Faculty of Medicine

University of Dhaka

Effectiveness of Dry Needling of Quadratus Lumborum on Pain and Disability a mong the Patients with Chronic Low Back Pain

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Session: 2018-2019

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DECLARATION

This work has not previously been accepted in substance for any degree and isn't concurrently submitted in candidature for any degree. This dissertation is being submitted in partial fulfillment of the requirements for the degree of B.Sc. in Physiotherapy.

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If the findings of this project are disseminated for future publication, the research supervisor will be highly concerned. It will be duly acknowledged as a graduate thesis, and consent will be taken from the physiotherapy department of SAIC College of Medical Science & Technology (SCMST).

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Session: 2018 – 2019

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CONTENTS

	Page no.
Acknowledgment	i
Acronyms	ii
List of Figures	iii
List of table	iv
Abstract	v
CHAPTER- I: INTRODUCTION	
1.1 Background	1-2
1.2 Rationale	3
1.3 Research question	4
1.4 Objectives	
1.5 Hypothesis	
1.6 List of variables	
1.7 Operational Definition	5
CHAPTER- II: LITERATURE REVIEW	9-18
CHAPTER- III: METHODOLOGY	
3.1 Study design	19
3.2 Study area	19
3.3 Study population	19
3.4 Sampling technique	19
3.5 Sample size	20
3.6 CONSORT flowchart	21

3.7.1 Inclusion criteria	22
3.7.2 Exclusion criteria	22
3.8.1 Data collection tools	23
3.8.2 Measurement tools	23-24
3.10 Data Collection Procedure	24
3.11 Intervention Protocol	25
3.12 Post-Treatment Assessment	25
3.13 Data Analysis	25
3.14 Ethical Consideration	26
CHAPTER- IV: RESULTS	27-46
CHAPTER- V: DISCUSSION	47-49
Limitations	50
CHAPTER- VI: CONCLUSION	51 - 52
Recommendations	52
CHAPTER- VI: REFERENCE	53-55
APPENDIX	56

Acknowledgment

In the name of Allah, the Most Gracious and the Most Merciful. First and foremost, I am profoundly grateful to Almighty Allah for granting me the strength, knowledge, ability, and opportunity to undertake and successfully complete this study.

I extend my heartfelt gratitude to my esteemed teacher and supervisor, Shahid Afridi, Lecturer Saic College of Medical Science & Technology for his invaluable guidance, unwavering support, and encouragement throughout this research journey. His professional insights and steadfast commitment have been instrumental in the successful completion of this dissertation.

I am also deeply thankful to Zahid Bin Sultan, Head of Department, for his continuous support and constructive feedback during the course of my study. I am equally grateful to Dr. Abul Kasem Mohammad Enamul Haque, Principal, Saic Sollege of Medical Science & Technology for his encouragement and leadership, which provided me with the foundation and opportunity to pursue this research.

I am eternally indebted to my parents for their unconditional love, encouragement, and unwavering belief in my academic pursuits. My deepest gratitude also goes to my wife for her moral support, patience, and understanding throughout the research process.

Lastly, I would like to extend my appreciation to all the participants who willingly took part in this study, as well as to everyone who directly or indirectly contributed to the successful completion of this research. Your contributions have been invaluable, and I am truly grateful for your support.

Acronyms

BMI - Body Mass Index

BMRC - Bangladesh Medical Research Council

DN: Dry Needling

QL: Quadratus Lumborum

CLBP: Chronic Low Back Pain

VAS: Visual Analog Scale

RMQ: Roland-Morris Questionnaire

SF-12: Short Form-12 Health Survey

PCS: Physical Component Summary

MCS: Mental Component Summary

RCT: Randomized Controlled Trial

SPSS: Statistical Package for the Social Sciences

List of Figures

Topics	Page
Figure 4.1: Age distribution of Experimental Group and Control Group Participants	56
Figure 4.2: Gender distribution of Experimental Group and Control Group participants	57
Figure 4.3: Living area distribution of Experimental Group and Control Group participants	57
Figure 4.4: Educational qualification distribution of Experimental Group and Control Group participants	58
Figure 4.5: The difference within Experimental Group of Visual Analogue Scale Scores after treatment	58
Figure 4.6: The difference within the Control Group of Visual Analogue Scale Scores after treatment	59
Figure 4.7: The difference within Experimental Group of Roland-Morris Disability Questionnaire Scores after treatment	60
Figure 4.8: The difference within the Control Group of Roland-Morris Disability Questionnaire Scores after treatment	61
Figure 4.9: The difference within Experimental Group of Physical Component Summary of SF-12 Questionnaire Scores	62
Figure 4.10: The difference within the Control Group of Physical Component Summary of SF-12 Questionnaire Scores	63
Figure 4.11: The difference within Experimental Group of Mental Component Summary of SF-12 Questionnaire Scores	64
Figure 4.12: The difference between Control Group of Roland-Morris Disability Questionnaire Scores	65

List of Tables

Topics	Page
Table 4.1: Sociodemographic information of Experimental Group and Control Group	55
Table 4.2: Description of continuous variables of Experimental Group and Control Group	56
Table 4.3: Paired t-test of Visual Analogue Scale (VAS) within group of Experimental Group and Control Group	58
Table 4.4: Paired t-test of Roland-Morris Disability Questionnaire (RMQ) within group of Experimental Group and Control Group	59
Table 4.5: Paired t-test of Physical Component Score (PCS) of SF-12 questionnaire within group of Experimental Group and Control Group	60
Table 4.6: Paired t-test of MCS questionnaire within group of Experimental Group and Control Group	61
Table 4.7: Independent sample t-test on evaluation of Visual Analogue Scale (VAS) questionnaire between Experimental Group and Control Group	62
Table 4.8: Independent sample t-test on evaluation of Roland-Morris Disability Questionnaire (RMQ) between Experimental Group and Control Group	63
Table 4.9: Independent sample t-test on evaluation of Physical Component Score (PCS) of SF-12 questionnaire between Experimental Group and Control Group	64
Table 4.10: Independent sample t-test on evaluation of Mental Component Score (MCS) of SF-12 questionnaire between Experimental Group and Control Group	65

Abstract

Background: Chronic low back pain (CLBP) is a prevalent and debilitating condition associated with significant pain, functional limitations, and reduced quality of life. Dry needling (DN), a therapeutic intervention targeting myofascial trigger points, has gained attention for its potential to reduce pain and improve function. **Objectives:** To evaluate the effectiveness of dry needling of the quadratus lumborum muscle combined with conventional physiotherapy in reducing pain and disability in patients with CLBP. **Methodology:** A single-blind randomized controlled trial was conducted at the outpatient physiotherapy department of SAIC College of Medical Science and Technology (SCMST). Forty patients diagnosed with CLBP were randomly assigned to either the experimental group (dry needling combined with physiotherapy) or the control group (physiotherapy alone). Pain intensity was assessed using the Visual Analog Scale (VAS), while disability was measured using the Roland-Morris Questionnaire (RMQ) and the Physical Component Summary (PCS) of the SF-12 Health Survey. Data were analyzed using SPSS version 22, applying paired and independent t-tests with a significance level of $p < 0.05$. **Results:** In this study 6 (33.3%) participants were male, and 12 (66.7%) were female. Both groups demonstrated significant improvements in pain and disability outcomes, but the experimental group showed greater reductions in VAS scores (3.67 ± 0.71 vs. 4.78 ± 0.83, $p < 0.01$) and greater improvements in PCS scores (49.75 ± 4.41 vs. 41.80 ± 5.94, $p < 0.01$). The experimental group also exhibited a statistically significant reduction in RMQ scores compared to the control group, indicating improved functional outcomes. **Conclusion:** Dry needling of the quadratus lumborum muscle combined with conventional physiotherapy significantly reduces pain and improves functional outcomes in patients with CLBP. These findings support the inclusion of DN as an effective component of physiotherapy for CLBP management. Further research is recommended to explore long-term effects and optimize treatment protocols.

Key words: *Chronic Low Back Pain, Dry Needling, Quadratus Lumborum, Pain Reduction, Physiotherapy, Rehabilitation*

CHAPTER I INTRODUCTION

1.1 Background:

Therapy based on dry needling has gained substantial acceptance as a clinical intervention for treating musculoskeletal pain and myofascial trigger points across different muscle regions. This technique involves the insertion of thin needles into specific muscle areas to relieve pain and improve functional capacity without relying on pharmaceuticals or injections (Kalichman & Vulfsons, 2010, p. 120). The growing interest in dry needling stems from its potential to provide an alternative, non-pharmacological approach to pain management, particularly in individuals with chronic pain conditions. Among the muscles frequently targeted in dry needling treatments, the quadratus lumborum (QL) has attracted notable research attention due to its critical role in lower back pain (LBP) and movement dysfunction. Given the high prevalence of LBP and its impact on daily activities, scientific inquiry into the efficacy of dry needling in treating this condition has intensified.

Studies have specifically examined the pain-suppressing effects and the improvements in the range of motion (ROM) associated with dry needling in cases of myofascial pain syndrome. Findings suggest that dry needling therapy significantly enhances ROM immediately after treatment, as evidenced by research conducted by Mansilla et al. (2016, p. 75). However, while the technique shows promise in improving movement ability, its effectiveness in long-term pain reduction remains debated. According to Mansilla et al. (2016, p. 75), dry needling yields lower pain relief outcomes than other interventions when assessed over extended treatment durations. The study underscores the potential of dry needling as an immediate but temporary solution for pain relief, necessitating further exploration of its long-term efficacy.

Further investigations into dry needling techniques have revealed the benefits of deep dry needling over superficial needling. Griswold et al. (2019, p. 87) examined the impact of both techniques on pain reduction and disability in spine-related conditions. Their study found that deep dry needling produced superior pain relief compared to superficial needling and was effective in decreasing disability associated with spinal dysfunctions. However, when assessing disability outcomes, the study did not find a

significant difference between the two methods. These findings suggest that while deep dry needling may offer better pain relief, its advantages over superficial needling in functional recovery remain inconclusive. Nonetheless, the overall body of evidence supports dry needling as a viable intervention for musculoskeletal pain management.

The scientific foundation of dry needling therapy lies in its ability to mechanically disrupt tissue while simultaneously activating the body's natural healing mechanisms. Diaz et al. (2022, p. 110) emphasize that the technique induces microtrauma in the affected area, triggering a cascade of physiological responses that promote tissue repair and reduce pain sensitivity. This aligns with the broader body of research indicating that dry needling can lead to substantial pain reduction across various musculoskeletal conditions. A study conducted by Boyles et al. (2015, p. 45) found that trigger point dry needling produced similar or superior outcomes compared to other conventional treatments such as stretching and percutaneous electrical nerve stimulation (PENS). These findings suggest that dry needling may be an effective standalone treatment or a valuable adjunct to other rehabilitative therapies.

Moreover, dry needling has demonstrated efficacy when combined with complementary therapeutic approaches. Sobhani et al. (2017, p. 152) investigated the combined effects of dry needling, manual therapy, and kinesio taping in patients with chronic myofascial neck pain. Their study found that while these interventions collectively improved pain intensity and ROM, no single approach proved significantly superior in all measured variables. However, their findings highlight the potential of dry needling to enhance treatment outcomes when integrated into multimodal rehabilitation programs. This raises the possibility of incorporating dry needling into broader pain management strategies that address the multifactorial nature of musculoskeletal disorders.

As research into dry needling therapy expands, its potential applications extend beyond myofascial pain syndromes to other musculoskeletal conditions, including LBP. LBP is a prevalent condition that significantly impairs quality of life and often requires a choice between pharmacological treatments and physical interventions (Thomas et al., 2010, p. 98). Given the limitations of long-term drug therapy, alternative approaches such as dry needling have gained traction as promising non-invasive options.

Additionally, research now explores the use of dry needling for conditions such as hip osteoarthritis. Laita et al. (2021, p. 120) found that dry needling therapy not only provided significant pain relief but also enhanced muscle strength and functional capabilities in patients with hip osteoarthritis. These findings suggest that dry needling may be beneficial beyond its traditional applications, warranting further exploration into its role in managing diverse musculoskeletal disorders.

Despite its growing acceptance, dry needling remains a subject of debate among healthcare professionals. Griswold et al. (2019, p. 87) conducted an umbrella review, concluding that dry needling provides temporary pain relief and outperforms sham or placebo treatments based on moderate-quality evidence. However, its long-term impact on quality of life and ROM remains uncertain. Similarly, Chys et al. (2023, p. 155) observed that dry needling is comparable to other treatments in reducing disability and enhancing functionality over time. While some studies highlight its short-term benefits, others caution that its efficacy relative to alternative interventions requires further validation.

1.2 Rationale:

Low back pain (LBP) is a widespread and debilitating condition affecting a significant portion of the global population. It often results from myofascial pain syndromes, particularly trigger points in the quadratus lumborum (QL) muscle, a key stabilizer of the lumbar spine and pelvis. Trigger points in the QL can lead to localized pain, stiffness, and reduced mobility, severely impairing daily functioning and overall well-being. Effective management of LBP is essential to improve patients' quality of life and mitigate the economic burden on healthcare systems associated with chronic pain conditions.

Traditional treatments for LBP include pharmacological interventions, physical therapy, and manual techniques. While these approaches provide some relief, they are not always sufficient or lasting for addressing myofascial pain. Dry needling (DN), a therapeutic technique involving the insertion of fine needles into muscle trigger points, has emerged as a promising alternative or complementary intervention. By directly targeting affected muscle structures, DN aims to alleviate pain, reduce stiffness, and improve function through neurophysiological and mechanical mechanisms. It is increasingly being used for various musculoskeletal conditions, including LBP, yet limited research focuses specifically on its efficacy for QL-related pain. The QL plays a vital role in stabilizing the lumbar spine and facilitating trunk movement, making it a frequent source of chronic LBP.

Previous studies have demonstrated that DN can offer immediate pain relief and improve function by targeting deep muscle structures. However, the evidence regarding its long-term benefits, especially for the QL, is scarce. This study aims to address the gap by evaluating the effects of DN on QL-related pain and disability in patients with chronic LBP. By investigating the outcomes of DN combined with conventional physiotherapy, this research seeks to provide evidence-based insights into its utility, potentially contributing to more targeted and effective management strategies for this common and challenging condition. The findings could enhance therapeutic protocols and improve patient outcomes in managing chronic LBP.

1.3 Research Question

Is dry needling of the quadratus lumborum muscle combined with conventional physiotherapy effective in reducing pain and disability in individuals with chronic low back pain?

1.4 OBJECTIVE

General objective

To compare the effectiveness of dry needling of quadratus lamborum muscle vs conventional physiotherapy on pain and disability among the patients with chronic low back pain in Outdoor Department of Physiotherapy in SAIC College of Medical Science & Technology (SCMST)

Specific objective

- To determine the sociodemographic profile of the participants
- To assess the level of pain by using Visual Analog Scale (VAS) Patients of experimental and control group before and after intervention
- To assess the functional disability by using Roland-Morris Disability questionnaire (RMDQ) participants of experimental and control group before and after intervention.
- To identify the quality of life by using SF-12 (12- Item Short Form Health Survey) questionnaire of experimental and control group before and after intervention.
- To compare the outcome of dry needling and conventional therapy of the participant by using independent T-test.

1.5 HYPOTHESIS:

Null Hypothesis (H_0): Dry needling of the quadratus lamborum muscle is not more effective for the patient with chronic low back pain.

$$\mu_1 - \mu_2 \neq 0 \text{ or } \mu_1 \neq \mu_2$$

Alternative Hypothesis (H_1): Dry needling of the quadratus lumborum muscle is more effective for the patient with chronic low back pain.

$$\mu_1 - \mu_2 = 0 \text{ or } \mu_1 \geq \mu_1$$

Where,

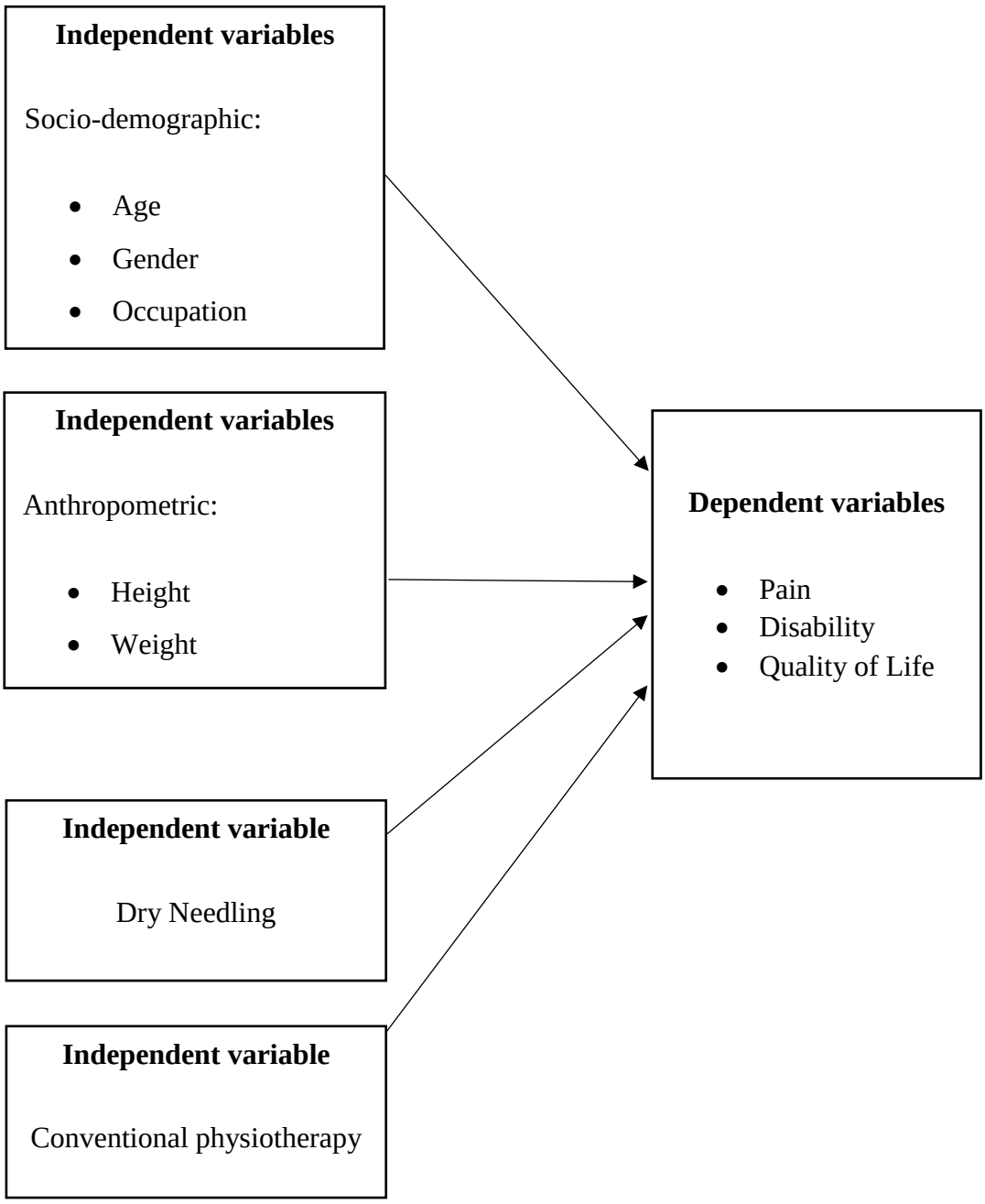
Ho= Null hypothesis

Ha = Alternative hypothesis

μ1 = Mean difference in initial assessment

μ2 = Mean difference in final assessment

1.7 List of variables:



1.6 OPERATIONAL DEFINITION

1. Chronic low back pain:

This refers to persistent or recurrent pain in the lower back area that lasts for more than 12 weeks and interferes with a person's daily activities. It can be caused by various factors, including muscle strain, degenerative disc disease, or nerve compression.

2. Quadratus lumborum muscle:

This is a group of muscles located in the lower back, specifically on the sides of the spine. The QL muscles play a crucial role in stabilizing the spine and supporting the lower extremities during activities such as walking, running, and lifting.

3. Dry needling:

This is a technique used in physical therapy and acupuncture that involves inserting thin needles into the muscle tissue without injecting any substance (hence the term "dry"). The needles stimulate healing responses in the body, which can help reduce pain and improve function.

4. Insertion of needles:

In dry needling of the QL muscle, needles are inserted into the muscle tissue at specific points along the QL muscle belly. The needles are typically 15-30 mm long and are inserted to a depth of about 15-20 mm. The needles are left in place for 15-60 seconds before being removed.

5. Pain and disability reduction:

Dry needling of the QL muscle has been shown to be effective in reducing pain and improving function in patients with chronic low back pain. By stimulating healing responses in the muscle tissue, dry needling can help reduce muscle spasms, inflammation, and adhesions, which can contribute to pain and disability.

CHAPTER II LITERATURE REVIEW

Chronic low back pain (CLBP) is a significant health issue, characterized by persistent pain localized below the costal margin and above the inferior gluteal folds, which may or may not radiate into the legs (Koes, Van Tulder & Thomas 2010, p. 120). It is a prevalent condition, with lifetime prevalence estimates ranging from 49% to 70% and point prevalences varying from 12% to 30% in Western countries (Koes et al. 2006, p. 45). The condition is associated with considerable impact on daily life and functionality, often resulting in substantial disability and a reduced quality of life (Koes et al. 2006, p. 45). CLBP poses a substantial burden on both individuals and healthcare systems, with its management frequently involving a multidisciplinary approach to address pain, disability, and associated functional limitations (Koes et al. 2006, p. 45).

The quadratus lumborum (QL) muscle is a deep muscle located in the lower back, extending from the iliac crest to the lower ribs and lumbar vertebrae (Diaz et al. 2022, p. 110). It plays a critical role in stabilizing the lumbar spine and aiding in various movements, such as lateral flexion and extension of the trunk (Diaz et al. 2022, p. 110). The QL muscle is implicated in CLBP, particularly when it becomes a site of myofascial pain and trigger points. This pain is often described as deep and aching, contributing to discomfort and functional impairment.

Dry needling (DN) has emerged as a potential therapeutic intervention for managing CLBP, especially targeting myofascial trigger points within the QL muscle. Research has demonstrated that DN can result in significant improvements in pain and functional outcomes for various musculoskeletal conditions, including those involving the QL muscle (Laita et al. 2021, p. 120; Chys et al. 2023, p. 155). By directly addressing trigger points and potentially reducing muscle tension, DN may offer a promising approach for alleviating CLBP and enhancing patients' overall functional capacity (Laita et al. 2021, p. 120).

Chronic low back pain (CLBP) is a multifaceted condition with various underlying causes and contributing factors, including muscular, skeletal, and neurological components. Muscular factors often involve the dysfunction of muscles, such as the quadratus lumborum, which can contribute to pain through myofascial trigger points.

Trigger points in these muscles are frequently targeted in dry needling (DN) interventions (Kalichman & Vulfsons 2010, p. 120). Skeletal factors encompass conditions like degenerative disc disease and facet joint dysfunction, which can contribute to both acute and chronic pain (Koes et al. 2006, p. 45). Neurological factors include nerve root irritation or entrapment that can exacerbate pain symptoms.

Pain mechanisms in chronic low back pain are generally classified into nociceptive and neuropathic pain. Nociceptive pain arises from damage or inflammation in tissues such as muscles, ligaments, or discs. This type of pain is typically associated with acute injuries but can persist and become chronic (Koes et al. 2006, p. 45). Neuropathic pain, on the other hand, results from damage or dysfunction within the nervous system, leading to pain that is often described as burning or tingling. This type of pain is less directly related to tissue damage and more to nerve irritation or central processing abnormalities (Mansilla et al. 2016, p. 75).

Central sensitization is a crucial aspect of chronic pain, involving the increased sensitivity of the central nervous system to stimuli. This mechanism contributes to the persistence and amplification of pain signals, even in the absence of ongoing peripheral injury or inflammation (Chys et al. 2023, p. 155). Central sensitization can lead to heightened pain perception and may play a role in the development and maintenance of chronic low back pain, complicating both diagnosis and treatment (Boyles et al. 2015, p. 45).

Understanding these mechanisms is essential for developing effective treatment strategies for CLBP. Dry needling, a technique that targets myofascial trigger points, is one such strategy that has been explored for its effectiveness in managing pain and improving function (Laita et al. 2021, p. 120).

Dry needling (DN) is a minimally invasive technique utilized primarily for managing musculoskeletal pain, particularly targeting myofascial trigger points (MTrPs). It involves inserting a thin, solid needle into specific points in the muscle to induce a local twitch response and facilitate pain relief and muscle relaxation (Kalichman & Vulfsons 2010, p. 120). Unlike acupuncture, which involves stimulating various points on the body to balance energy flow (Griswold et al. 2019, p. 87), dry needling focuses on

mechanically disrupting dysfunctional muscle fibers and connective tissues without injecting any substances (Diaz et al. 2022, p. 110).

Research comparing DN with other needling techniques, such as acupuncture, suggests that while both modalities involve needle insertion, DN is distinct in its approach and intended outcomes. For instance, Griswold et al. (2019, p. 87) highlighted that deep needling generally provides superior pain relief compared to superficial needling, and DN, in general, is more effective than placebo or sham treatments in reducing pain and improving function over the short term (Chys et al. 2023, p. 155). Similarly, Kalichman & Vulfsons (2010, p. 120) emphasized that DN is more effective than superficial needling methods for managing pain associated with trigger points.
Dry needling operates through several mechanisms, primarily involving muscle relaxation and pain modulation. The insertion of the needle into MTrPs can lead to immediate and short-term reductions in pain intensity and disability (Boyles et al. 2015, p. 45; Dunning et al. 2014, p. 78). This is achieved through the elicitation of a local twitch response, which can help normalize muscle function and reduce pain by disrupting the abnormal neuromuscular activity associated with trigger points (Sobhani et al. 2017, p. 152).

In terms of pain modulation, DN has been shown to be effective in decreasing pain intensity and improving range of motion (Mansilla et al. 2016, p. 75). This technique facilitates muscle relaxation and decreases muscle tenderness by affecting the underlying pathophysiological mechanisms of myofascial pain syndrome. For instance, Díaz et al. (2022, p. 110) reported that DN significantly reduced pain and improved function in various musculoskeletal conditions, particularly when combined with conventional physiotherapy.

Furthermore, the literature suggests that DN's efficacy extends beyond immediate pain relief. Long-term benefits include sustained improvements in pain and function, as evidenced by significant effect sizes in pain reduction and physical function improvements (Laita et al. 2021, p. 120). This supports the use of DN as a viable treatment modality for managing chronic low back pain and other musculoskeletal disorders, highlighting its role in both immediate and sustained pain relief and functional enhancement.

Overall, dry needling demonstrates a robust capability to address various aspects of musculoskeletal pain and dysfunction through its targeted approach to myofascial trigger points (MTrPs), setting it apart from other needling techniques and providing a valuable tool in the treatment of low back pain and related conditions. The quadratus lumborum (QL) muscle plays a crucial role in the mechanics of the lower back and is often implicated in chronic low back pain (CLBP). The QL assists in stabilizing the lumbar spine and contributing to lateral flexion of the trunk. Dysfunction or myofascial trigger points within the QL can lead to significant discomfort and contribute to the overall pain experience in CLBP (Koes et al. 2006, p. 45). Evidence suggests that the QL is frequently involved in low back pain syndromes, with trigger points in this muscle associated with increased pain and disability (Griswold et al. 2019, p. 87).

Several studies have highlighted the involvement of the QL in low back pain. For instance, Kalichman & Vulfsons (2010, p. 120) note that myofascial pain, often involving muscles like the QL, is a prevalent issue contributing to chronic pain complaints. Additionally, Diaz et al. (2022, p. 110) reported that dry needling (DN) has shown significant improvements in pain associated with myofascial trigger points, including those in the QL muscle, supporting its role in CLBP management.

Dry needling (DN) has shown evidence for its ability to handle pain problems linked to the QL according to researchers. The analysis by Mansilla et al. (2016, p. 75) demonstrated that dry needling treatments lead to substantial increases in ROM along with reduced pain intensity but proved less effective than other interventions for pain reduction during weeks two through three. The initial outcomes of DN treatment revealed positive results through improvement of ROM (Mansilla et al. 2016, p. 75).

Multiple studies assessing DN therapy against different treatment modalities produce conflicting outcome results. Deep needling methods used in DN provide more pain relief than superficial needling treatments according to Griswold et al. (2019, p. 87), thus making deep needling appropriate for treating deep muscles such as the QL. According to Chys et al. (2023, p. 155), DN therapy demonstrated comparable short-term pain reduction results as alternative approaches but did not produce long-term clinical differences.

Laita et al. (2021, p. 120) successfully applied DN therapy on patients with hip osteoarthritis, thereby demonstrating potential similar benefits for the treatment of the QL muscle in low back pain cases. The research by Sobhani et al. (2017, p. 152) revealed that needle insertion therapy produced substantial improvements both in pain intensity ratings and joint movement functions, thus demonstrating its capability in managing muscle-related pain disorders.

Research must continue to determine how well DN measures up to alternative treatment methods when treating QL-related low back pain over the extended term.

Different studies demonstrate that dry needling (DN) successfully diminishes pain intensities, but the strength of this pain reduction varies between research findings. The study authors found that DN produced substantial ROM improvements within the same session as placebo but demonstrated reduced pain reduction when measured against other interventions spanning 3-4 weeks (Mansilla et al. 2016, p. 75). The research showed DN as more effective than placebo in decreasing pain at the point of intervention (Mansilla et al. 2016, p. 75).

Griswold et al. (2019, p. 87), in their systematic review with meta-analysis, evaluated that deep dry needling delivered superior pain relief than superficial needling methods across multiple time frames that included brief (<12 weeks) and extensive durations. The reviewed evidence indicates that deep needling demonstrates better pain reduction than shallow needling methods but shows no meaningful differences in patient disability evaluation (Griswold et al. 2019, p. 87).

As described by Kalichman & Vulfsons (2010, p. 120), deep dry needling proved more beneficial than superficial dry needling for treating myofascial trigger point-related pain through deep penetrative methods. Deep muscle layer penetration explains why dry needling demonstrates its effectiveness, according to Kalichman & Vulfsons (2010, p. 120).

Patients experienced greater short-term pain reduction under DN therapy than sham/placebo treatments, according to Chys et al. (2023, p. 155), and follow-up results showed DN provided statistically better outcomes (moderate level) for pain relief in the

6 to 12 months period. The research demonstrates DN provides patients with instant pain relief together with prolonged pain control (Chys et al. 2023, p. 155).

In terms of functional disability, DN has demonstrated positive effects on physical function and quality of life. Díaz et al. (2022, p. 110) reported that DN, when combined with conventional physiotherapy, effectively reduced pain and disability in various pathologies, particularly in the upper limb. The combination of DN with conventional physiotherapy showed superior outcomes compared to DN alone (Diaz et al. 2022, p. 110).

Laita et al. (2021, p. 120) found significant improvements in physical function, hip muscle strength, and reduction in pain among patients with hip osteoarthritis who received DN therapy. The results showed large effect sizes in the DN group compared to sham and control groups, indicating substantial improvements in physical function and quality of life (Laita et al. 2021, p. 120).

Boyles et al. (2015, p. 45) and Chys et al. (2023, p. 155) noted that while DN shows effectiveness in pain relief, the evidence regarding its superiority over other interventions and long-term benefits remains inconsistent. The diverse methodologies and outcome measures employed across studies contribute to this inconsistency, highlighting the need for more uniform research protocols and standardized outcome measures (Boyles et al. 2015, p. 45).

Several research gaps persist in the field of dry needling for low back pain. First, while studies underscore the benefits of DN, there is a need for more robust long-term studies to confirm its sustained efficacy and safety (Kalichman 2010, p. 120; Laita et al. 2021, p. 120). Additionally, research should address the optimal technique and depth of needle insertion, as discrepancies between superficial and deep needling outcomes have yet to be fully resolved (Griswold et al. 2019, p. 87).

Furthermore, Díaz et al. (2022, p. 110) and Sobhani et al. (2017, p. 152) suggest that combining DN with conventional physiotherapy yields better results, yet studies specifically targeting the quadratus lumborum and comparing combined interventions with standalone DN are limited. Addressing these gaps could provide clearer insights

into the best practices for integrating DN into treatment regimens for low back pain, particularly in muscle-specific contexts (Sobhani et al. 2017, p. 152).

This review synthesizes the evidence on the effectiveness of dry needling (DN) in treating low back pain, particularly focusing on the quadratus lumborum (QL) muscle. Several studies highlight the efficacy of DN in reducing pain and improving functional outcomes across various musculoskeletal conditions. Mansila et al. (2016, p. 75) observed that DN significantly increased range of motion (ROM) and reduced pain intensity immediately after treatment compared to placebo, although its long-term effectiveness was less pronounced. Griswold et al. (2019, p. 87) found that deep DN was more effective than superficial DN for pain relief and disability reduction, emphasizing the importance of needle depth in achieving clinical benefits. Kalichman et al. (2010, p. 120) supported the use of deep DN over superficial techniques, noting its effectiveness for myofascial pain, which may be relevant for QL treatment.

Díaz et al. (2022, p. 110) reported that DN effectively reduced pain and disability in various musculoskeletal conditions, including subacromial syndrome, with improved outcomes when combined with conventional physiotherapy. Boyles et al. (2015, p. 45) highlighted DN's broad applicability for trigger points across different body regions, suggesting its potential benefits for QL-related low back pain. Dunning et al. (2014, p. 78) emphasized immediate and short-term improvements in pain and disability with DN, reinforcing its utility for managing myofascial pain. Sobhani et al. (2017, p. 152) found DN to be effective in reducing pain and improving cervical range of motion, although it was comparable to other interventions in certain measures.

Chys et al. (2023, p. 155) provided moderate-quality evidence that DN offers short-term pain relief and functional improvements, with similar effects to other treatments. Laita et al. (2021, p. 120) demonstrated that DN therapy improved pain, hip muscle strength, and physical function in patients with hip osteoarthritis, indicating potential benefits for musculoskeletal pain management beyond the hip.

The evidence suggests that DN can be an effective intervention for managing low back pain, including that originating from the QL muscle. The findings highlight DN's potential benefits in providing immediate pain relief and improving functional

outcomes (Diaz et al. 2022, p. 110). Clinicians should consider incorporating DN into treatment plans, particularly for patients with myofascial pain syndromes. However, it is crucial to note that while DN shows promise, its effectiveness can vary based on factors such as needle depth and the inclusion of complementary treatments. Clinicians should also be aware of the limited long-term evidence and the need for individualized treatment plans.

Future research should address several gaps identified in the current literature. There is a need for more high-quality, large-scale randomized controlled trials specifically focusing on DN's effectiveness for QL-related low back pain. Studies should explore optimal treatment protocols, including needle depth and frequency, and compare DN with other established interventions. Additionally, research should investigate the long-term effects of DN on pain and functional outcomes, as well as its impact when combined with other physiotherapy techniques. Exploring patient-specific factors that may influence DN's efficacy could further refine treatment approaches and enhance clinical outcomes (Diaz et al. 2022, p. 110).

CHAPTER-III METHODOLOGY

3.1 Study Design

The study was a single-blind, randomized controlled trial (RCT) designed to evaluate the effectiveness of dry needling of the quadratus lumborum muscle on pain and disability in patients with chronic low back pain. Participants were randomly assigned to either the experimental group (receiving dry needling in addition to conventional physiotherapy) or the control group (receiving only conventional physiotherapy).

3.2 Study Area

Outdoor facility of SAIC College of Medical Science & Technology (SCMST)

3.3 Study Population

The study population consisted of adult patients diagnosed with chronic low back pain.

3.4 Sampling Technique

A simple random sampling technique was employed to select patients for the study. The sampling frame included patients diagnosed with chronic low back pain who met the inclusion criteria. From this pool, 40 eligible participants were randomly selected for the study. Participants were randomly assigned to either the experimental group (20 patients) or the control group (20 patients). This allocation helped minimize bias and ensured the internal validity of the study.

The study used a single-blind design, where participants did not know which group they had been assigned to. This reduced performance bias. Participants were identified with unique codes (e.g., C1, C2, C3 for the control group and E1, E2, E3 for the experimental group).

3.5 Sample size:

$k = \frac{n_2}{n_2} = 1$

$n_1 = \frac{\left(\sigma_1^2 + \sigma_2^2 / K\right)\left(Z_1 - \frac{a}{2} + Z_1 - \beta\right)^2}{\Delta^2}$

$n_1 = \frac{(1.48^2 + 1.48^2/1)\ (1.96+1.04)^2}{1.39^2}$

$n_1 = 20$

$n_2 = K \times n_1 = 20$

Here,

$\Delta = \mu_2 - \mu_1$ = absolute difference between two means

σ_1 , σ_1 = variance of mean 1 and 2

n_1 = sample size for group 1

n_2 = sample size for group 2

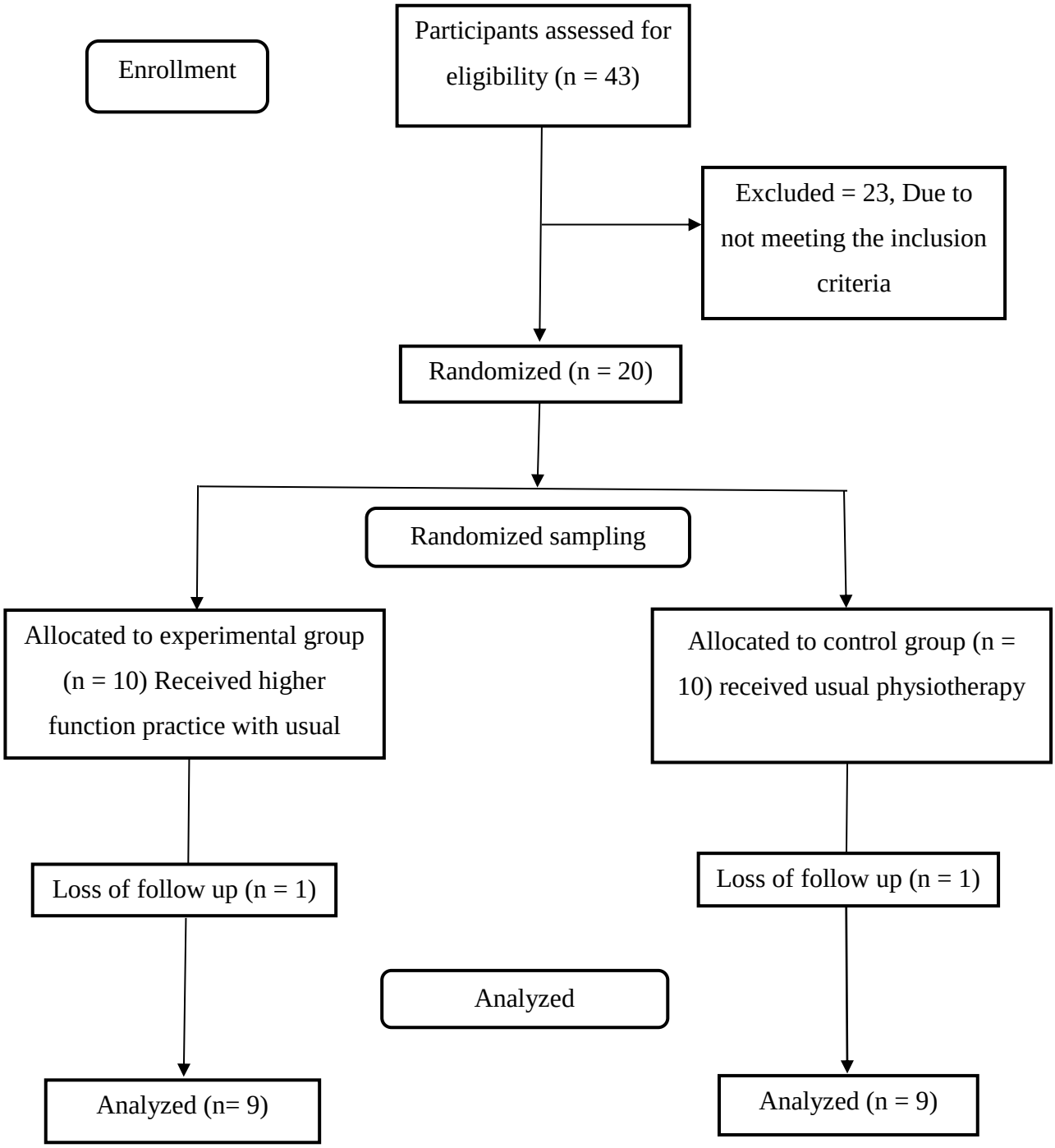
α = probability of type I error (usually 0.05)

β = probability of type II error (usually 0.2)

z = critical Z value for a given α or β

k = ratio of sample size for group 2 to group 1

3.6 CONSORT (Consolidated Standards of Reporting Trials) flow chart:



3.7 Eligibility Criteria

3.7.1 Inclusion Criteria:

1. Adults aged 18–60 years, diagnosed with chronic low back pain (pain persisting for at least 3 months) (Hu et al. 2018, p. 90).
2. Patients experiencing moderate to severe pain Visual Analog Scale.
3. Patients who were medically stable and cleared for physiotherapy intervention (Gattie et al. 2017, p. 133).
4. Patients who had provided written informed consent to participate in the study (Braithwaite et al. 2018, p. 89).
5. Patients willing and able to follow the dry needling and physiotherapy protocols (Furlan et al. 2015, p. 77).

3.7.2 Exclusion Criteria:

1. Patients with severe neurological or cardiovascular conditions (e.g., stroke, heart disease) (Romero-Morales et al. 2024, p. 45).
2. Pregnant women or patients with conditions contraindicating dry needling (e.g., infections, allergies to needles) (Valera-Calero et al. 2022, p. 120).
3. Patients with a history of malignancy, osteoporosis, or recent fractures in the lumbar spine (Palomo et al. 2023, p. 71).
4. Patients who had undergone spinal surgery within the past 6 months.
5. Patients with conditions that may interfere with pain perception (e.g., diabetes, chronic pain syndromes) (Liu et al., 2018, p. 74).
6. Patients unable or unwilling to consent to participate (Braithwaite et al. 2018, p. 89).

3.8 Data Collection Method and Materials

3.8.1 Data Collection Tools

Data collection form

Informed consent form

Visual Analog Scale (VAS): To assess pain intensity.

Roland-Morris Questionnaire (RMQ)

SF-12 Questionnaire

3.8.2 Measurement Tools

Visual Analog Scale (VAS)

The Visual Analog Scale (VAS) was employed to measure pain intensity. This tool consists of a 10 cm horizontal line with endpoints labeled "no pain" (0) and "worst possible pain" (10). Participants marked a point on the line that best represented their level of pain at the time of assessment. The VAS is a widely validated instrument for pain measurement and was chosen for its simplicity, reliability, and ability to capture subtle variations in pain intensity.

Roland-Morris Questionnaire (RMQ)

The Roland-Morris Questionnaire (RMQ) was used to evaluate functional disability related to chronic low back pain. The RMQ is a self-reported tool that consists of 24 items assessing the impact of low back pain on daily activities. Each item is scored as either "yes" or "no," with higher scores indicating greater disability. The RMQ’s specificity to low back pain made it an ideal choice for assessing changes in functionality following the intervention.

SF-12 Questionnaire

The SF-12 Questionnaire was included to assess health-related quality of life, encompassing both physical and mental health components. This tool generates two summary scores: the Physical Component Summary (PCS) and the Mental Component Summary (MCS). The SF-12 is a validated, widely used instrument that captures the multidimensional impacts of health conditions. Its inclusion allowed for a holistic evaluation of participants' overall well-being, complementing the more specific measures of pain and disability.

3.9 Data Collection Procedure

The data for this study was collected using a structured approach comprising closed-ended questionnaires and interviews with predetermined responses. This method was chosen for its consistency and efficiency in capturing comprehensive data across all relevant domains. The structured questionnaire proved invaluable in standardizing responses and ensuring that all necessary information was gathered effectively.

To capture socio-demographic information and other relevant variables, a structured, closed-ended questionnaire was designed specifically for this study. The questionnaire was meticulously developed to align with the study's objectives, and individual items were carefully crafted and reviewed to address the specific research questions. Minor adjustments were made to the wording of certain items to ensure clarity and relevance, thereby enhancing the reliability of the responses.

The data collection process began with obtaining informed consent from all participants, ensuring they were fully aware of the study's aims and procedures. Participants then completed the questionnaire, either through direct interviews conducted by the researcher or by self-administration under the researcher’s guidance. This dual approach ensured accessibility and minimized response bias, while the closed-ended format facilitated efficient data analysis and comparability across participants.

3.10 Screening and Baseline Assessment:

Eligible patients were screened based on the inclusion and exclusion criteria. After obtaining informed consent, baseline assessments for pain intensity (VAS), RMQ, SF-12 questionnaire.

3.11 Intervention Protocol:

Treatment Protocol: Experimental Group	**Treatment Protocol: Control Group**
Intervention: Dry needling to the quadratus lumborum muscle combined with conventional physiotherapy.	**Intervention:** Conventional physiotherapy only (without dry needling).
Dry Needling Details: - Administered by a trained and certified physiotherapist. - Single-use sterile needles were used. - Needles were inserted to a depth eliciting a local twitch response.	**Conventional Physiotherapy Details:** Core strengthening exercises. Lumbar spine stabilization exercises. Dynamic stretching exercises Bridging exercise Pelvic tilting exercise Core stabilization exercises Lumbar flexion and extension exercises Side-lying leg lifts
Frequency: 12 treatment sessions over 4 weeks (3 sessions per week).	**Frequency:** 12 treatment sessions over 4 weeks (3 sessions per week).
Reference: (Gattie et al, 2017)	**Reference:** (Cairns et al., 2006)

The experimental group received dry needling to the quadratus lumborum muscle, in addition to conventional physiotherapy. The dry needling was administered by a trained and certified physiotherapist using sterile, single-use needles. The needle was inserted into the muscle to a depth that elicited a local twitch response. Conventional physiotherapy for both groups included exercises for strengthening the core and lumbar spine stabilization.

The control group received only conventional physiotherapy (without dry needling). Both groups received 12 treatment sessions over 4 weeks (3 sessions per week).

3.12 Post-Treatment Assessment:

After the completion of the intervention (4 weeks), post-treatment assessments for pain intensity (VAS), RMQ, SF-12 questionnaire.

3.13 Data Analysis

Data analysis was performed using SPSS (Statistical Package for the Social Sciences), and Microsoft Excell 2016. Descriptive statistics (mean, standard deviation) were calculated for baseline and post-treatment measures. To analyze within-group differences, the Paired t-test was used for parametric data. Between-group differences were analyzed using the Independent samples t-test. A significance level of $p < 0.05$ was considered statistically significant.

3.14 Ethical consideration

Strict adherence to ethical guidelines was paramount in this study. A formal project proposal was submitted to the Department of Physiotherapy at Saic College of Medical Science and Technology (SCMST), and approval was obtained from the Institutional Review Board (IRB) of SCMST to conduct the study. This study followed the guidelines set forth by the World Health Organization (WHO) and the Bangladesh Medical Research Council (BMRC), ensuring the confidentiality of participant information at all times. Permission to collect data was obtained from the study area authorities. Participants were fully informed about the aims and objectives of the study before consenting to participate. Written consent was obtained from each participant, and the process was explained verbally as well. Participants were assured of the confidentiality of their information, which was only shared with the research supervisor. They were informed of their rights, including the option to withdraw from the study at any time without consequences. To protect anonymity, participant names and addresses were not used; instead, participation numbers were assigned in all notes and transcripts. It was made clear that information gathered might be presented in presentations, seminars, or written papers, but in a way that ensured no identification of individuals and posed no harm to them. Participants were also assured of their right to discuss any concerns related to the study with senior authorities. The ethical standards upheld in this study aimed to protect participant welfare while maintaining the integrity and confidentiality of the research process.

Baseline characteristic

Table 4.1: Sociodemographic information of Experimental group and Control group

Variable	Experimental N (%)	Control N (%)	Total N (%)	*p*-value
Gender				
Male	3 (33.3%)	3 (33.3%)	6 (33.3%)	1.000
Female	6 (66.7%)	6 (66.7%)	12 (66.7%)	
Living Area				
Rural	2 (22.2%)	1 (11.1%)	3 (16.7%)	0.300
Semi-urban	0 (0.0%)	2 (22.2%)	2 (11.1%)	
Urban	7 (77.8%)	6 (66.7%)	13 (72.2%)	
Marital Status				
Married	6 (66.7%)	8 (88.9%)	14 (77.8%)	0.257
Unmarried	3 (33.3%)	1 (11.1%)	4 (22.2%)	
Family Type				
Extended family	3 (33.3%)	5 (55.5%)	8 (44.4%)	0.343
Nuclear family	6 (66.7%)	4 (44.4%)	10 (55.5%)	

Educational Level				
Graduation & above	2 (22.2%)	3 (33.3%)	5 (27.8%)	0.077
HSC	4 (44.4%)	3 (33.3%)	7 (38.9%)	
SSC	2 (22.2%)	2 (22.2%)	4 (22.2%)	
Illiterate	1 (11.1%)	1 (11.1%)	2 (11.1%)	
BMI status				
Normal weight	5 (55.6%)	6 (66.7%)	11 (61.1%)	0.311
Pre-obesity	2 (22.2%)	2 (22.2%)	4 (22.2%)	
Underweight	2 (22.2%)	1 (11.1%)	3 (16.7%)	
Comorbidities				
DM	2 (22.2%)	1 (11.1%)	3 (16.7%)	1.017
Don’t know	6 (66.7%)	5 (55.6%)	11 (61.1%)	
HTN	0 (0.0%)	2 (22.2%)	2 (11.1%)	
Others	1 (11.1%)	1 (11.1%)	2 (11.1%)	

(*= < 0.05, ** = < 0.01, ***= < 0.001)

Gender distribution was identical in both groups, with males constituting 33.3% and females 66.7% of participants, yielding a p-value of 1.000, signifying no difference. In terms of living area, the majority of participants resided in urban areas (72.2%), followed by rural (16.7%) and semi-urban areas (11.1%). A slightly higher proportion of urban residents was observed in the experimental group (77.8%) compared to the control group (66.7%), but the difference was not statistically significant ($p = 0.300$).

Regarding marital status, married individuals constituted 77.8% of the total population, with a higher proportion in the control group (88.9%) than in the experimental group (66.7%). The remaining 22.2% were unmarried, with no significant difference between the groups ($p = 0.257$). Family type analysis showed that participants from nuclear families were more prevalent (55.5%) compared to extended families (44.4%), with no significant difference ($p = 0.343$).

Educational levels revealed that the majority of participants had completed Higher Secondary Certificate (HSC) education (38.9%), followed by those with graduation or higher (27.8%), Secondary School Certificate (SSC) (22.2%), and illiterate individuals (11.1%). The distribution across groups was comparable, with a p-value of 0.077.

BMI analysis indicated that most participants had a normal weight (61.1%), followed by pre-obesity (22.2%) and underweight status (16.7%). The distribution was similar across groups, with no significant difference ($p = 0.311$).

Finally, the prevalence of comorbidities showed that 61.1% of participants were unaware of any comorbid conditions. Among those aware, diabetes mellitus (DM) was reported by 16.7%, hypertension (HTN) by 11.1%, and other conditions by 11.1%. The differences between groups were not statistically significant ($p = 1.017$).

Table 4.2: Description of continuous variable of Experimental Group and Control Group

Variable	Experimental Group	Control Group	*t*	*p*-value
	Mean ± SD			
Age	37.11 ± 13.03	42.12 ± 12.55	-0.884	0.390
BMI	22.15 ± 4.11	22.09 ± 3.02	0.32	0.975

The continuous variables of the experimental and control groups were analyzed, and their descriptive statistics are presented in Table 4.2. The mean age of participants in the experimental group was 37.11 years (±13.03), while in the control group, it was slightly higher at 42.12 years (±12.55). However, the difference in mean age between the two groups was not statistically significant (t = -0.884, p = 0.390), indicating that the age distribution was comparable across groups.

Similarly, the mean BMI of participants in the experimental group was 22.15 (±4.11), closely matching the mean BMI of 22.09 (±3.02) in the control group. The t-test revealed no significant difference in BMI between the groups (t = 0.32, p = 0.975), suggesting that the groups were also comparable in terms of body mass index.

Overall, the analysis of continuous variables indicates that the experimental and control groups were well-matched, with no significant differences in age or BMI. This balance supports the validity of subsequent comparisons between the groups in the study.

Table 4.3: Identified the level of pain within group of Experimental Group and Control Group

Variable	Experimental		Control	
	t	P value	t	P value
Visual Analogue Scale (VAS)	8.315	0.000	4.400	0.002

Paired t test

(*= < 0.05, ** = < 0.01, ***= < 0.001)

The paired t-test results for the Visual Analogue Scale (VAS) within the Experimental and Control groups are shown in the table. The pre- and post-intervention VAS scores were analyzed to measure the effectiveness of the intervention in reducing pain intensity. The first column indicates the group, while the second and third columns show the t-values and p-values for each group.

The Experimental group exhibited a highly significant improvement in pain levels with a t-value of 8.315 and a p-value of <0.001 (*), indicating substantial pain reduction. Similarly, the Control group also showed a significant reduction in pain, with a t-value of 4.400 and a p-value of 0.002 ().

These results suggest that both interventions effectively reduced pain intensity, but the higher t-value in the Experimental group implies a greater magnitude of improvement compared to the Control group. The intervention targeting the Experimental group demonstrates a robust potential for alleviating pain, surpassing the effects seen in standard care alone.

Table 4.4: Identified the level of Disabiity within group of Experimental Group and Control Group

Variable	Experimental		Control	
	t	P value	t	P value
RMQ pre	3.281	0.012	0.496	0.633
RMQ post				

(*= < 0.05, ** = < 0.01, ***= < 0.001)

The paired t-test results for the Roland-Morris Disability Questionnaire (RMQ) within the Experimental and Control groups are presented in the table. The RMQ assesses functional disability related to low back pain, with lower scores indicating improved function. The first column specifies the group, while the second and third columns show the t-values and p-values for each group.

The Experimental group demonstrated a statistically significant reduction in disability scores with a t-value of 3.281 and a p-value of 0.012 (*), indicating meaningful improvements in functional capacity following the intervention. Conversely, the Control group showed a minimal and non-significant change in RMQ scores, with a t-value of 0.496 and a p-value of 0.633.

These results highlight that the intervention applied in the Experimental group significantly improved functional outcomes, as reflected in the RMQ scores, whereas the Control group, receiving standard care, exhibited no notable changes. The greater t-value in the Experimental group supports the effectiveness of the targeted intervention in reducing disability associated with chronic low back pain.

Table 4.5: Identified the Quality of life (Physical Component Summary) within group of Experimental Group and Control Group

Variable	Experimental		Control	
	t	P value	t	P value
PCS pre	-5.684	0.000	-3.042	0.016
PCS post				

Paired t test

(*= < 0.05, ** = < 0.01, ***= < 0.001)

The paired t-test results for the Physical Component Summary (PCS) questionnaire within the Experimental and Control groups are shown in the table. The PCS measures physical health-related quality of life, with higher scores indicating better physical health. The first column identifies the group, while the second and third columns display the t-values and p-values for each group.

The Experimental group exhibited a highly significant improvement in PCS scores, with a t-value of -5.684 and a p-value of <0.001 (*), reflecting a substantial enhancement in physical health following the intervention. The Control group also showed significant improvements, though to a lesser extent, with a t-value of -3.042 and a p-value of 0.016.

These findings suggest that while both groups experienced improvements in physical health, the intervention in the Experimental group resulted in a more pronounced positive impact. The greater t-value and lower p-value in the Experimental group highlight the superior effectiveness of the targeted intervention compared to standard care in improving physical health outcomes.

Table 4.6: Paired t test of MCS questionnaire with in group of Experimental Group and Control Group

Variable	Experimental		Control	
	t	P value	t	P value
MCS pre	-5.199	0.001	-2.673	0.028
MCS post				

(*= < 0.05, ** = < 0.01, ***= < 0.001)

The paired t-test results for the Mental Component Summary (MCS) questionnaire within the Experimental and Control groups are presented in the table. The MCS measures mental health-related quality of life, with higher scores indicating better psychological well-being. The first column specifies the group, while the second and third columns display the t-values and p-values for each group.

The Experimental group demonstrated a highly significant improvement in MCS scores, with a t-value of -5.199 and a p-value of 0.001 (**), indicating a substantial enhancement in mental health following the intervention. The Control group also showed significant improvements, albeit to a lesser degree, with a t-value of -2.673 and a p-value of 0.028 (*).

These results highlight that the intervention applied to the Experimental group produced more profound improvements in mental health-related quality of life compared to the standard care received by the Control group. The higher t-value and lower p-value in the Experimental group emphasize the superior effectiveness of the intervention in positively influencing psychological well-being.

Table 4.7: Identified the quality of life between two groups Experimental Group and Control Group before and after treatment

Variable		Experimental	Control	*t*	*p*-value
		Mean ± SD			
VAS	Before	6.11 ± 1.05	6.00 ± 0.866	0.244	0.810
	After	3.67 ± 0.707	4.78 ± 0.83	-3.050	0.008

Independent samples t-test

(*= < 0.05, ** = < 0.01, ***= < 0.001)

The independent sample t-test results for the Visual Analogue Scale (VAS) questionnaire, comparing the Experimental and Control groups before and after treatment, are shown in the table. The VAS measures pain intensity, with lower scores reflecting less pain. Before treatment, the Experimental group reported a mean VAS score of 6.11 ± 1.05, while the Control group reported a similar mean score of 6.00 ± 0.866. The t-value of 0.244 and p-value of 0.810 indicate no statistically significant difference between the groups at baseline, confirming comparable pain levels prior to the intervention. After treatment, the Experimental group demonstrated a greater reduction in pain, with a mean VAS score of 3.67 ± 0.707 compared to the Control group's mean score of 4.78 ± 0.83. The t-value of -3.050 and a p-value of 0.008 (**) indicate a statistically significant difference in post-treatment pain levels between the groups. These findings suggest that while both groups experienced pain reduction, the intervention in the Experimental group was significantly more effective in alleviating pain compared to the standard care received by the Control group. The results highlight the efficacy of the targeted intervention in producing greater improvements in pain intensity.

Table 4.8: Identified the level of disability between two groups Experimental Group and Control Group before and after treatment

Variable		Experimental	Control	*t*	*p*-value
		Mean ± SD			
RMQ	Before	16.33 ± 2.69	15.89 ± 2.57	0.358	0.725
	After	13.78 ± 1.92	15.33 ± 1.58	-1.875	0.079

Independent samples t-test

(*= < 0.05, ** = < 0.01, ***= < 0.001)

The independent sample t-test results for the Roland-Morris Disability Questionnaire (RMQ) comparing the Experimental and Control groups before and after treatment are presented in the table. The RMQ assesses functional disability related to low back pain, with lower scores indicating better functionality. Before treatment, the Experimental group had a mean RMQ score of 16.33 ± 2.69, while the Control group had a mean score of 15.89 ± 2.57. The t-value of 0.358 and p-value of 0.725 indicate no statistically significant difference between the groups at baseline, suggesting similar levels of disability prior to the intervention. After treatment, the Experimental group showed a reduction in disability, with a mean RMQ score of 13.78 ± 1.92 compared to 15.33 ± 1.58 in the Control group. The t-value of -1.875 and a p-value of 0.079 suggest that although the Experimental group demonstrated a trend toward better outcomes, the difference in post-treatment RMQ scores between the two groups did not reach statistical significance.

Table 4.9: Identified the quality of life between two groups Experimental Group and Control Group before and after treatment

Variable		Experimental	Control	*t*	*p*-value
		Mean ± SD			
PCS	Before	32.54 ± 8.20	32.97 ± 7.27	-0.119	0.907
	After	49.75 ± 4.41	41.80 ± 5.94	3.221	0.005

Independent t-test

(*= < 0.05, ** = < 0.01, ***= < 0.001)

The independent sample t-test results for the Physical Component Summary (PCS) questionnaire, comparing the Experimental and Control groups before and after treatment, are presented in the table. The PCS measures physical health-related quality of life, with higher scores indicating better physical well-being.

Before treatment, the Experimental group had a mean PCS score of 32.54 ± 8.20, while the Control group had a comparable mean score of 32.97 ± 7.27. The t-value of -0.119 and a p-value of 0.907 indicate no statistically significant difference between the groups at baseline, confirming similar physical health status prior to the intervention.

After treatment, the Experimental group demonstrated a notable improvement in PCS scores, with a mean score of 49.75 ± 4.41, compared to the Control group's mean score of 41.80 ± 5.94. The t-value of 3.221 and a p-value of 0.005 (**) indicate a statistically significant difference in post-treatment PCS scores between the two groups.

These findings suggest that the intervention applied to the Experimental group resulted in significantly greater improvements in physical health-related quality of life compared to the standard care provided to the Control group. The results underscore the effectiveness of the targeted intervention in enhancing physical health outcomes.

Table 4.10: Independent sample t-test on evaluation of Mental Component Score of SF-12 questionnaire between two groups Experimental Group and Control Group before and after treatment

Variable		Experimental	Control	*t*	*p*-value
		Mean ± SD			
MCS	Before	36.44 ± 5.43	37.43 ± 7.13	-0.331	0.745
	After	51.31 ± 5.42	43.38 ± 4.34	3.424	0.003

(*= < 0.05, ** = < 0.01, ***= < 0.001)

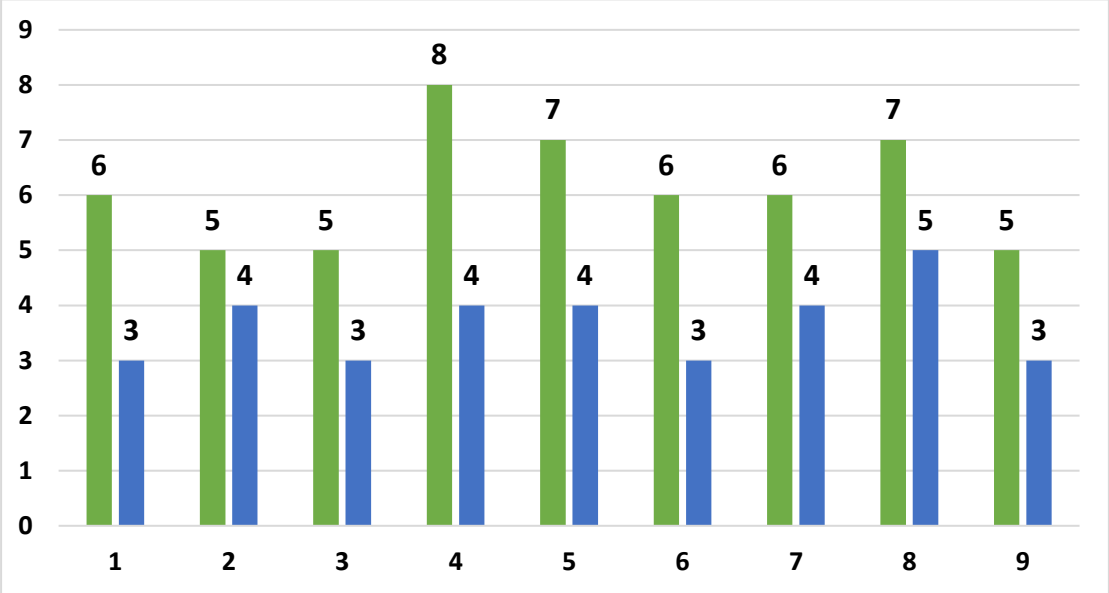
The independent sample t-test results for the Mental Component Summary (MCS) questionnaire, comparing the Experimental and Control groups before and after treatment, are displayed in the table. The MCS evaluates mental health-related quality of life, with higher scores indicating better psychological well-being.

Before treatment, the Experimental group had a mean MCS score of 36.44 ± 5.43, while the Control group had a slightly higher mean score of 37.43 ± 7.13. The t-value of -0.331 and a p-value of 0.745 indicate no statistically significant difference between the groups at baseline, suggesting comparable mental health status prior to the intervention.

After treatment, the Experimental group demonstrated significant improvement in MCS scores, with a mean score of 51.31 ± 5.42, compared to 43.38 ± 4.34 in the Control group. The t-value of 3.424 and a p-value of 0.003 (**) indicate a statistically significant difference in post-treatment MCS scores between the two groups.

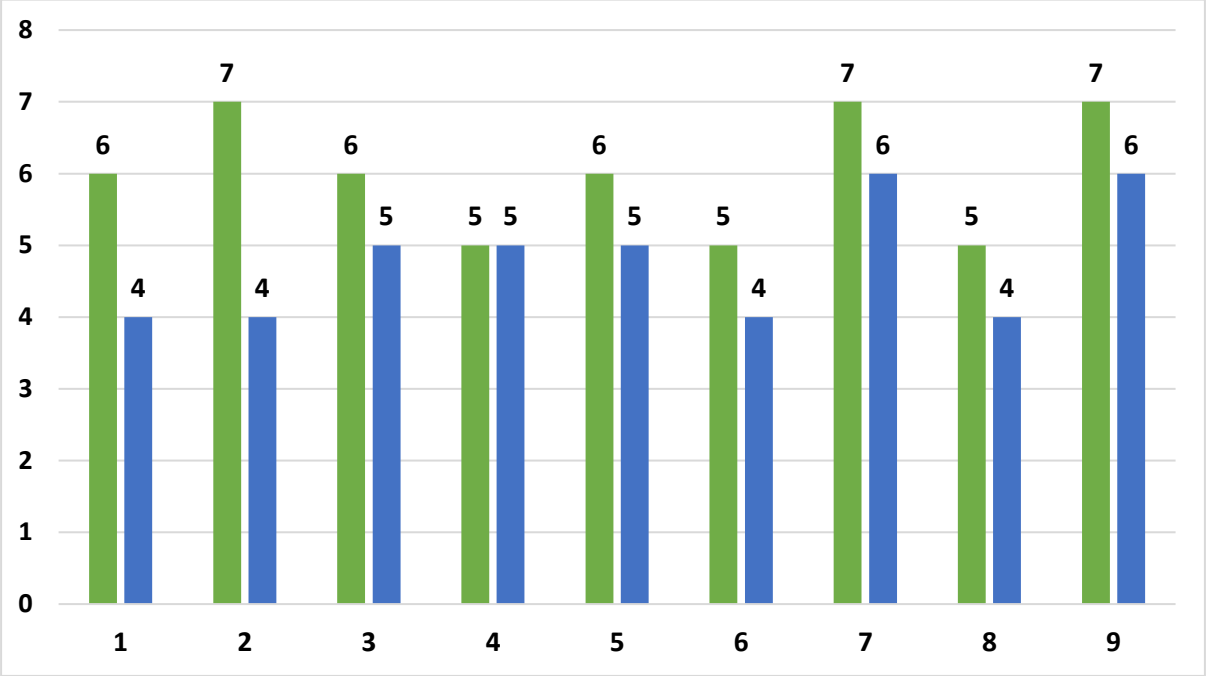
These results highlight that the intervention applied to the Experimental group resulted in significantly greater improvements in mental health-related quality of life compared to the standard care provided to the Control group. This underscores the superior efficacy of the intervention in enhancing psychological well-being for participants.

Figure 4.1: The difference within Experimental Group of Level of pain after treatment



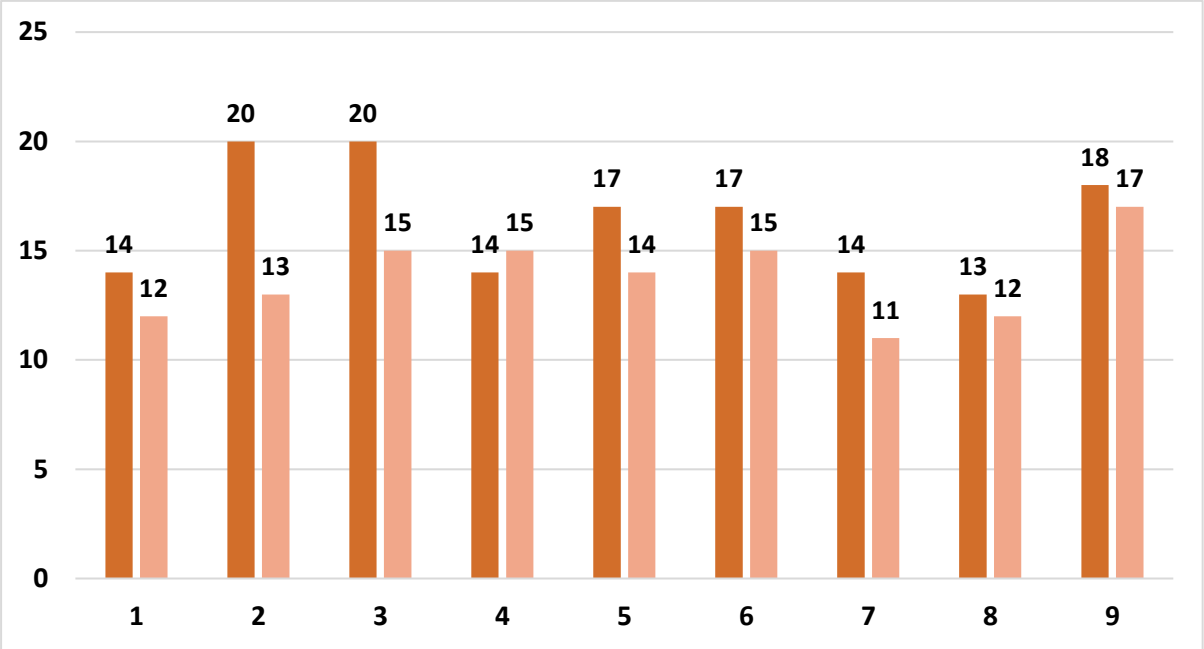
The pre- and post-test VAS scores indicate a significant reduction in pain intensity, with scores decreasing from a range of 5–8 before intervention to 3–5 after. This consistent improvement across participants highlights the effectiveness of the treatment in managing pain. The observed reductions of 1–4 points suggest a clinically meaningful impact, demonstrating the intervention's role in enhancing patient outcomes.

Figure 4.2: The difference within Control Group of Level of pain after treatment



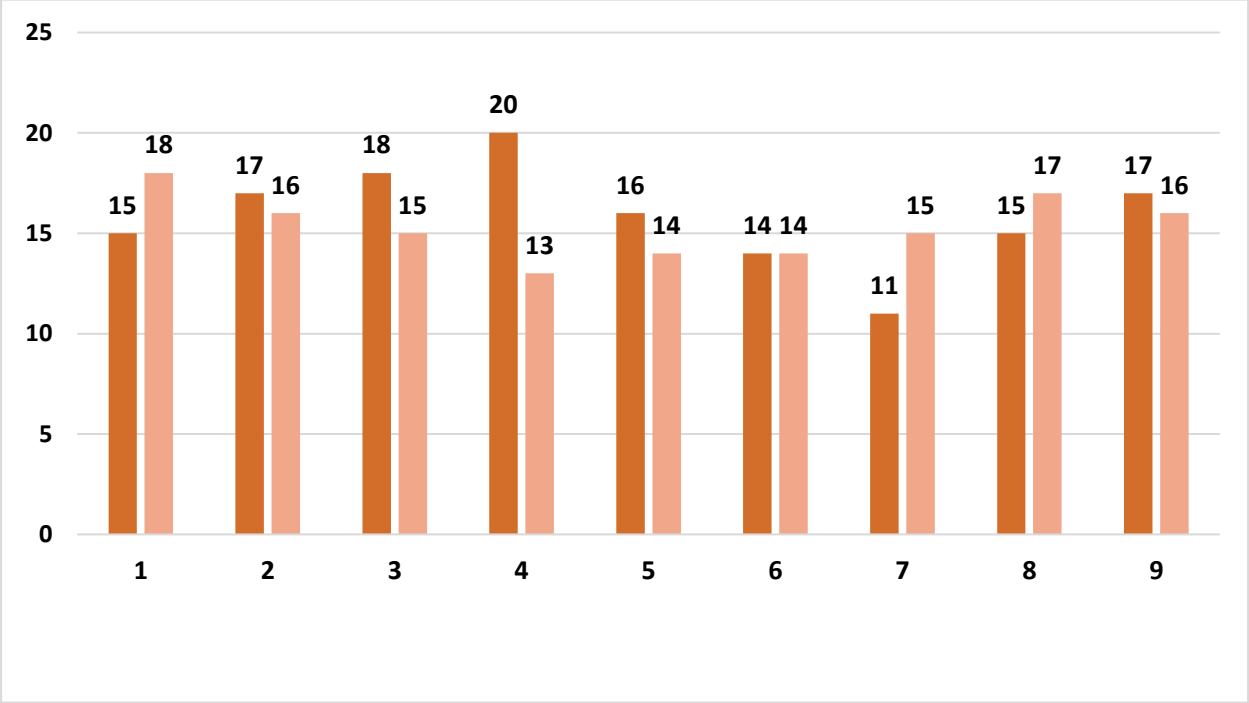
The VAS scores before and after the intervention show a decrease in pain levels for most participants. The pre-intervention scores range from 5 to 7, while the post-intervention scores range from 4 to 6. Several participants experienced a decrease of 1 to 3 points, indicating a reduction in pain, while others showed little or no change in their scores. This data highlights the variations in the changes of VAS scores after the intervention.

Figure 4.3: The difference within Experimental Group of Disability after treatment



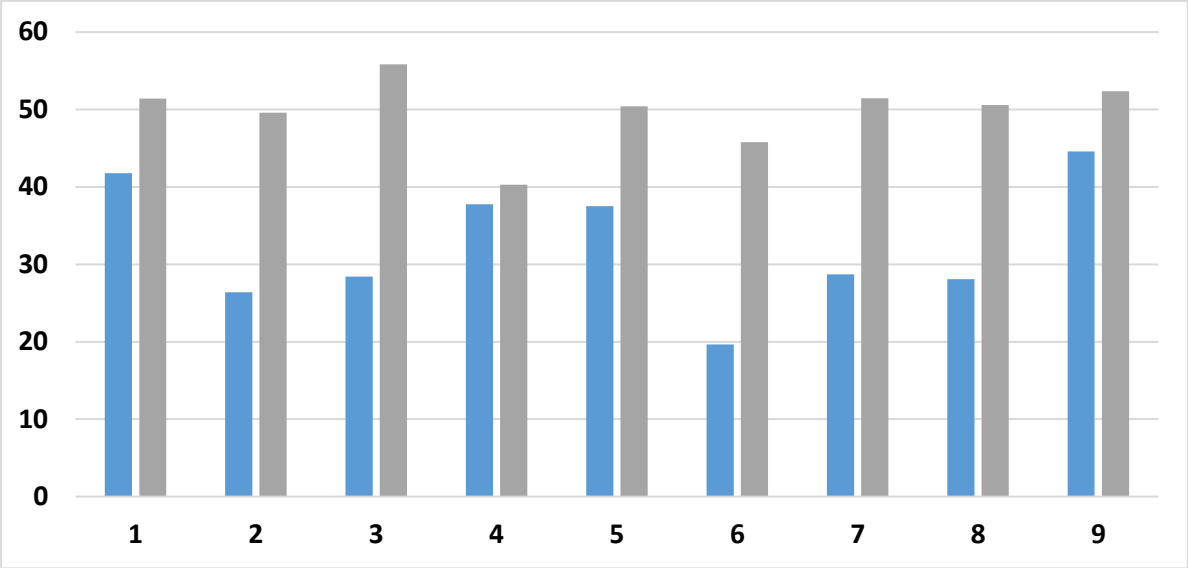
The RMQ (Roland-Morris Questionnaire) scores before and after the intervention show varied changes in functional disability. The pre-intervention scores range from 13 to 20, while the post-intervention scores range from 11 to 17. Most participants show a decrease in RMQ scores, indicating an improvement in functional status, with reductions ranging from 1 to 7 points. However, some participants exhibit little to no change or even a slight increase in scores, reflecting individual variations in the outcomes.

Figure 4.4: The difference within the Control Group of Disability after treatment



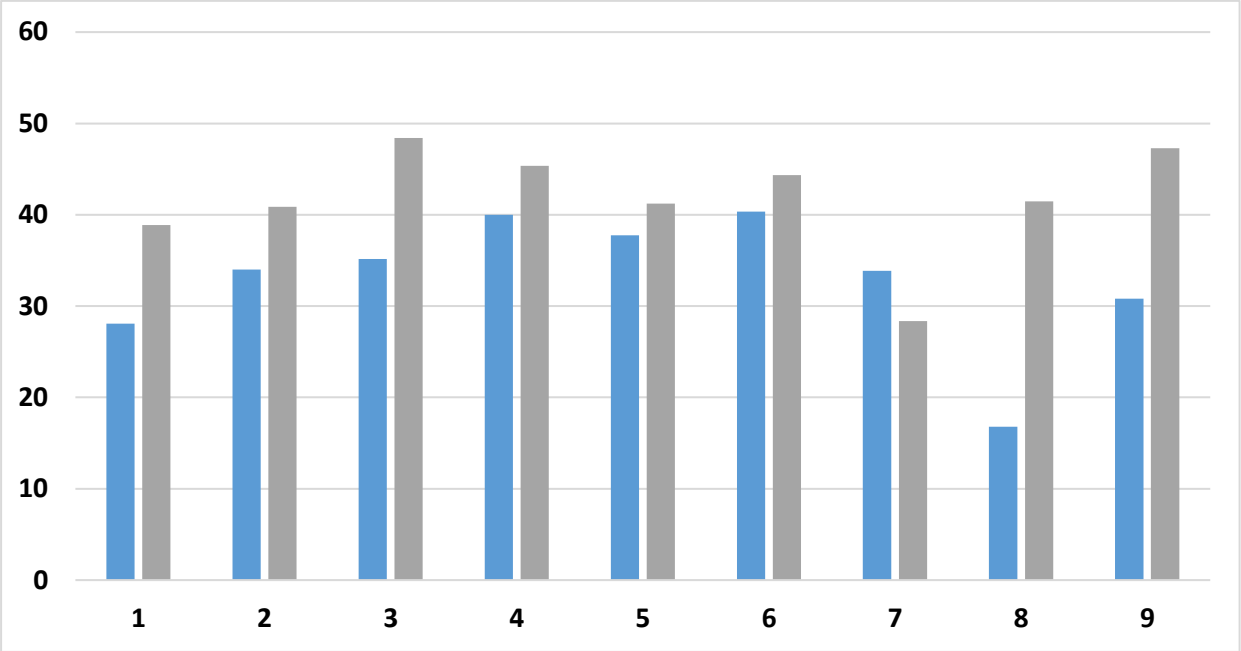
The RMQ (Roland-Morris Questionnaire) scores before and after the intervention show varied outcomes in functional disability. The pre-intervention scores range from 11 to 20, while the post-intervention scores range from 13 to 18. While some participants experienced a decrease in scores, indicating an improvement in functional status (e.g., 20 to 13), others showed an increase (e.g., 15 to 18) or no change. This data demonstrates variability in the changes of RMQ scores following the intervention.

Figure 4.5: The difference within Experimental Group of Physical Component Summary



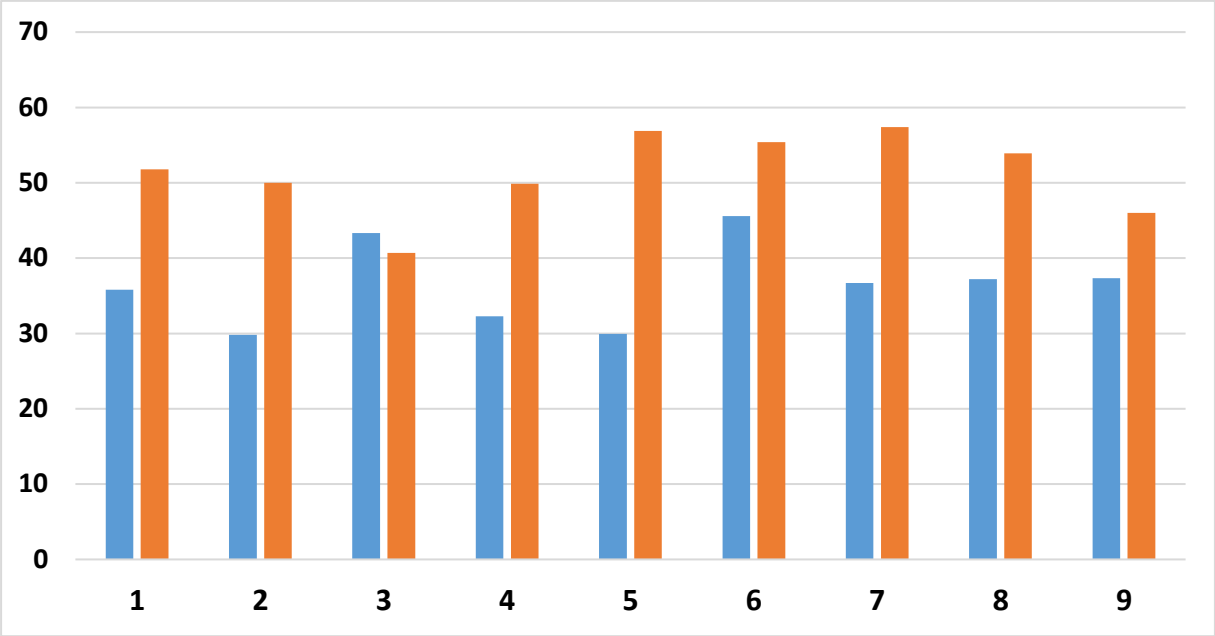
The PCS (Physical Component Summary) scores before and after the intervention show an overall improvement in physical health. The pre-intervention scores range from 19.66 to 44.59, while the post-intervention scores range from 40.3 to 55.84. Most participants demonstrate an increase in their PCS scores, indicating better physical functioning and overall physical health after the intervention. However, one participant shows a slight decline (37.76 to 40.3), highlighting individual variability in outcomes.

Figure 4.6: The difference within Control Group of Physical Component Summary



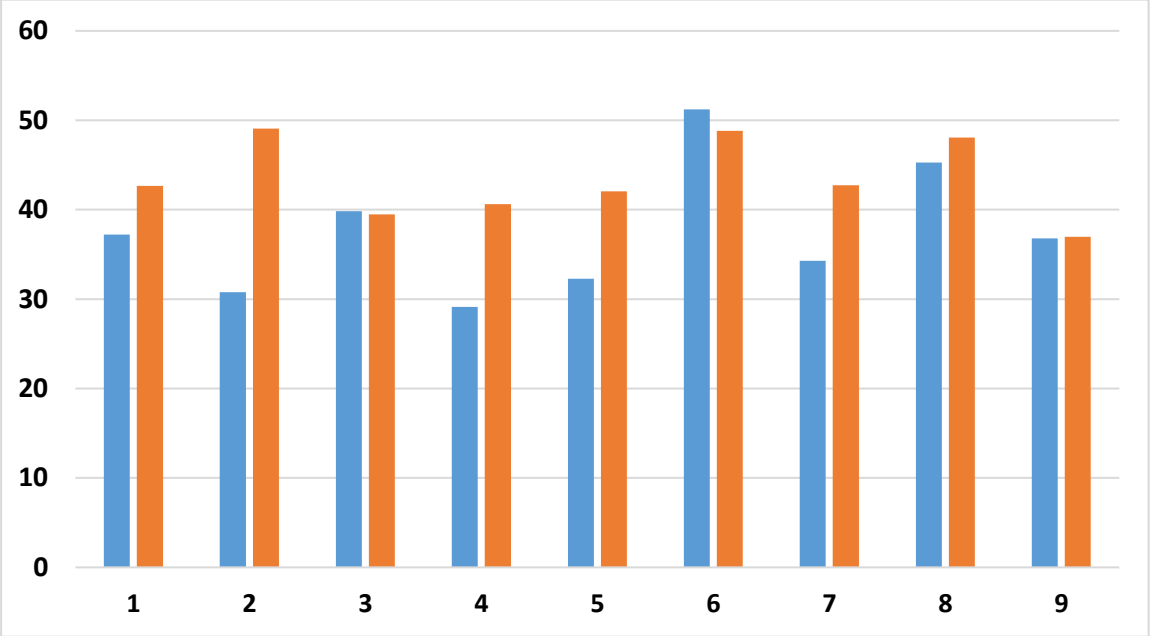
The PCS (Physical Component Summary) scores show changes before and after the intervention, with pre-intervention scores ranging from 16.78 to 40.34 and post-intervention scores ranging from 28.37 to 48.4. Most participants experienced an improvement in PCS scores, indicating enhanced physical functioning and health, with increases ranging from moderate to significant (e.g., 16.78 to 41.46 and 28.08 to 38.88). However, one participant showed a decrease (33.87 to 28.37), reflecting individual variability in outcomes.

Figure 4.7: The difference within Experimental Group of Mental Component Summary



The MCS (Mental Component Summary) scores before and after the intervention show an overall improvement in mental health. Pre-intervention scores range from 29.79 to 45.58, while post-intervention scores range from 40.7 to 57.39. Most participants demonstrate an increase in their MCS scores, indicating better mental well-being, with significant improvements observed in several cases (e.g., 29.94 to 56.86 and 36.7 to 57.39). However, one participant showed a slight decline (43.33 to 40.7), reflecting some variability in the results.

Figure 4.8: The difference within Control Group of Mental Component Summary



The MCS (Mental Component Summary) scores before and after the intervention show mixed changes in mental health. Pre-intervention scores range from 29.12 to 51.23, while post-intervention scores range from 36.96 to 49.07. Most participants show improvements in their scores, indicating enhanced mental well-being (e.g., 30.79 to 49.07 and 29.12 to 40.64). However, some participants exhibit little or no change (e.g., 39.84 to 39.47 and 36.8 to 36.96), and one participant shows a slight decrease (51.23 to 48.83). This data highlights variability in mental health outcomes.

CHAPTER-V DISCUSSION

The study assessed the impact of dry needling (DN) on the quadratus lumborum (QL) in managing chronic low back pain (CLBP). By comparing pain intensity, disability, and health-related quality of life in experimental and control groups, the findings provide critical insights into DN's clinical utility. These results, juxtaposed with existing research, underscore the potential of DN in improving patient outcomes.

The significant reduction in Visual Analogue Scale (VAS) scores within the experimental group highlights the effectiveness of DN in alleviating pain. Post-intervention scores in the experimental group (3.67 ± 0.707) were markedly lower than the control group (4.78 ± 0.83), with a statistically significant p-value of 0.008. This aligns with Mansilla et al. (2016), who found that DN effectively reduces pain intensity, particularly in the short term. The greater magnitude of improvement in the experimental group reflects DN’s ability to directly target myofascial trigger points, a key source of pain in CLBP. Shah et al. (2015) explained that DN disrupts dysfunctional muscle fibers, facilitating the release of inflammatory mediators and local twitch responses that contribute to immediate pain relief.

Griswold et al. (2019) further emphasized that deep DN, compared to superficial techniques, is particularly effective for spine-related conditions. This effectiveness is attributed to its mechanical stimulation of deeper muscle tissues like the QL, which play a central role in CLBP. In the current study, the deeper targeting of QL trigger points likely contributed to the superior outcomes observed in the experimental group.

Although the experimental group demonstrated greater reductions in Roland-Morris Disability Questionnaire (RMQ) scores (mean reduction of 2.55), the results did not achieve statistical significance ($p = 0.079$). However, the trend supports existing literature indicating that DN can improve physical functionality in musculoskeletal conditions. For instance, Boyles et al. (2015) found that DN effectively reduces functional disability across multiple body regions. The modest improvements in RMQ scores may reflect the study’s relatively small sample size or the short follow-up period.

Additionally, individual variability in response to DN, as reported by Chys et al. (2023), might have contributed to the observed results.

Moreover, Blanco-Díaz et al. (2022) suggested that combining DN with conventional therapies yields superior outcomes for functional recovery. In this study, both groups received conventional physiotherapy, which may have influenced the control group's outcomes and narrowed the observed differences. Future studies could explore the additive effects of DN combined with other modalities such as core stabilization exercises or manual therapy.

The Physical Component Summary (PCS) scores from the SF-12 questionnaire revealed substantial improvements in the experimental group, with post-treatment scores significantly higher than the control group (49.75 ± 4.41 vs. 41.80 ± 5.94, $p = 0.005$). These results align with findings by Laita et al. (2021), who reported significant enhancements in physical function and muscle strength following DN therapy. The superior outcomes in the experimental group demonstrate DN's ability to address pain and muscle dysfunction comprehensively, contributing to improved physical health.

Mansilla et al. (2016) emphasized DN's role in enhancing range of motion and reducing physical limitations, particularly in patients with myofascial pain syndrome. In the context of CLBP, targeting the QL muscle with DN likely alleviated deep-seated pain and improved lumbar spine stability, resulting in better PCS scores.

The experimental group also showed marked improvements in Mental Component Summary (MCS) scores (51.31 ± 5.42) compared to the control group (43.38 ± 4.34, $p = 0.003$). These results are consistent with Chys et al. (2023), who found that DN improves quality of life by alleviating pain and associated psychological distress. Chronic pain often has a profound impact on mental health, leading to conditions such as anxiety and depression. By reducing pain intensity, DN indirectly enhances mental well-being, as suggested by Dommerholt and Huijbregts (2011).

The study's findings also echo those of Sánchez-Romero et al. (2020), who highlighted DN's effectiveness in improving psychological health in patients with central nervous

system disorders. The observed improvements in MCS scores underscore the holistic benefits of DN in addressing both physical and mental health aspects of CLBP.

DN's effectiveness can be attributed to its ability to address myofascial trigger points, which are common in CLBP. These points are hyperirritable spots in skeletal muscle associated with palpable nodules in taut bands of muscle fibers (Dommerholt & Huijbregts, 2011). DN induces a localized twitch response, releasing these trigger points and normalizing muscle function. Liu et al. (2018) explained that the insertion of needles stimulates mechanoreceptors and nociceptors, modulating pain through spinal and supraspinal pathways.

Additionally, DN has been shown to influence central sensitization, a phenomenon where the nervous system becomes hypersensitive to stimuli (Shah et al., 2015). By reducing peripheral nociceptive input, DN helps mitigate central sensitization, contributing to sustained pain relief.

The study’s results align with several previous investigations but also highlight areas of divergence. For instance, Kalichman and Vulfsons (2010) found that DN provides immediate pain relief, particularly when applied to deep muscles like the QL. However, Barrera et al. (2020) noted that the benefits of DN may diminish over time, emphasizing the need for maintenance sessions or adjunctive therapies.

The current findings also reflect the variability reported by Griswold et al. (2019), who observed that while DN is effective for pain relief, its impact on functional outcomes can vary depending on factors such as needle depth, duration, and patient characteristics. This variability underscores the need for personalized treatment approaches to maximize DN's effectiveness.

Limitations and Future Directions

While the study provides valuable insights, several limitations should be addressed in future research:

1. **Sample Size**: The small sample size may have limited the statistical power to detect significant differences in RMQ scores. Larger-scale studies are necessary to validate these findings.
2. **Follow-Up Duration**: The short follow-up period precluded an assessment of DN's long-term efficacy. Future studies should investigate whether the observed benefits persist over time.
3. **Comparative Interventions**: Including additional comparison groups, such as those receiving other modalities (e.g., manual therapy, exercise therapy), could provide a more comprehensive understanding of DN's relative efficacy.

CHAPTER-VI CONCLUSION

Chronic low back pain (CLBP) is a prevalent and debilitating condition that adversely impacts individuals' physical and mental well-being, leading to significant disability and a reduced quality of life. This study investigated the effectiveness of dry needling (DN) of the quadratus lumborum (QL) muscle, in conjunction with conventional physiotherapy, in managing pain, improving functional disability, and enhancing the overall quality of life in patients with CLBP.

The findings demonstrated that DN significantly reduced pain intensity, as measured by the Visual Analogue Scale (VAS), with patients in the experimental group experiencing greater relief compared to the control group. Improvements in functional disability, as assessed by the Roland-Morris Disability Questionnaire (RMQ), were observed, though not statistically significant, suggesting a positive trend in favor of DN. Furthermore, the study highlighted significant enhancements in health-related quality of life, reflected in the Physical Component Summary (PCS) and Mental Component Summary (MCS) scores of the SF-12 questionnaire. These improvements underscore DN's dual role in addressing both physical and psychological aspects of CLBP.

The observed outcomes align with the growing body of evidence supporting DN as an effective intervention for CLBP. By targeting myofascial trigger points within the QL muscle, DN alleviates deep-seated pain, reduces muscle dysfunction, and addresses central sensitization, which are all key contributors to CLBP. This study also emphasized the importance of combining DN with conventional therapies to achieve holistic care and sustained benefits.

Overall, this research provides robust evidence that DN is a valuable therapeutic modality for managing CLBP. The findings suggest that DN not only alleviates pain but also supports physical functionality and mental well-being, making it an essential component of comprehensive treatment protocols for CLBP. Future research should build on these results to refine DN techniques, explore long-term efficacy, and expand its application in diverse clinical settings.

Recommendation:

Integrate Dry Needling into CLBP Management Protocols DN should be incorporated as a standard treatment modality for patients with CLBP, especially those with myofascial pain syndromes involving the QL muscle. Its targeted approach offers significant pain relief and functional improvements.

Personalize Treatment Plans Treatment protocols should be tailored to each patient's specific needs, considering factors such as age, severity of CLBP, presence of comorbidities, and individual physical capabilities. Personalized plans enhance patient outcomes by addressing unique requirements.

Combine DN with Conventional Physiotherapy The combination of DN with core stabilization exercises, stretching, and strengthening programs should be prioritized to maximize therapeutic benefits and support long-term recovery.

Focus on Trigger Point Identification Healthcare professionals administering DN should ensure accurate identification of active trigger points in the QL muscle to optimize treatment efficacy.

Emphasize Patient Education and Adherence Educate patients about the benefits of DN and the importance of adhering to prescribed exercise and physiotherapy regimens. Encourage consistent participation to maintain improvements in pain and functionality.

Monitor Progress Regularly Clinicians should assess patients' progress periodically using validated tools such as the VAS, RMQ, and SF-12. Regular monitoring allows for timely modifications to treatment plans, ensuring optimal outcomes.

Promote Long-Term Maintenance Encourage patients to engage in low-impact physical activities such as swimming, walking, or yoga beyond the intervention period to maintain the benefits of DN and physiotherapy.

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APPENDIX

সম্মতি ফর্ম

গবেষণার শিরোনাম: **"Dry needling of quadratus lamborum on pain and disability among the patient with chronic low back ."।**

অংশগ্রহণকারীর আইডি নং ……তারিখ……./……./……

আসসালামুয়ালাইকুম ,আমি মো রাসেল মিয়া ফিজিওথেরাপিতে বিএসসির চতুর্থ বর্ষের ছাত্র । আমি সাইক কলেজ মেডিকেল সাইন্স এন্ড টেকনোলজি এসেছি, যা ঢাকা বিশ্ববিদ্যালয়ের অধিভুক্ত, ঢাকার মিরপুরে অবস্থিত। আমি এখন "Dry needling of quadratus lamborum on pain and disability among the patient with chronic low back" নিয়ে একটি গবেষণা পরিচালনা করছি। আপনি এই গবেষণায় অংশগ্রহণ করলে আমি খুব খুশি হব। ফিজিওথেরাপি চিকিৎসায় আপনার সন্তুষ্টি সম্পর্কে আমি আপনাকে কিছু প্রশ্ন করতে চাই। এই সাক্ষাত্কারটি সম্পূর্ণ হতে সাধারণত 15-20 মিনিট সময় নেয়। আপনি যে তথ্য প্রদান করবেন তা কঠোরভাবে গোপন রাখা হবে এবং অন্যদের দেখানো হবে না। এই গবেষণায় অংশগ্রহণ স্বেচ্ছায় এবং আপনি কোনো পৃথক প্রশ্ন বা সমস্ত প্রশ্নের উত্তর না দেওয়া বেছে নিতে পারেন। যাইহোক, আমি আশা করি আপনি এই গবেষণায় অংশগ্রহণ করবেন যেহেতু আপনার মতামত গুরুত্বপূর্ণ। এই সময়ে আপনি এই গবেষণা সম্পর্কে আমাকে কিছু জিজ্ঞাসা করতে চান?

যদি কোন প্রশ্ন থাকে তাহলে শুধু আমার সাথে যোগাযোগ করুন যোগাযোগ নম্বর 01634518197 বা আমার সুপারভাইজার নাম শহীদ আফ্রিদি (প্রভাষক SCMST) যোগাযোগ নম্বর 01780006441।

আমি আরও বুঝি যে আমি যেকোন সময় অধ্যয়ন থেকে সরে যেতে পারি এবং এই অধ্যয়নে অংশগ্রহণের জন্য আমি কোন আর্থিক সুবিধা পাব না।

আমি গবেষণায় অংশগ্রহণ করতে ইচ্ছুক

অংশগ্রহণকারীর স্বাক্ষর……তত্ত্বাবধায়কের স্বাক্ষর…….

.

তারিখ ……

যোগাযোগের নম্বর …….

Questionnaires(Bangla)

Part 1: Sociodemographic Information

1.1 রোগীর নাম:	
1.2 ঠিকানা	গ্রাম: জেলা:
1.3 মোবাইল	

Part 2: Sociodemographic Information

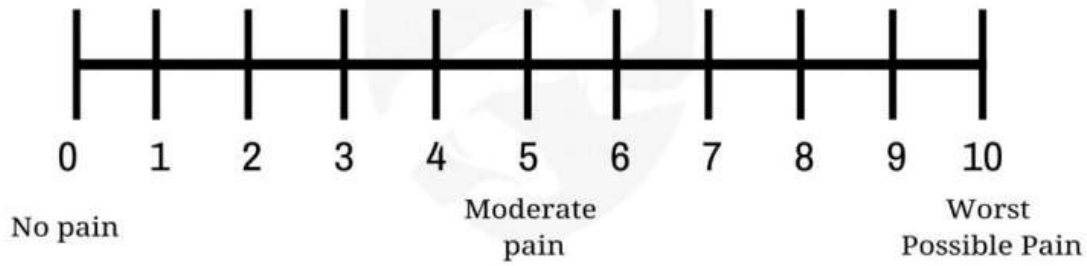
প্রশ্ন	উত্তর
2.1 বয়স	 ।.....বছর)
2.2 লিঙ্গ	পুরুষ = 1 মহিলা = 2
2.3 আপনার বসবাসের এলাকা কি?	শহুরে = 1 উপশহুরে = 2 গ্রাম =3
2.4 আপনার বৈবাহিক অবস্থা কি?	বিবাহিত = 1 একক =2 তালাকপ্রাপ্ত =3 বিচ্ছিন্ন = 4 বিধবা = 5
2.5 আপনার পরিবারের ধরন কি?	এককপরিবার = 1 বর্ধিত পরিবার = 2
2.6 আপনার শিক্ষার স্তর কি?	নিরক্ষর=1 মাধ্যমিক =2 এইচএসসি = 3 স্নাতক এবং তার উপরে = 4
2.7 আপনার মাসিক আয় কেমন?	.....(টাকা)

পার্ট 3 : মেডিকেল তথ্য

3.1 আপনার উচ্চতা কত?	.....সেমি
3.2 আপনার ওজন কত?	.....কেজি
3.3 BMI	1= কম ওজন 2 = স্বাভাবিক ওজন 3 = অতিরিক্ত ওজন 4 = স্থূলতা
3.4 কমরবিডিটিস	1= উচ্চ রক্তচাপ 2= ডায়াবেটিস মেলিটাস 3= জানি না
3.5 কার্যদিবসের শেষে শারীরিকভাবে আপনি কতটা ক্লান্ত?	1= ক্লান্ত না 2= একটু ক্লান্ত 3 = খুব ক্লান্ত
3.6 আপনি কি প্রায় সারাদিন একই কাজ করেন?	1= হ্যাঁ 2 = না
3.7 আপনি কি মনে করেন আপনার নিম্ন পিঠের অস্বস্তি একই কাজ করার জন্য দায়ী?	1= হ্যাঁ 2 = না
3.8 কোন ধরনের কাজ LBP তৈরি করে?	1 = দাঁড়ানো 2 = বসা 3= অস্ত্র/হাতের প্রসারণ- 4= দীর্ঘ সময় ধরে একই অবস্থানে কাজ করা 5= পুনরাবৃত্তিমূলক কাজগুলি বহুবার করা 6= বোর্ডে লিখতে স্ট্রেচিং
3.9 আপনি কি মনে করেন দাঁড়ানো/বসা/বাহুর সম্প্রসারণ বা হাত/একই অবস্থানে দীর্ঘ সময় ধরে কাজ করা/অনেকবার পুনরাবৃত্তিমূলক কাজ করা।	1= হ্যাঁ 2 = না
3.10 আপনি কি মনে করেন আপনার ব্যথা উপকরণ ব্যবহারের জন্য দায়ী?	1= হ্যাঁ 2 = না
3.11 কতক্ষণ ব্যথা অব্যাহত থাকে?	1 = (0-5) ঘন্টা 2 = (6 - 12) ঘন্টা 3 = (13 - 24) ঘন্টা
3.11 ব্যথার ধরন কী?	1 = মাঝে মাঝে 2= বিরতিহীন

বেসলাইন

Visual Analog Scale (VAS)



রোল্যান্ড-মরিস নিম্ন পিঠে ব্যথা এবং অক্ষমতা প্রশ্নাবলী (RMQ)

প্রশ্ন	রোগীদের প্রতিক্রিয়া
আমি আমার পিঠের ব্যথার কারণে বেশিরভাগ সময় বাড়িতেই থাকি।	1. হ্যাঁ 2. না
আমি আমার পিঠে আরাম পেতে চেষ্টা করার জন্য ঘন ঘন অবস্থান পরিবর্তন করি।	1. হ্যাঁ 2. না
আমি আমার পিঠের ব্যথার কারণে স্বাভাবিকের চেয়ে বেশি ধীরে হাঁটছি।	1. হ্যাঁ 2. না
আমার পিছনের ব্যথার কারণে, আমি এমন কোনও কাজ করছি না যা আমি সাধারণত বাড়ির আশেপাশে করি।	1. হ্যাঁ 2. না
আমার পিছনের ব্যথার কারণে, আমি উপরে উঠতে একটি ব্যবহার করি।	1. হ্যাঁ 2. না
আমার পিঠের ব্যথার কারণে, আমি প্রায়শই বিশ্রাম নিতে শুয়ে থাকি।	1. হ্যাঁ 2. না
আমার পিঠের ব্যথার কারণে, আমাকে ইজি চেয়ার থেকে উঠতে কিছু ধরে রাখতে হবে।	1. হ্যাঁ 2. না

আমার পিঠের ব্যথার কারণে, আমি অন্য লোকেদের কাছে আমার জন্য কিছু করার চেষ্টা করি।	1. হ্যাঁ 2. না
আমার পিঠের ব্যথার কারণে আমি স্বাভাবিকের চেয়ে ধীরে ধীরে পরিধান করি।	1. হ্যাঁ 2. না
আমি শুধুমাত্র আমার পিঠের ব্যথার কারণে অল্প সময়ের জন্য দাঁড়াই।	1. হ্যাঁ 2. না
আমার পিঠের ব্যথার কারণে, আমি বাঁকা বা হাঁটু গেড়ে না বসার চেষ্টা করি।	1. হ্যাঁ 2. না
আমার পিছনের ব্যথার কারণে চেয়ার থেকে উঠতে আমার অসুবিধা হয়।	1. হ্যাঁ 2. না
আমার পিঠে প্রায় সব সময় ব্যথা হয়।	1. হ্যাঁ 2. না
আমার পিঠের ব্যথার কারণে বিছানায় শুয়ে পড়া কঠিন।	1. হ্যাঁ 2. না
আমার পিঠের ব্যথার কারণে আমার ক্ষুধা খুব একটা ভালো নেই।	1. হ্যাঁ 2. না
আমার পিঠে ব্যথার কারণে আমার মোজা (বা স্টকিংস) পরতে সমস্যা হয়।	1. হ্যাঁ 2. না
আমার পিঠের ব্যথার কারণে আমি কেবল অল্প দূরত্বে হাঁটতে পারি।	1. হ্যাঁ 2. না
আমার পিঠের কারণে আমি কম ঘুমাই।	1. হ্যাঁ 2. না
আমার পিঠের ব্যথার কারণে আমি অন্য কারো সাহায্যে পোশাক পরাই।	1. হ্যাঁ 2. না
আমি আমার পিঠের কারণে দিনের বেশিরভাগ সময় বসে থাকি।	1. হ্যাঁ 2. না
আমি আমার পিঠের কারণে বাড়ির চারপাশে ভারী কাজ এড়াই।	1. হ্যাঁ 2. না
পিঠের ব্যথার কারণে, আমি স্বাভাবিকের চেয়ে বেশি খিটখিটে এবং মানুষের সাথে খারাপ মেজাজ।	1. হ্যাঁ

	2. না
আমার পিঠের কারণে, আমি স্বাভাবিকের চেয়ে ধীরে ধীরে উপরে যাই।	1. হ্যাঁ 2. না
আমি আমার পিঠের কারণে বেশিরভাগ সময় বিছানায় থাকি।	1. হ্যাঁ 2. না

SF- 12 প্রশ্নাবলী

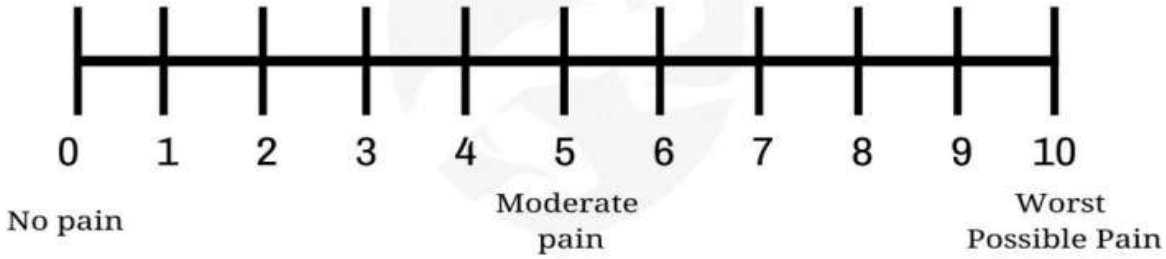
প্রশ্ন নম্বর	**প্রশ্নাবলী**	**প্রতিক্রিয়া বিকল্প**
1	সাধারণভাবে, আপনার স্বাস্থ্য কেমন ?	চমৎকার = 1 খুব ভাল = 2 ভালো=3 ন্যায্য = 4 দরিদ্র=5
2	এক বছর আগের তুলনায়, এখন আপনি আপনার স্বাস্থ্যকে সাধারণভাবে কীভাবে মূল্যায়ন করবেন?	এখন অনেকটা ভালো এখন কিছুটা ভালো একই রকম এখন কিছুটা খারাপ এখন অনেক খারাপ
3	নিম্নোক্ত প্রশ্নগুলি একটি সাধারণ দিনে আপনি করতে পারেন এমন কার্যকলাপ সম্পর্কে। আপনার স্বাস্থ্য কি এখন এই ক্রিয়াকলাপগুলিতে আপনাকে সীমাবদ্ধ করে? অনেক, কিভাবে যদি তাই হয়?	হ্যাঁ=1 প্রচুর / হ্যাঁ = 2 সামান্য / না = 3 মোটেও সীমাবদ্ধ নয়=4
4	গত 4 সপ্তাহে, আপনার শারীরিক স্বাস্থ্যের ফলে আপনার কাজ বা অন্যান্য নিয়মিত দৈনন্দিন ক্রিয়াকলাপে নিম্নলিখিতগুলির মধ্যে কোন সমস্যা হয়েছে?	হ্যাঁ=1 প্রচুর / হ্যাঁ = 2 সামান্য / না = 3 মোটেও সীমাবদ্ধ নয়=4
5	বিগত 4 সপ্তাহে, কোনো মানসিক সমস্যার (যেমন হতাশা বা উদ্বিগ্ন বোধ) এর ফলে আপনি কি আপনার কাজ বা অন্যান্য নিয়মিত দৈনন্দিন ক্রিয়াকলাপগুলির সাথে আপনার ইচ্ছার চেয়ে কম	হ্যাঁ=1 নং = 2

	সম্পন্ন করেছেন?	
6	গত 4 সপ্তাহে, কোন মানসিক সমস্যার (যেমন হতাশা বা উদ্বিগ্ন বোধ) এর ফলে আপনার কাজ বা অন্যান্য নিয়মিত দৈনন্দিন কাজকর্মের সাথে নিম্নলিখিতগুলির মধ্যে কোন সমস্যা হয়েছে?	হ্যাঁ=1 প্রচুর / হ্যাঁ = 2 সামান্য / না = 3 মোটেও সীমাবদ্ধ নয়=4
7	গত 4 সপ্তাহে আপনার কতটা শারীরিক ব্যথা হয়েছে?	কোনটিই নয়=1 খুব মৃদু = 2 মৃদু =3 পরিমিত = 4 গুরুতর = 4
8	গত 4 সপ্তাহে, ব্যথা আপনার স্বাভাবিক কাজে কতটা হস্তক্ষেপ করেছে (বাড়ির বাইরের কাজ এবং বাড়ির কাজ উভয়ই সহ)?	মোটেই না = 1 সামান্য বিট = 2 পরিমিত=3 বেশ কিছুটা =4 অত্যন্ত = 5
9	এই প্রশ্নগুলি হল আপনি কেমন অনুভব করেন এবং গত 4 সপ্তাহে আপনার সাথে কেমন ছিল। আপনি কতটা সময় শান্ত এবং শান্তিপূর্ণ অনুভব করেছেন?	সব সময় = 1 বেশিরভাগ সময় = 2 একটু ভালো সময়=3 কিছু সময় = 4 একটু সময় =5 কোন সময় নয় =6
10	গত 4 সপ্তাহে, আপনি কতটা সময় হতাশ এবং বিষণ্ণতা বোধ করেছেন?	সব সময় = 1 বেশিরভাগ সময় = 2 একটু ভালো সময়=3 কিছু সময় = 4 একটু সময় = 5 কোন সময় নয়=6

11	গত 4 সপ্তাহে, কতটা সময় আপনার প্রচুর শক্তি ছিল?	সব সময় = 1 বেশিরভাগ সময় = 2 একটু ভালো সময়=3 কিছু সময় = 4 একটু সময় = 5 কোন সময় নয় = 6
12	গত 4 সপ্তাহে, আপনি কতটা সময় ক্লান্ত বোধ করেছেন?	সব সময় = 1 বেশিরভাগ সময় = 2 একটু ভালো সময়=3 কিছু সময় = 4 একটু সময় = 5 কোন সময় নয় = 6

৮সেশনের পর

Visual Analog Scale (VAS)



রোল্যান্ড-মরিস নিম্ন পিঠে ব্যথা এবং অক্ষমতা প্রশ্নাবলী (RMQ)

প্রশ্ন	রোগীদের প্রতিক্রিয়া
আমি আমার পিঠের ব্যথার কারণে বেশিরভাগ সময় বাড়িতেই থাকি।	3. হ্যাঁ 4. না
আমি আমার পিঠে আরাম পেতে চেষ্টা করার জন্য ঘন ঘন অবস্থান পরিবর্তন করি।	3. হ্যাঁ 4. না
আমি আমার পিঠের ব্যথার কারণে স্বাভাবিকের চেয়ে বেশি ধীরে হাঁটছি।	3. হ্যাঁ 4. না
আমার পিছনের ব্যথার কারণে, আমি এমন কোনও কাজ করছি না যা আমি সাধারণত বাড়ির আশেপাশে করি।	3. হ্যাঁ 4. না

আমার পিছনের ব্যাথার কারণে, আমি উপরে উঠতে একটি হ্যান্ড্রেল ব্যবহার করি।	3. হ্যাঁ 4. না
আমার পিঠের ব্যথার কারণে, আমি প্রায়শই বিশ্রাম নিতে শুয়ে থাকি।	3. হ্যাঁ 4. না
আমার পিঠের ব্যথার কারণে, আমাকে ইজি চেয়ার থেকে উঠতে কিছু ধরে রাখতে হবে।	3. হ্যাঁ 4. না
আমার পিঠের ব্যথার কারণে, আমি অন্য লোকেদের কাছে আমার জন্য কিছু করার চেষ্টা করি।	3. হ্যাঁ 4. না
আমার পিঠের ব্যথার কারণে আমি স্বাভাবিকের চেয়ে ধীরে ধীরে পরিধান করি।	3. হ্যাঁ 4. না
আমি শুধুমাত্র আমার পিঠের ব্যথার কারণে অল্প সময়ের জন্য দাঁড়াই।	3. হ্যাঁ 4. না
আমার পিঠের ব্যথার কারণে, আমি বাঁকা বা হাঁটু গেড়ে না বসার চেষ্টা করি।	3. হ্যাঁ 4. না
আমার পিছনের কারণে চেয়ার থেকে উঠতে আমার অসুবিধা হয়।	3. হ্যাঁ 4. না
আমার পিঠে প্রায় সব সময় ব্যথা হয়।	3. হ্যাঁ 4. না
আমার পিঠের ব্যথার কারণে বিছানায় শুয়ে পড়া কঠিন।	3. হ্যাঁ 4. না
আমার পিঠের ব্যথার কারণে আমার ক্ষুধা খুব একটা ভালো নেই।	3. হ্যাঁ 4. না
আমার পিঠে ব্যথার কারণে আমার মোজা (বা স্টকিংস) পরতে সমস্যা হয়।	3. হ্যাঁ 4. না
আমার পিঠের ব্যথার কারণে আমি কেবল অল্প দূরত্বে হাঁটতে পারি।	3. হ্যাঁ 4. না
আমার পিঠের ব্যথার কারণে আমি কম ঘুমাই।	3. হ্যাঁ 4. না

আমার পিঠের ব্যথার কারণে আমি অন্য কারো সাহায্যেপোশাক পরি।	3. হ্যাঁ 4. না
আমি আমার পিঠের ব্যথার কারণে দিনের বেশিরভাগ সময় বসে থাকি।	3. হ্যাঁ 4. না
আমি আমার পিঠের ব্যথার কারণে বাড়ির চারপাশে ভারী কাজ এড়িয়ে চলি \	3. হ্যাঁ 4. না
পিঠের ব্যথার কারণে, আমি স্বাভাবিকের চেয়ে বেশি খিটখিটে এবং মানুষের সাথে খারাপ মেজাজ দেখাই	3. হ্যাঁ 4. না
আমার পিঠের ব্যথার কারণে, আমি স্বাভাবিকের চেয়ে ধীরে ধীরে উপরে যাই।	3. হ্যাঁ 4. না
আমি আমার পিঠের ব্যথার কারণে বেশিরভাগ সময় বিছানায় থাকি।	3. হ্যাঁ 4. না

SF- 12 প্রশ্নাবলী

প্রশ্ন নম্বর	**প্রশ্নাবলী**	**প্রতিক্রিয়া বিকল্প**
1	সাধারণভাবে, আপনার স্বাস্থ্য কেমন?	চমৎকার = 1 খুব ভাল = 2 ভালো=3 ন্যায্য = 4 দরিদ্র=5
2	এক বছর আগের তুলনায়, এখন আপনি আপনার স্বাস্থ্যকে সাধারণত কীভাবে মূল্যায়ন করবেন?	এখন অনেকটা ভালো এখন কিছুটা ভালো একই সম্পর্কে এখন কিছুটা খারাপ এখন অনেক খারাপ
3	নিম্নোক্ত প্রশ্নগুলি একটি সাধারণ দিনে আপনি করতে পারেন এমন কার্যকলাপ সম্পর্কে। আপনার স্বাস্থ্য কি এখন এই ক্রিয়াকলাপগুলিতে আপনাকে সীমাবদ্ধ করে? অনেক, কিভাবে যদি তাই হয়?	হ্যাঁ=1 সীমিত একটি প্রচুর / হ্যাঁ = 2 সীমিত একটি সামান্য / না = 3

		মোটেও সীমাবদ্ধ নয়=4
4	গত 4 সপ্তাহে, আপনার শারীরিক স্বাস্থ্যের ফলে আপনার কাজ বা অন্যান্য নিয়মিত দৈনন্দিন ক্রিয়াকলাপে নিম্নলিখিতগুলির মধ্যে কোন সমস্যা হয়েছে?	হ্যাঁ=1 সীমিত একটি প্রচুর / হ্যাঁ = 2 সীমিত একটি সামান্য / না = 3 মোটেও সীমাবদ্ধ নয়=4
5	বিগত 4 সপ্তাহে, কোনো মানসিক সমস্যার (যেমন হতাশা বা উদ্বিগ্ন বোধ) এর ফলে আপনি কি আপনার কাজ বা অন্যান্য নিয়মিত দৈনন্দিন ক্রিয়াকলাপগুলির সাথে আপনার ইচ্ছার চেয়ে কম সম্পন্ন করেছেন?	হ্যাঁ=1 নং = 2
6	গত 4 সপ্তাহে, কোন মানসিক সমস্যার (যেমন হতাশা বা উদ্বিগ্ন বোধ) এর ফলে আপনার কাজ বা অন্যান্য নিয়মিত দৈনন্দিন কাজকর্মের সাথে নিম্নলিখিতগুলির মধ্যে কোন সমস্যা হয়েছে?	হ্যাঁ=1 সীমিত একটি প্রচুর / হ্যাঁ = 2 সীমিত একটি সামান্য / না = 3 মোটেও সীমাবদ্ধ নয়=4
7	গত 4 সপ্তাহে আপনার কতটা শারীরিক ব্যথা হয়েছে?	কোনটিই নয়=1 খুব মৃদু = 2 মৃদু =3 পরিমিত = 4 গুরুতর = 4
8	গত 4 সপ্তাহে, ব্যথা আপনার স্বাভাবিক কাজে কতটা হস্তক্ষেপ করেছে (বাড়ির বাইরের কাজ এবং বাড়ির কাজ উভয়ই সহ)?	মোটেই না = 1 সামান্য বিট = 2 পরিমিত=3 বেশ কিছুটা =4 অত্যন্ত = 5
9	এই প্রশ্নগুলি হল আপনি কেমন অনুভব করেন এবং গত 4 সপ্তাহে আপনার সাথে কেমন ছিল। আপনি কতটা সময় শান্ত এবং শান্তিপূর্ণ অনুভব করেছেন?	সব সময় = 1 বেশিরভাগ সময় = 2 একটু ভালো সময়=3 কিছু সময় = 4 একটু সময় = 5

		সময়ের কোনটিই নয় = 6
10	গত 4 সপ্তাহে, আপনি কতটা সময় হতাশ এবং নীল বোধ করেছেন?	সব সময় = 1 বেশিরভাগ সময় = 2 একটু ভালো সময়=3 কিছু সময় = 4 একটু সময় = 5 সময়ের কোনটিই নয় = 6
11	গত 4 সপ্তাহে, আপনার কতটা সময় প্রচুর শক্তি ছিল?	সব সময় = 1 বেশিরভাগ সময় = 2 একটু ভালো সময়=3 কিছু সময় = 4 একটু সময় = 5 সময়ের কোনটিই নয় = 6
12	গত 4 সপ্তাহে, আপনি কতটা সময় ক্লান্ত বোধ করেছেন?	সব সময় = 1 বেশিরভাগ সময় = 2 একটু ভালো সময়=3 কিছু সময় = 4 একটু সময় =৫ =সময়ের কোনটিই নয় = 6

CONSERT FORM(ENGLISH)

Research Title: **"Dry needling of quadratus lamborum on pain and disability among the patient with chronic low back pain".**

Participant ID No……..... Date……./……./……

Assalamualaikum, 1 am Md Rasel Miah Student of B Sc in physiotherapy. I came from SAIC collage of medical science and technology, which is affiliated by Dhaka University, located at Mirpur, Dhaka. I am now conducting a study on"Dry needling of quadratus lamborum on pain and disability among the patient with chronic low back pain." I would be very much pleased if you participate in this study. I would like to ask you some question about your satisfaction on physiotherapy treatment. This interview usually takes between 15-20 minutes to complete. Whatever information you provide will be keeping strictly confidential and will not be shown to others. Participation in this study is voluntary and you can choose not to answer any individual question or all of the questions. However, I hope that you will participate in this study since your views are Important. At this time do you want to ask me anything about this study?

If any question then just contact with me contact number 01634518197 or my Supervisor name Shahid Afridi(lecturer SCMST)contact number 01780006441 .

I further understand that I can withdraw from the study at any time and I will not get any financial benefit for attending this study.

I am willing to participate in the study

Participant signature…….Supervisor's signature……..

.

Questionnaire (English)

Date……/……/……..

Contact No…….

Part 1: Sociodemographic Information

1.1 Patients name:	
1.2 Address	Village: District:
1.3 Mobile	

Part 2: Sociodemographic Information

Question	Answer
2.1 Age	…….……(In years)
2.2 Sex	Male =1 Female =2
2.3 What is your living area?	Urban =1 Semi urban = 2 Rural =3
2.4 What is your Marital Status?	Married =1 Single =2 Divorced =3 Separated =4 Widow=5
2.5 What is your Family type?	Nuclear family =1 Extended family =2
2.6 What about your educational level?	Illiterate =1 Secondary =2 H.S.C =3 Graduation & above =4

2.7 How about your Monthly income?	…….(In BDT)

Part 3: Medical information

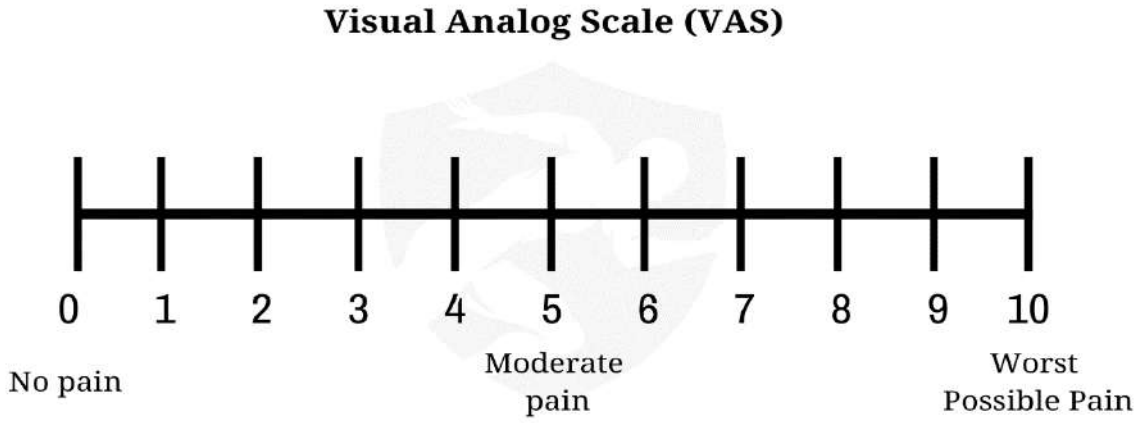
3.1 What is your Height?	……..…….cm
3.2 What is your Weight?	……..…….kg
3.3 BMI	1= Underweight 2= Normal weight 3= Over weight 4= Obesity
3.4 Comorbidities	1= Hypertension 2= Diabetes mellitus 3= Don't know
3.5 How tired are you normally at the end of a working day physically?	1= Not tired 2= A bit tired 3= Very tired
3.6 Do you carry out the same work almost the whole day?	1= Yes 2= No
3.7 Do you think your Low back discomfort is responsible for carrying out the same work?	1= Yes 2= No
3.8 Which kind of work create LBP?	1= Standing 2= Sitting 3= Extension of arms/ hand- 4= Working in the same position for long periods 5= Doing repetitive tasks many times 6= Stretching to write on board
3.9 Do you think Standing/Sitting/Extension of arms or hand/Working in the same position for long periods /Doing repetitive tasks many times.	1= Yes 2= No
3.10 Do you think your pain is responsible for using materials?	1= Yes 2= No
3.11 How long the pain persist?	1 = (0-5) hours 2 = (6 – 12) hours 3 = (13 – 24) hours

3.11 What is the type of pain?	1= Constant 2= Intermittent

Questions	Patients' response
I stay at home most of the time because of my back.	1. Yes 2. No
I change position frequently to try to get my back comfortable.	1. Yes 2. No
I walk more slowly than usual because of my back.	1. Yes 2. No
Because of my back, I am not doing any jobs that I usually do around the house.	1. Yes 2. No
Because of my back, I use a handrail to get upstairs.	1. Yes 2. No
Because of my back, I lie down to rest more often.	1. Yes 2. No
Because of my back, I have to hold on to something to get out of an easy chair.	1. Yes 2. No
Because of my back, I try to get other people to do things for me.	1. Yes 2. No
I get dressed more slowly than usual because of my back.	1. Yes 2. No
I only stand up for short periods of time because of my back.	1. Yes 2. No
Because of my back, I try not to bend or kneel down.	1. Yes 2. No
I find it difficult to get out of a chair because of my back.	1. Yes 2. No
My back is painful almost all of the time.	1. Yes 2. No
I find it difficult to turn over in bed because of my back.	1. Yes 2. No
My appetite is not very good because of my back.	1. Yes 2. No
I have trouble putting on my socks (or stockings) because of the pain in my back.	1. Yes 2. No
I can only walk short distances because of my back pain.	1. Yes 2. No

I sleep less well because of my back.	1. Yes 2. No
Because of my back pain, I get dressed with the help of someone else.	1. Yes 2. No
I sit down for most of the day because of my back.	1. Yes 2. No
I avoid heavy jobs around the house because of my back.	1. Yes 2. No
Because of back pain, I am more irritable and bad tempered with people than usual.	1. Yes 2. No
Because of my back, I go upstairs more slowly than usual.	1. Yes 2. No
I stay in bed most of the time because of my back.	1. Yes 2. No

Baseline



Roland-Morris Low Back Pain and Disability Questionnaire (RMQ)

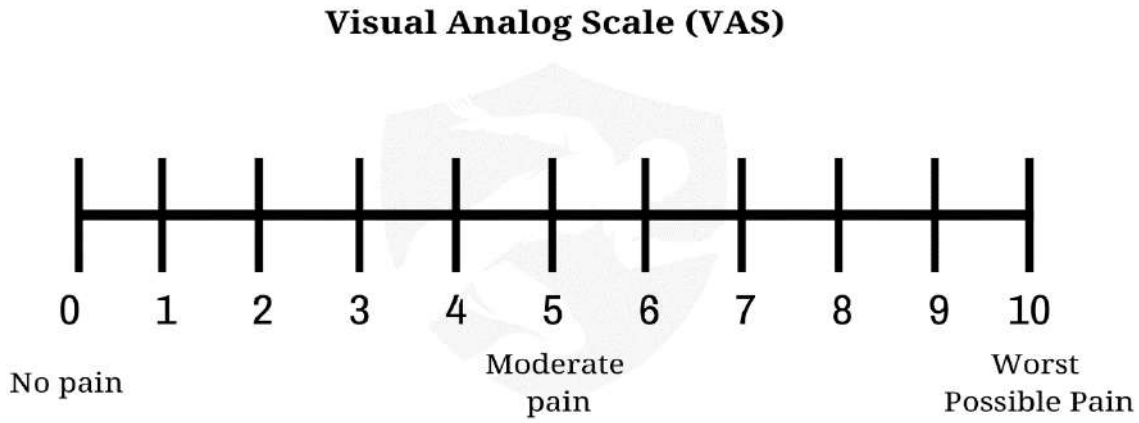
SF- 12 Questionnaire

Question Number	Question	Response Options
1	In general, would you say your health is:	Excellent=1 Very Good=2 Good=3 Fair=4 Poor=5

2	Compared to one year ago, how would you rate your health in general now?	Much Better Now Somewhat Better Now About the Same Somewhat Worse Now Much Worse Now
3	The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?	Yes=1 Limited A Lot / Yes=2 Limited A Little / No=3 Not Limited at All=4
4	During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?	Yes=1 Limited A Lot / Yes=2 Limited A Little / No=3 Not Limited at All=4
5	During the past 4 weeks, have you accomplished less than you would like with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?	Yes=1 No=2
6	During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?	Yes=1 Limited A Lot / Yes=2 Limited A Little / No=3 Not Limited at All=4
7	How much bodily pain have you had during the past 4 weeks?	None=1 Very Mild=2 Mild =3 Moderate =4 Severe=4
8	During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?	Not at all=1 a little bit=2 moderately=3 quite a bit =4 extremely=5

9	These questions are about how you feel and how things have been with you during the past 4 weeks. How much of the time have you felt calm and peaceful?	All of the time=1 Most of the time=2 A good bit of the time=3 Some of the time=4 A little of the time =5 None of the time=6
10	During the past 4 weeks, how much of the time have you felt downhearted and blue?	All of the time=1 Most of the time=2 A good bit of the time=3 Some of the time=4 A little of the time =5 None of the time=6
11	During the past 4 weeks, how much of the time have you had a lot of energy?	All of the time=1 Most of the time=2 A good bit of the time=3 Some of the time=4 A little of the time =5 None of the time=6
12	During the past 4 weeks, how much of the time have you felt tired?	All of the time=1 Most of the time=2 A good bit of the time=3 Some of the time=4 A little of the time =5 None of the time=6

After 8 Session



Roland-Morris Low Back Pain and Disability Questionnaire (RMQ)

Questions	Patients' response
I stay at home most of the time because of my back.	3. Yes 4. No
I change position frequently to try to get my back comfortable.	3. Yes 4. No
I walk more slowly than usual because of my back.	3. Yes 4. No
Because of my back, I am not doing any jobs that I usually do around the house.	3. Yes 4. No
Because of my back, I use a handrail to get upstairs.	3. Yes 4. No
Because of my back, I lie down to rest more often.	3. Yes

	4. No
Because of my back, I have to hold on to something to get out of an easy chair.	3. Yes 4. No
Because of my back, I try to get other people to do things for me.	3. Yes 4. No
I get dressed more slowly than usual because of my back.	3. Yes 4. No
I only stand up for short periods of time because of my back.	3. Yes 4. No
Because of my back, I try not to bend or kneel down.	3. Yes 4. No
I find it difficult to get out of a chair because of my back.	3. Yes 4. No
My back is painful almost all of the time.	3. Yes 4. No
I find it difficult to turn over in bed because of my back.	3. Yes 4. No
My appetite is not very good because of my back.	3. Yes 4. No
I have trouble putting on my socks (or stockings) because of the pain in my back.	3. Yes 4. No
I can only walk short distances because of my back pain.	3. Yes 4. No
I sleep less well because of my back.	3. Yes 4. No
Because of my back pain, I get dressed with the help of someone else.	3. Yes 4. No
I sit down for most of the day because of my back.	3. Yes 4. No
I avoid heavy jobs around the house because of my back.	3. Yes 4. No
Because of back pain, I am more irritable and bad tempered with people than	3. Yes 4. No

usual.	
Because of my back, I go upstairs more slowly than usual.	3. Yes 4. No
I stay in bed most of the time because of my back.	3. Yes 4. No

SF- 12 Questionnaire

Question Number	**Question**	**Response Options**
1	In general, would you say your health is:	Excellent=1 Very Good=2 Good=3 Fair=4 Poor=5
2	Compared to one year ago, how would you rate your health in general now?	Much Better Now Somewhat Better Now About the Same Somewhat Worse Now Much Worse Now
3	The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?	Yes=1 Limited A Lot / Yes=2 Limited A Little / No=3 Not Limited at All=4
4	During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?	Yes=1 Limited A Lot / Yes=2 Limited A Little / No=3 Not Limited at All=4
5	During the past 4 weeks, have you accomplished less than you would like with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?	Yes=1 No=2

6	During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?	Yes=1 Limited A Lot / Yes=2 Limited A Little / No=3 Not Limited at All=4
7	How much bodily pain have you had during the past 4 weeks?	None=1 Very Mild=2 Mild =3 Moderate =4 Severe=4
8	During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?	Not at all=1 a little bit=2 moderately=3 quite a bit =4 extremely=5
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11	During the past 4 weeks, how much of the time have you had a lot of energy?	All of the time=1 Most of the time=2 A good bit of the time=3 Some of the time=4 A little of the time =5 None of the time=6

12	During the past 4 weeks, how much of the time have you felt tired?	All of the time=1 Most of the time=2 A good bit of the time=3 Some of the time=4 A little of the time =5 None of the time=6

SCMST-BPT/IRB/05-23/032

To
Md. Rasel Miah
4th Year Student of B.Sc in Physiotherapy
Session:2018-2019 , Reg No:10425
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh

Subject: Approval of the thesis proposal **"Dry needling of quadratus lamborum on pain and disability among the patient with chronic low back pain"** by ethics committee.

Dear Md. Rasel Miah
Congratulations.
The Institutional Review Board (IRB) of SCMST has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the principal investigator. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Dissertation Proposal
2	Questionnaire (Bangla and English version)
3	Information sheet & consent form.

The purpose of the study is to determine the Barriers and Challenges Confronted by Lower Limb Amputees after Completing Prosthetic Rehabilitation. The study involves face to face interview by using semi-structured questionnaire to explore the Barriers and Challenges Confronted by Lower Limb Amputees in Bangladesh that may take 30 to 40 minutes to fill in the questionnaire and there is no likelihood of any harm to the participants. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 09:00 AM on 28th September 2023 at SCMST.

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring during the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,

30.05.24

Dr. Abul Kasem Mohammad Enamul Haque
Principal, SCMST &Chairman, Institutional Review Board (IRB)
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