lumbar radiculopathy in terms of leg and back pain, disability, SLR ROM, and patient satisfaction. Although this study shows that SMWLM is beneficial in enhancing outcomes in lumbar radiculopathy, there are certain limitations to take into account. (11)

The study conducted by Zainab, Sahreen Anwar, Ana Avaid, Wajeeha Fatimah, Wajida Perveen, and Nimra Naseem, the sciatic nerve mobilization group demonstrated better improvement in terms of pain and disability compared to the conventional group and these results are in accordance with the present study in which treatment with sciatic nerve mobilization showed more improvement as compared to simple conventional physical therapy treatment along with straight leg raise. In patients with lumbar radicular pain, the study assesses the efficacy of sciatic nerve mobilization on disability and range of straight leg raise. Eighty patients were enrolled in the study, and they were allocated into two groups at random according to a single-blinded randomized controlled trial design. The control group received standard physical therapy treatment consisting of a wet heat pack and back exercises, while the experimental group additionally underwent sciatic nerve mobilization. The Modified Oswestry Disability Index (MODI), the inclinometer, and the numeric pain rating scale were used to quantify the outcomes of pain, disability, and the range of the straight leg lift. At the baseline, fourth, and sixth treatment-week evaluations of the results were performed. Although this study demonstrates that sciatic nerve mobilization is useful for treating lumbar radicular pain, there are certain limitations to take into account. Because the study was single-blinded, bias may have been introduced. In order to evaluate the treatment's long-lasting effects, long-term follow-up was not included in the study. To support the findings and give more thorough data on the efficacy of sciatic nerve mobilization for lumbar radicular pain, additional study with bigger sample sizes, longer follow- up periods, and comparison with other treatment modalities would be beneficial (12).

Conclusions:

This randomized controlled trial was designed to find out effect of conventional physical therapy treatment with or without sciatic nerve mobilization in patients with sciatica nerve related para spinal muscle spasm. Total 124 patients were allocated in two groups; named group A and group B according to inclusion and exclusion criterion. Then almost 6 patients were drop out from the study, in which two were drop out from the group A and four were drop out from the group B. Group A received straight leg raising technique along with the baseline conventional treatment for a time period of 6 times per week in total 6 sessions. Group B received slump stretching technique along with the conventional as same for the group A.

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