Effectiveness of Spinal Manipulation for Patients with Prolapse Lumber Intervertebral Disc (PLID): A Randomized Controlled Trial

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"Effectiveness of Spinal Manipulation for Patients with Prolapse Lumber Intervertebral Disc (PLID): A Randomized Control Trial"

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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.

I confirm that if anything identified in my work that I have done plagiarism or any form of cheating that will directly awarded me fail and I am subject to disciplinary actions of authority. I confirm that the electronic copy is identical to the bound copy of the Thesis.

In case of dissemination the finding of this project for future publication, research supervisor will highly concern, it will be duly acknowledged as graduate thesis and consent will take from the physiotherapy department of Saic College of Medical Science and Technology (SCMST).

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CONTENTS

List of Table

Table Description Page

List of figures

Acronyms

BMI	Body mass index
BMRC	Bangladesh Medical Research Association
EBR	Ethical Review Board
LBP	Low Back Pain
LDH	Lumber Disc Herniation
NPRS	Numeric Pain Rating Scale
NPRS	Numeric pain rating scale
ODI	Oswestry Disability Index
ODI	Oswestry disability index
PLID	Prolapse lumber intervertebral disc
SAIC	Saic College of Medical science and Technology
SPSS	Statistical Package for the social Sciences
UPT	Usual physiotherapy technique

ABSTRACT

Background: Low back pain as well as lumber disc herniation is a major public health issue that affects people's wellbeing and daily activities. Spinal manipulation is a newly developed approach that manipulates the spinal disc and neural foramina canal of spine that reduces the nerve root compression and reduce the symptom of patients with spinal pain. ***Purpose:*** To assess the effectiveness of Spinal manipulation for the patients with prolapsed lumber intervertebral disc (PLID). ***Methodology:*** The study was conducted randomized control trial (RCT) design.The patients with prolapsed lumber disc attended in different physiotherapy center consisted in the study population for the present study.Data was collected from the outpatient services musculoskeletal physiotherapy unit of the Unique Pain and Paralysis Centre-Mirpur 11, Pain paralysis Specialized & general hospital Manikganj, Saic Physiotherapy and Rehabilitation Services-Mirpur 14, Academy of Physiotherapy Pain and Rehabilitation center-Mirpur 10.Investigator selected 28 participants as sample. After randomization 14 allocated to the experimental group and 14 to the control group. Experimental group received spinal manipulationwithusual physiotherapy intervention; however control group received only usual physiotherapy intervention. Data was collected by using structured questionnaire related to LBP and disability. Socio-demographic data were collected by a semi-structured questionnaire. Data was analyzed by using SPSS software version 25.0 which focused through column, pie chart, table and paired t-test and also unpaired t-test of the parametric test. ***Results:*** Asignificant improvement of pain in different position and disability were demonstrated in within group analysis by paired t-test whereas, no significant improvement found on pain between group but it showed significant between group ODI analysis by independent sample t-test. ***Conclusion:*** It is concluded that the spinal manipulation has no significant effect on pain but it decrease the disability of patients with Prolapse lumber intervertebral disc.

Key words: *PLID, Spinal manipulation, usual physiotherapy*

CHAPTER-I INTRODUCTION

1.1 Background of the study:

One of the most prevalent conditions that cause leg pain and/or low back pain is prolapse lumber intervertebral disc (PLID).The prevalence of symptomatic prolapse lumber intervertebral disc ranges from 1%to 3% over the course of a lifetime. Despite the fact that 20% to 40% of imaging studies performed on asymptomatic people reveal PLID physically. Although it can also happen to teens and older persons, the age group with the highest occurrence is between 30 and 50 years old (Raoof, Gharib and Adel, 2015).

Prolapse lumber disc is a condition of slipped disc material nucleus pulposus and annulus fibrosus outward the intervertebral disc space. There is a little evidence of suggest drug treatment are effective in herniated disc. Prolapse lumber intervertebral disc is a common musculoskeletal disorder which cause back and leg pain, sometimes may feel paresthesia, numbness and tingling sensation in both or one leg. It could be acute and chronic in its clinical presentation. It affects 80% of people in their life time. Bangladesh is one of the overcrowded populated developing countries. According to World Health Organization in Bangladesh there is 10% of population are disable. PLID is one of the most common cause of disability, It is a social and economic burden all over the world (Camy, 2016).

The major clinical symptoms of PLID or LDH are lower back or lumbosacral pain. Patient with PLID according to severity they may develop lower limb paralysis and incontinence. Nowadays LDH incidence and affects a large group of people all over the world. it has become an important disease that's makes people life unhealthy, loss of functioning, quality of life, impairment and disability(Xu et al., 2020).

Usually most patients with lumber disc herniation chose conservative management and surgical management. Nowadays evidence based physiotherapy management for PLID including traction, Mckenzie extension exercise, and rehabilitation. The use of spinal manipulative therapy for patients of PLID also has been suggested; But it's safety and indication have remain debatable, the use of spinal manipulation has some harmful effect or should be maintain percussion and safety measurement in patients with disc disruption or instability. In this condition SMT worsening disc herniation or cauda eqine syndrome. A systemic review 2004 confirmed the safety and efficacy of SMT for

patients with symptomatic lumber disc disease (SLDD) after manipulation in comparison to traction, heat, and sham manipulation but no significant difference to manual therapy and medical corsets. A recent study found that long term improvement found in pain and functional activity after 1 year follow up, and another study in 2016 reported significant improvement in leg pain after 1 month in patients with sequestration and extrusion of lumber discs, following manipulation (shokri et al., 2018).

So therefore Manipulation is the popular treatment method in Chinese medicine for PLID. By rotation of the spine the protrusion of the nucleus pulposus and position of the nerve roots can be changed to removed adhesions, relives compression, and expand the nerve root canal. Additionally this manipulation can improve repair of the posterior extensor of the lumber spine muscles, by decreasing muscle spasm, increase muscle relaxation, dilating peripheral blood vessels, correction of local anemia and anoxia, removing inflammation and decrease fluid accumulation. Progressive strengthening exercise of the lumber spine muscles (posterior lumber multifidus, erector spine, psoas major), muscle strength and coordination can be increased, muscle adhesion can be released, muscle elasticity should maintain and muscle atrophy should be prevented. Such therapy plays an important role for balance and mechanical correction of the lumber spine (Xu et al., 2020).

According to several investigations, patients with prolapse lumber intervertebral disc (PLID) also showed facet joint angle asymmetries (facet tropism), which is widely regarded as a typical radiological indication of PLID. Facet tropism increases shear stresses, which makes it a possible risk factor for early disc prolapse and degeneration. PLID management involves a variety of therapy approaches, however the outcomes are inconsistent. PLID is frequently treated using spinal manipulations. Although the advantages and risks of this strategy are unknown, some researchers have suggested using it in PLID cases even when other treatments have failed. The available evidence points to spinal manipulation as a way to reduce discomfort, increase range of motion, release sticky fibrosis surrounding prolapsed disc or facet joints and entrapped synovial fluid. Modifying disc movement, blocking nociceptive impulses and calming down tense muscles there aren't any research that have examined whether spinal manipulation has any effect on asymmetry of the facet joints in relation to instances of PLID. According to certain research, spinal cauda equina syndrome and disc herniation may result from manipulation. The findings are also contradictory for persistent back pain.

These contrasting ideas results could be partially explained by differences in inadequate methodological quality of the study design, hence the goal of this study was to took into the potential advantages of additional spinal manipulation rather than more common physical therapeutic regimen for individuals with symptoms of PLID, measured in terms of level of pain, facet angle's asymmetry and practical use between L4 and L5 (Raoof, Gharib and Adel, 2015).

People having low back pain and sciatica one of the most common reason for care from a physician the total coast is about above 100 million dollar annually only USA. This cost increase by 7% to 10% if the pain is persist for a chronic period. Manipulative therapy is most common conservative treatment. In America people received manipulative therapy for LBP out of cost 3.9 billion dollar in a year. Spinal manipulation broadly classified as two types manipulation based and mobilization based approach. Manipulation based approach applied high velocity low amplitude force that may often produce audible audible sound two or more joints. Mobilization based approach apply low velocity low amplitude force that does not produce audible sound. Some studies indicate that manipulation based technique is more effective than mobilization based technique for treating LBP; however some research shows that there is no significant difference between manipulation and mobilization. Finally most studies show that manipulation as a standard care of chose list in the comparison group. This clinical trial should apply to identify the unresolved issue (Thomas et al., 2020).

1.2 Justification

Many therapeutic interventions are used for the management of PLID but the results are conflicting (Santilli, Beghi, and Finucci, 2006). Spinal manipulations are commonly used for the treatment of PLID patients. The benefits and hazards of this intervention are contradictory; however, some researcher recommended it's used in case of PLID (Raoof, Gharib and Adel, 2015). Researcher would like to show the effectiveness of spinal manipulation in the treatment of PLID. The effectiveness of manipulative therapy for acute and chronic low back pain is mixed. Review has generally found that manipulation is more effective compared the clinical effectiveness of manipulative therapy and conventional physiotherapy and existing studies have needed for discrepant result. In traditional chines medicine manipulation is the best treatment option for treating PLID. Using massage rotation the protruded disc material and nerve root position can be changed to removed adhesion, relive nerve root compression and decrease narrowing of the spinal canal. Otherwise manipulation can improve by increasing blood circulation local anemia and anoxia it can also developed posterior extensor group of lumber spine muscle by reliving muscle spasm and improve local relaxation. Muscle elasticity and flexibility can be improve by manipulation following back strengthening and core muscle stability exercise (Xu et al., 2020) Following previous article this study is very important for developing evidence based treatment. That might be save money and loss of time. This study helps to establish evidence regarding the effectiveness of spinal manipulation for PLID patients. It provide relevant information for future study. So, this study is necessary for physiotherapy practice and it will be help in future research.

1.3 Research Hypothesis

1.3.1 Null Hypothesis (Ho):

- Spinal manipulation is not effective for the management of patient with prolapsed lumber intervertebral disc (PLID).
- Null hypothesis $Ho = \mu1 - \mu2 = 0$ or $\mu1 = \mu2$, where the experimental group and control group initial and final difference is same.

1.3.2 Alternative hypothesis (Ha):

- Spinal manipulation is effective for the management of patient with prolapsed lumber intervertebral disc (PLID).
- Alternative Hypothesis $H\alpha = \mu1 - \mu2 \neq 0$ or $\mu1 \neq \mu2$, where the experimental group and control group initial and final difference is not same.

Where,

Ho =the null hypothesis,

Ha = the alternative hypothesis

$\mu1$ = the mean of population 1, and

$\mu2$ = the mean of population 2

1.4Objectives

1.4.1: General objective:

I. To assess the effectiveness of Spinal manipulation for the patients with prolapsed lumber intervertebral disc (PLID).

1.4.2: Specific objectives:

I. To assess the severity of pain of both groups (experimental and control) by using Numeric pain rating scale before and after intervention.

II. To assess the disability of both groups (experimental and control) by using Oswestry Disability Index (ODI) scale before and after intervention.

III. To evaluate the effectiveness of spinal manipulation on pain intensity and disability status by comparing the finding of pre-test and post-test.

IV. To determine the socio demographic characteristics of the participants.

1.5 Operational Definition:

Lumber disc herniation or (PLID): When disc prolapse takes place in the lumber region due to trauma, degeneration of disc or intervertebral joints is known as prolapsed lumber intervertebral disc or lumber disc herniation. It is a common cause of back pain and leg pain.

Pain: The word pain is derived from the Latin word poena, for the study of pain (IASP) defines pain is an unpleasant sensory and emotional experience associated with acute or potential tissue damage or describe in terms of such damage.

Low back pain (LBP): Low back pain (LBP) describes pain between the lower edge of the ribs and the buttock. It can last for a short time (acute), a little longer (sub-acute) or a long time (chronic). It can affect anyone.

Radiating Pain: The term "Radiating pain" refers to pain that travels from one body part to another. This pain starts in one place and then spreads into a broader area of the body. For example people with herniated disc may developed low back pain .This pain with travels with the sciatic nerve that runs down the leg.

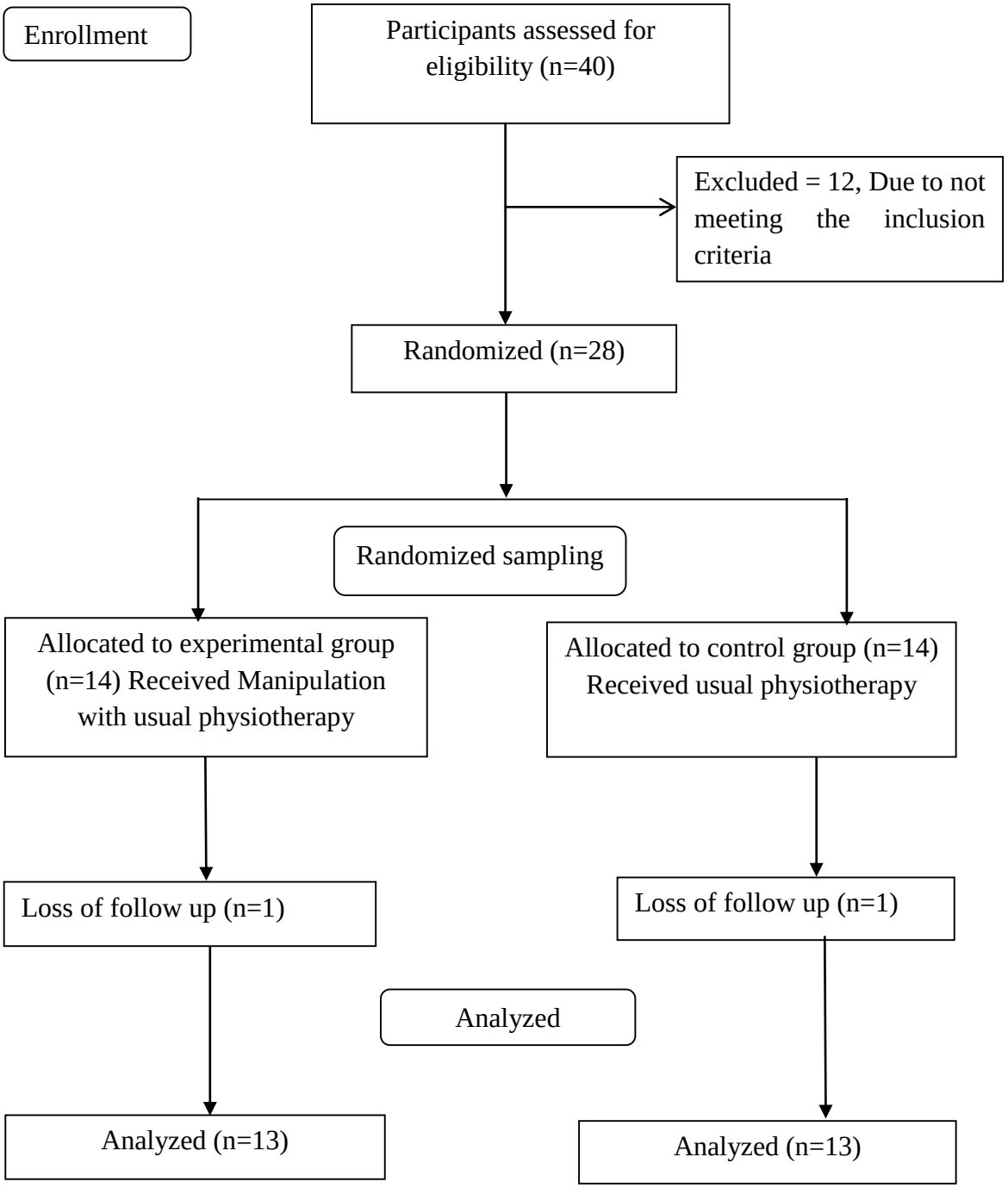
Cauda equine syndrome: Cauda equine syndrome is a condition that occurs when the bundle of nerves below the end of the spinal cord known as cauda equina is damaged. Sign and symptoms include low back pain, pain that radiate down the leg, numbness around the anus, and loss of bowel and bladder control. Onset may rapid or gradual.

Spinal Manipulation: Spinal manipulation is a technique where practitioner uses their hands or a device to apply controlled thrust to a joint of your spine. The amount of force can vary, but the thrust moves the joint more than it would on its own.

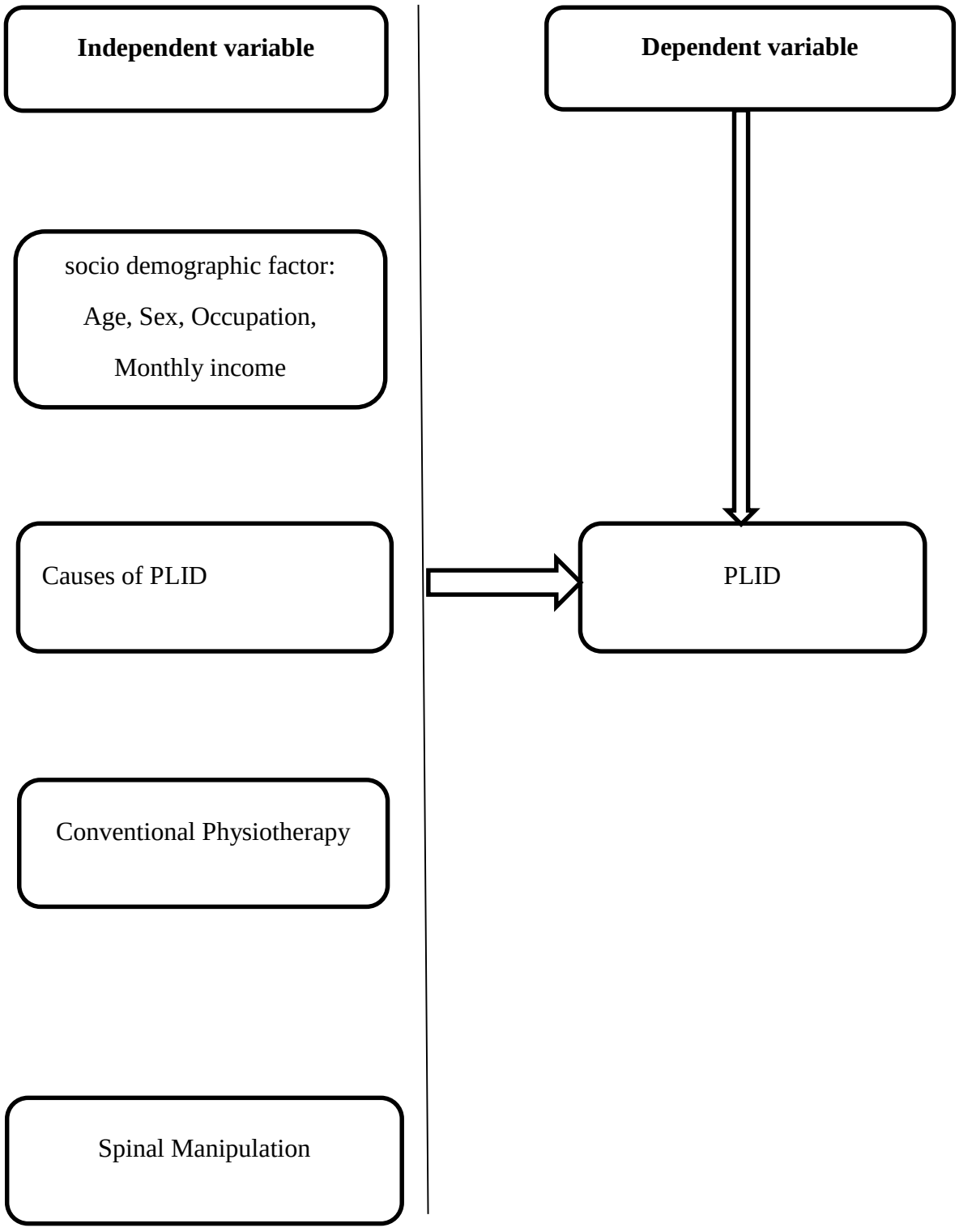
Conventional Physiotherapy: Conventional Physiotherapy is defines as the treatment of movement disorders caused by impairment of joints and muscles that moves the joint. Mobilization, strengthening and stretching exercises are three main constitute of the conventional physiotherapy.

Chronic Pain: Chronic primary pain is defined as pain in one or more anatomical regions that persists or recurs for longer than 3 months and is associated with significant emotional distress or functional disability.

1.6 **CONSORT (Consolidated Standards of Reporting Trials) flow Chart:**



1.7 Conceptual Framework:



CHAPTER: II LITERATURE REVIEW

Low back pain (LBP) is a prevalent condition, with lifetime prevalence rates of up to 84% and annual incidence rates ranging from 15% to 45%. Unknown medical causes of back pain are known as non-specific LBP (Griswold, et al., 2019).

More than 80% of population in developed nations have low back pain (LBP) at some points in their lives (Freburger et al., 2009). According to thirty one research, low back pain has a frequency of between 62% and 78% in Indian's general population, with lumber disc herniation (LDH) being one of the main regions (Bindra, Benjamin and Sinha, 2013). The most frequent cause of lumbosacral radiculopathy is throught to be LDH, which is defined as the localized displacement or disruption of disc material beyond borders of intervertebral disc place (Hahne, Ford and McMeeken, 2010). LDH is describe as the localized displacement or disturbance of disc material beyond the LDH that results in central low back discomfort and/or radiating pain down one or more lumber spinal nerve roots or down the sacrum, along with neurologic impairments or concomitant symptoms of nerve root compression (Erdogmus,et al. 2007). The phenomenon may also cause lumbo-sacral plexus motor deficits and impairments in daily activities and livelihood-related function (Luijsterburg,et al., 2007).

Radiating pain in a region of the leg commonly supplied by one lumber or sacral spinal nerve root, together with dermatomal changes, are symptoms of lumber radiculopathy. And or aberrant tendon reflexes (Linqiu, Schneck and Shao, 2012). A herniated nucleus pulposus or lumber spinal stenosis are two prevalent degenerative disorder that generally cause the issue, which affects roughly 3-5% of the population and affects 10-25% of those who experience recurrent symptoms that typically last more than three months (Casey, 2011).

Waist and lower back discomfort are the predominant clinical signs of LDH. Patients with severe LDH may potentially experience incontinence and lower limb paralysis (Anhui, 2016) LDH is prevalent and has a broad range of effects different persons. It has developed into a significant illness that has an impact on people's quality of life, ability to work, and health. Because senior patients are more likely to have many underlying morbidities, such as diabetes and hypertension, the risk of surgery are higher in this population. Long-term suffering is a result of LDH,s protracted illness course, high relapse rate, and challenges in getting excellent results from radical therapy.

Therefore, developing efficient treatment and rehabilitation techniques to lower the frequency of LDH attacks that reoccur presents a significant challenges for the medical community (xu et al., 2020).

Lumber Disc Herniation, a prevalent chronic musculoskeletal illness, has a significant impact on quality of life. The spine nerve root compression issue was addressed by the development of the percutaneous endoscopic lumber discectomy procedure, which allows for direct disease finding visibility while reducing tissue damage. Damage after exposure. It is a reliable and secure method of treating LDH. However, after lumber discectomy for primary LDH, recurrence LDH is a significant issue. Numerous clinical investigations have shown that manual therapy practice is beneficial for people with LDH and radiculopathy. SMT was developed based on the traditional Chinese medicine theory, Which has been demonstrated to have a superior effect in reducing muscle tension and easing joints to treat radiculopathy, stiffness, activity discomfort, and back and leg pain. However there aren't enough credible clinical studies to back up the statement. The goal of the study is to assess to effectiveness of spinal manipulation along with other conventional physiotherapy for patients with LDH (Wang et al., 2021).

Lumber Disc Herniation is one of the issues that outpatient physical therapists encounter the most frequently. Herniation is a multifaceted mechanical condition that depends on physical, behavioral, and psychological aspects, as has been well established (Sulivan et al., 2011). The severity of disc displacement that is generating the range of clinical manifestations determines how LDH should be managed, and conservative treatment is advised for those without warning signs. Extreme discomfort, a developing neurological deficiency, and/or cauda equine syndrome are all indicated by red flag. Various pharmaceutical treatments, such as patient education, analgesics, rest, exercise, traction, mobilization, and manipulative therapy are all included in conservative care. Although surgical or invasive therapies may be the preferred courses of treatment (Traeger et al., 2019). Supports giving conventional therapy priority as the initial line of management (Qaseem et al., 2017).

One common illness that is linked to discomfort, incapacity, a lower quality of life, and a fear of moving is chronic low back pain (LBP). As of yet, no research has examined the relative merits of spinal manipulation against functional method in the treatment of this particular population (Castro-Sanchez,at el., 2016).

Studies have shown that before undergoing surgical procedures, conservative management of lumbar radiculopathy should be tried if there are no worsening neurological symptoms or cauda equina syndrome. This has led to the development and investigation of numerous conservative care modalities, such as manual therapy, in the treatment of this illness. Furthermore, data from systematic reviews and international guidelines suggests that manual therapy approaches are useful for managing pain and disability in individuals with lower extremity problems associated to the back, both temporarily and permanently (Danazumi, 2021).

Soft tissue therapies, including massage, have been suggested by other authors as a means of managing chronic lower back pain. A prior Cochrane systematic review found that massage therapy is useful for managing lower back pain. Studies examining alternative soft tissue therapies, such soft tissue myofascial release, for the treatment of individuals with LBP are, nevertheless, scarce (Ramsook and Malanga, 2012).

The purpose of the current randomized clinical trial was to compare the effectiveness of spinal manipulation along with other conventional physiotherapy in the treatment of prolapse lumber intervertebral disc (PLID).

According to research by Flynn et al., and Childs et al., throughout all spinal manipulations, if no popping sound was heard on the first attempt, the therapist repositioned the patient and did a second manipulation. Each patient was only permitted to attempt an intervention a maximum of twice (Castro-Sanchez, at el., 2016).

The benefits of spinal manipulation include reducing pain and disability. A third of the existing guideline's recommended spinal manipulation as a part of multimodal program for patients with chronic low back pain. the most recent overview of clinical-practice guidelines for patients with low back pain found that a third recommended treatment was spinal manipulation (De Oliveira at el., 2020).

Spinal manipulative therapy, for example, has been suggested by some writers to change central sensitization and be useful for treating people with long- term LBP. Actually, Spinal manipulation may prevent neuroplasticity modification of pain perception at the spinal cord dorsal horn. There is considerable debate regarding the effectiveness of spinal manipulation for patients with chronic LBP, despite the fact that many studies have looked into the mechanical, physiological, and neurological effect brought on by lumber spine manipulations, while other studies have come to different conclusions (Castro-Sanchez,at el., 2016).

Treatment for spinal manipulation the individual was positioned sideways, facing the physician, with the side that was hurting more upward. To cause lumber spine flexion, the medical professional passively flexed the participant's hips and knees. Until they felt the afflicted lumber vertebrae's spinous process start to shift. Then, until rotation was felt in the vertebrae above the suspected lesion, the physician passively rotated the participant's torso in opposite direction from the side they were lying on. A rotational force couple was applied to the hypo mobile region as a result of clinician applying a quick thrust to the shoulder (anterior to posterior force) and pelvic (posterior to anterior force). A cavitation, or audible pop, was thought a sign that the procedure was finished. In the absence of cavitation, the person was moved, and another attempt at the manipulation was completed. There could be only two attempts per side. After four tries-two on each side- if cavitation didn't form, the procedure was deemed successful (Thomas et al., 2020).

Manipulating the pelvic girdle when supine the side was hurting more was up while the patient was side lying. The therapist flexed the patient's top while standing in front of them. The patient's foot was then put in the popliteal fossa of the lower leg after moving the L5-S1 junction. While the other hand was resting against the area of the patient's rib cage, the therapist made contact with the forearm of one extremity on the lateral aspect of the pelvic girdle. The patient's upper knee was covered by the therapist knee. The patient's trunk was gently rotated to the opposite side, with the pelvis moving anteriorly and the upper body moving posteriorly, until a mild tension was felt in the L5-S1 junction. Finally, therapist performed an anterior pelvic thrust intervention with high velocity-low amplitude (Fig.1)

Fig.1 Side lying pelvic girdle manipulation (Castro- Sanchez et al., 2016).

Spinal manipulation while lying on your side the side that was hurting more was up while the patient was side lying. The therapist positioned the patient's foot in the popliteal fossa of the lower leg while standing in front of them, fixing the top leg until the chosen segment moved. One motion was sensed at the chosen interspace, the therapist applied trunk side-bending with a contralateral rotation while holding the patient's bottom shoulder and arm (L4-L5). The therapist position patient's arms around his/her right arm and put his right thumb on the right side of the spine to do a manipulation on the right side of the lumber spine. As the patient was being rolled in the direction of the therapist. Finally, the therapist used the left arm in an anterior orientation to perform a high velocity low amplitude pelvic thrust intervention (Fig.2)

Fig. 2 side lying lumber spine manipulation (Castro-Sanchez, et al., 2016).

Recent research have looked into directed and generic manipulative therapy, and the results indicate that in certain musculoskeletal diseases, generic manipulation—that is, manipulating a vertebral segment that is not painful—can also be beneficial. The majority of research indicates that thoracic manipulation is a non-specific therapeutic option for patients with persistent low back pain and neck pain. Of the investigations, only one examined the immediate effects on individuals with chronic low back pain who underwent guided or generic thoracic manipulation (De Oliveira, et al., 2013).

It is still unclear how spinal manipulation affects the body physiologically. However, a model for a potential mechanism of impact has been put out. According to this idea, a mechanical stimulus would have neurophysiological effects that would alleviate symptoms. These neurophysiological effects encompass supra spinal, spinal cord, and peripheral processes. In terms of the peripheral processes, musculoskeletal injuries may cause the damaged area to become inflamed, which could start a healing process that affects how pain is perceived. Therefore, spinal manipulation stimulation may modify this pain processing mechanism (De Oliveira, et al., 2020).

As for the peripheral mechanisms, musculoskeletal injuries can cause inflammation in the injured area, which can start a healing process that affects how pain is perceived. Therefore, spinal manipulation stimulation may modify this pain processing mechanism. In terms of spinal cord mechanics, spinal manipulation results in a decrease in the dorsal horn of the spinal cord's activity. Therefore, sensory impulses from muscle proprioceptors would over stimulate the central nervous system in

response to a spinal cord signal. In conclusion, the anterior cingulate cortex, amygdala, periaqueductal grey matter, and rostral ventromedial medulla are among the supra spinal regions that influence pain perception. As a result, spinal manipulation would have an impact on the central nervous system and lessen the activation of these structures (Schneider et al., 2015).

After more than three spinal joint manipulation sessions, there's a chance that changes in pain intensity will be more pronounced and clinically significant. A recent study found that a higher substance P plasma level may result in an improved pressure pain threshold, which may explain an improvement in pain following manipulative treatment. The length of this effect's duration is still unknown, though. According to a meta-analysis, manipulative therapy for back pain is only more effective at lowering pain than sham therapy—and only for a brief period of time during the follow-up. As far as we are aware, no prior research has examined the functional technique's short-term efficacy in comparison to a placebo or control group (Molina-Ortega, 2014).

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Therefore, spinal manipulation stimulation may modify this pain processing mechanism. In terms of spinal cord mechanics, the dorsal horn of the spinal cord becomes less activated following spinal adjustment. Therefore, sensory impulses from muscle proprioceptors would over stimulate the central nervous system in response to a spinal cord signal. In conclusion, the anterior cingulate cortex, amygdala, periaqueductal grey matter, and rostral ventromedial medulla are among the supra spinal regions that influence pain perception. As a result, manipulating the spine would have an impact on the central nervous system and lessen the activation of these structures (Bialosky, et al., 2018)

Before undergoing surgery, studies have shown that conservative management of lumber radiculopathy should be tried if there are no worsening neurological symptoms or cauda equina syndrome (Valat, 2011).

Based upon numerous conservative treatment modalities, including manual therapy, have been created and researched for management of this illness (Ostelo, 2020). Furthermore, data from international guideline and symptomatic review shows that manual therapy approaches are efficient for treating patients with lower extremity problem connected to their backs in the short- and –long –term, as well as managing pain and disability. However, there are no established procedures criteria for proper manual therapy techniques, which are the most successful therapies for people with lumber radiculopathy, indicating the need for further treatment alternatives (Delitto et al., 2012).

Traditional physical therapy using infrared light was provided to all participants in both groups. After 20 minutes of radiation, ultrasound therapy was administered. Each patient's received five minutes of moving head technique ultrasound treatment at the lower back with a frequency of 1 MHz, continuous mode, and 0.5W/cm2. Exercise programs in the form of massage, stretches for the hamstring to reduce posterior pelvic tilt and enhance mobility, and back exercise in the form of static, bridging, and dynamic exercises (Delitto et al, 2012). Were also provided in the form of progression of the quadruped, bridge, and plank (side and prone) position. Progressions designed activate the multifidi and transverse abdominus in coordination with the hip musculature. Within the pain free range, the workout regimen was applied for 45 minutes. Patients in the experimental group also underwent indirect rotation, postero-anterior central pressure treatment for lumber manipulation (Raoof, Gharib and Adel, 2015).

Physical therapists frequently use the McKenzie approach to treat pain and improve flexibility in individuals who have specific mechanical symptoms of LDH (Dunsford, Kumar and Clarke, 2011).

McKenzie, in order to "reduce derangements," mechanical diagnosis and therapy combines directional preference-based exercise with a clinician's manipulative therapy approach, emphasizing patient-performed self-directed exercises. This usually involves one direction of repeated movement that reduces or centralizes referred symptoms and eliminates midline symptoms. The McKenzie method is obvious to be more cost-efficient and effective for treating low back pain than pain and impairment throughout the long and short terms (Hossain,et al., 2021).

The American Physiotherapy Association asserts that there is convincing evidence that spinal mobilization and manipulation techniques can be used to enhance spinal health. Patients with low back pain who fulfill the clinical prediction rule should have increase hip mobility and less pain and disability (Childs et al., 2004). A recent systemic review found that spinal manipulation is superior to non-recommended interventions (such as ineffective light soft tissue massage, no treatment, waiting list control, and potentially harmful treatments such as electrotherapies) and has similar effect to other therapies (such as non-drug: exercise; and drug treatments: non-steroidal anti-inflammatory drugs, analgesics) recommended for chronic low back pain (Rubinstein et al., 2019).

A physiotherapist with 11 years of experience in clinical practice, extensive training in spinal manipulative therapy, and a degree in osteopathy provided care for the participants. All study participants underwent a clinical assessment by this therapist, who also took their medical histories. If a person was between the ages of 18 and 80 and seeking treatment for non-specific persistent low back pain (for a period of 12 weeks), they were continuously recruited regardless of gender. On the 11-point Pain Numerical Rating Scale, they had to have at least a 3 point pain severity level. However, if they were expecting, had spinal stenosis, a vertebral fracture, cancer, extensive osteoporosis, or other hemorrhagic disorders, they were not allowed to take part (De Oliveira et al, 2020).

The level of pain decreased in both groups. The estimated difference in pain intensity between manipulating specifically at the most painful lumbar level and manipulating generally was too minor to be considered clinically significant (De Oliveira et al., 2020).

(Castro-Sanchez,et al., 2016) Said that for measurement the pain intensity Numerical Pain Rate Scale (NPRS) was used. Patients undergoing spinal manipulation saw statistically, but not clinically, significantly larger decreases in terms of pain compared to those receiving functional method. Of ODI (post-treatment: 2.9; at 1 month: 1.4) and RMQ (standardized mean difference in score changes between groups at post-treatment: 0.1; at 1 month: 0.1).

This study calculated the effects of 10 sessions of guided or generic vertebral manipulation on pain severity, disability, pain threshold under pressure, and overall reported change in patients with chronic low back pain after 4, 12, and 26 weeks following randomization. For the endpoints of pain intensity, disability, overall perceived effect, and pressure pain threshold, no clinically significant differences were

found. Following the therapies, participants in both groups reported significantly less intense pain. The observed improvements may possibly be the result of regression to the mean and other contextual effects that are always present during treatment because the initial level of pain was rather high (De Oliveira et al., 2020).

Spinal manipulative therapy demonstrated a larger reduction in disability in patients with chronic LBP compared to functional method, but not in terms of pain, fear of movement, quality of life, isometric resistance of trunk flexors, or spinal mobility. Spinal manipulative therapy did not outperform functional method therapy in terms of clinically significant short-term benefits due to variations in impairment, which were not clinically significant. Furthermore, neither treatment had a clinically significant advantage because neither group after treatment reached the bar for the minimal clinically significant difference (Castro-Sanchez,et al., 2016).

Following the baseline examination, patients were randomly assigned to receive either spinal manipulative therapy or functional technique therapy. Both groups were treated by a physical therapist with more than 10 years' experience in the management of individuals with chronic pain. All participants attended a physical therapy clinic four times a week for 3 weeks (twelve sessions). Concealed allocation (ratio 1:1) was performed using a computer-generated randomized table of numbers created before the start of data collection by a researcher not involved in the recruitment or treatment of patients. Individual and sequentially numbered index cards with the random assignment were prepared. Outcome measures were assessed before the first treatment session (baseline data), after the 3-week intervention period (immediately after).

Ten questions covering various elements of function—such as pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social life, travel, and employment/homemaking—make up the questionnaire. Every component has a score between 0 and 5, where larger numbers indicate more disability. Every patient was directed to select the response that best reflected his or her functional level. Score 0 for the section applies if the first statement is marked. The section score is five if the final statement is marked. It was stated that ODQ was trustworthy and had enough width scale to identify if most patients with low back pain were improving or declining. The entire score is expressed as a multiplied by two and expressed as a percentage (Latif, Garib and Adel, 2015).

The patients' current degree of pain as well as the greatest and lowest level of pain they had experienced in the previous 24 hours were evaluated using a 10-point

NPRS (0: no pain, 10: maximum pain) . In the analysis, the three scores' mean value was employed. Patients with persistent LBP had a reported 2.5 point MCID for the NPRS (Castro-Sanchez, et al., 2016).

Utilizing the intention-to-treat analysis approach, statistical analysis was carried out using SPSS statistical software, version 25.0 (SPSS, Chicago, Illinois, USA).Baseline data were used in cases where post-intervention data were not available. For every variable, mean standard deviations or 95% confidence intervals were computed.

The paired and unpaired t-tests were used to compare the preand post-treatment values of the measured parameters within the group and between the two groups (experimental and control groups) respectively (Latif, Garib, and Adel, 2015).

CHAPTER- III METHODOLOGY

3.1 Study design:

The study was randomized controlled trial (RCT). RCT is appropriate for the comparison to the effectiveness of spinal manipulation and other conventional physiotherapy for the patients with prolapse lumber intervertebral disc (PLID).

3.2 Study area:

Data were collected from the outpatient services of physiotherapy unit of the Unique Pain and Paralysis Centre-Mirpur 11, Pain Paralysis Specialized & General Hospital Manikganj, Saic Physiotherapy and Rehabilitation Services-Mirpur 14, and the Academy of Physiotherapy Pain and Rehabilitation Center-Mirpur 10.

3.3 Study period:

The duration of the study was twelve's months from 1stJuly 2022 to 30th June 2023.

3.4 Study population:

The patients with prolapsed lumber disc attended in different physiotherapy center constituted in the study population for the present study.

3.5 Sample Size:

The sample size calculation of clinical trial by the following equation-

$$\mathbf{n} = \frac{\boldsymbol{2SD}\,(\frac{\boldsymbol{Z\alpha}}{\boldsymbol{2}} + \boldsymbol{Z\beta})^{\boldsymbol{2}}}{\boldsymbol{d^2}}$$

Here,

From Z table at type 1 error of 5%, $\frac{Z\alpha}{2} = 1.96$

From Z table at 80% power, Zβ=0.84

Effect size- difference between mean values, d=3 (Danazumi, et al., 2021).

Standard deviation, SD=14.30(Castro-Sanchez, et all., 2016).

Sample size n=?

$$= \frac{\mathbf{2 \times 14.30(1.96 + 0.84)^2}}{\mathbf{3^2}}$$

$$= \mathbf{24.92}(10\%\ \text{add})$$

Sample size n = 28

So, the researcher aim was focus his study by sample following the above initially. The researcher was adding a 10% non-response rate along with a non- response rate to the full sample size. Then 28 patients were allocated into experimental and control group by randomization. Allocated to experimental group 14 patients received manipulation with usual physiotherapy and Allocated to control group 14 patients received usual physiotherapy.

3.6 Sampling technique:

The present study is a randomized controlled trial. The selected participants were allocated into experimental and control group by randomization.

3.7. Inclusion criteria:

Male or female participants who met the following criteria were eligible for the study.

Age group between 24 and 65 years

Patients needed to have one or more levels of lumber disc herniation seen on an MRI.

As well as either a positive or cross- lasegue's sign.

A diagnosis of derangement syndrome and the MDT approach

Chronic PLID patients.

Willingness to complete the required spinal manipulation treatment and conventional physiotherapy

3.8 Exclusion criteria:

Past or current participation in other clinical investigations within the last 3 months

History of failed nonsurgical treatment for 6 months with aggravation of symptoms

An obvious decrease in muscle strength within a short period of time

(Muscle grade < 3) with symptoms of cauda equine syndrome

History of severe lumber trauma and lumber surgery

Pregnancy or preparation for pregnancy

Systemic disease such as malignant tumors, severe rheumatism, or severe osteoporosis.

Failure to understand or sign informed consent

3.9 Method of data collection:

Data was collected through a face-to-face interview using an internationally accepted questionnaire. The assessor was bilingual (Bengali and English), and the investigator did forward and backward translations of the questionnaire by different people and found the same meaning.

3.10 Instrument and Measurement tools of data collection:

A questionnaire was prepared according to the objectives and variables of the present study. The questionnaire contained both open-ended and closed-ended questions. The questionnaire has three parts. The first part contained questions on socio-demographic information (a structured questionnaire was used for socio-demographic information). The second part included questions about pain using the Numeric Pain Rating Scale (NPRS). The third part included questions about disability using the Oswestry Disability Index (ODI).

3.11 Procedure of data collection:

The researcher selected 40 patients with PLID from the out patients services in the department of physiotherapy Unique Pain and Paralysis Centre-Mirpur 11, Pain Paralysis Specialized & General Hospital Manikganj, Saic Physiotherapy and Rehabilitation Services-Mirpur 14, and the Academy of Physiotherapy Pain and Rehabilitation Center-Mirpur 10. The 12 patients were excluded on the basis of exclusion criteria. Then 28 patients were allocated into experimental and control group by randomization. Allocated to experimental group 14 patients received manipulation with usual physiotherapy and Allocated to control group 14 patients received usual physiotherapy. One patient in both groups did not complete 12 session of treatment. Ultimately the number of participants in experimental and control groups were 13 respectively. Information on pain and disability was collected. From both experimental and control groups before intervention. This information has been regarded as pre-test data.The intervention for the present study by spinal manipulation and conventional physiotherapy in experimental group. For control group only conventional physiotherapy was given. Both groups received similar 12 sessions. After completion of intervention information on pain and disability was collected. The information after intervention has been regarded as post test data among with 26 PLID patients.

3.12 Intervention protocol:

Experimental Group (40-45 minutes) (Manipulation along with UPT)	Control Group(40-45minutes) (Usual Physiotherapy intervention)
• Usual physiotherapy intervention	• Education about posture and home exercise
• Manipulation: Manipulation treatment was given 3-4 treatment sessions per week for 3 weeks. • One or two sudden thrust in both sides.	• Mckenzie Approach (directional Preference)- 1 set of 10 rep performed • Lumber spinal mobilization (Maitland)-30-60 oscillation per minutes performed in every segments. • Soft tissue technique -10 minutes in each session. • Lower back, core and pelvic floor muscle stabilization: 8 rep of each set with 10 seconds hold once daily. • Hot and cold compression-10 minutes

3.13 Data management:

At the end of each day, the collected questionnaires were checked for any errors or inconsistencies. The necessary corrections were made. The recorded data were coded accordingly into the SPSS-25 version of the program.

3.14 Analysis of data:

Data were analyzed by SPSS version 25 using descriptive analysis for sociodemographic variables. A paired t-test was used to assess the pre-test and post-test interventions within the group, and an independent t-test was used to assess the differences between the groups pre- and post-intervention. Microsoft Excel 2019 was used for the bar diagram and chart.

3.15 Ethical consideration:

The investigator followed the guidelines of the World Health Organization (WHO) and the Bangladesh Medical Research Council (BMRC).

Approval was received from the ERB of SCMST.

Data collection permission was obtained from the head of the physiotherapy department at SCMST.

Confidentiality is maintained strictly.

Informed consent was obtained from every participant**.**

3.16 Limitation of the study:

I. The generalizability of the result is quite difficult due to the small sample size.

II. The researcher only shows the pain and disability. It was needed to show the other variables. Such as quality of life, psychological status.

III. No follow-up study was included; it was quite important to take a follow-up session. The follow up of the participants could not be done due to shortage of time.

IV. The researcher collected data from only four rehabilitation centers, but samples should be collected from large area.

CHAPTER-IV RESULTS

The objective of the present study was to assess the effectiveness of spinal manipulation for the patients with PLID. Data were collected through face to face interview with participants using a pretested questionnaire NPRS and ODI questionnaire for pain and disability measurement. The data was analyzed by Microsoft Office Excel 2010 with SPSS 25 version software program. In this study the researcher used frequency table, figure and description of the variables to present the result of the study.

4.1 Socio demographic variable of the participants

Table 1: Frequency distribution of the participants by age

Age of the participants in years	Experimental group		Control group	
	Frequency		Frequency	
	N	%	N	%
Less than 24	1	7.7	0	0
25 - 34	1	7.7	2	15.4
35 - 44	3	23.1	4	30.8
45 - 54	5	38.5	5	38.5
55 and above	3	23.1	2	15.4
Total	13	100	13	100

Regarding the frequency distribution of the respondents by age, in the experimental group, it was found that 5 (38.5%) belonged to the 45–54 years age group. It was also found that 3 (23.1%) respondents were in the age group of 55 and above. The mean age of the experimental group was 44.08 and the standard deviation was 10.547. In the control group, 4 (30.8%) respondents belonged to the age group 35–44, and 5 (38.5%) respondents were in the age group 45–54. The mean age of the control group was 45.69 and the standard deviation was 11.912 (Table no: 1).

Table 2: Frequency distribution of the participants by gender

Gender of the participants	Experimental group		Control group	
	Frequency		Frequency	
	N	%	N	%
Male	9	69.2	7	53.8
Female	4	30.8	6	46.2
Total	13	100	14	100

Respectively in experimental group there were 9(69.2%) male and 4(30.8%) female. In control group 7(53.8 %) were male and 6(46.2 %) were female (Table no: 2)

Table 3: Frequency distribution of the participants by BMI

BMI of the participant	Experimental Group		Control Group	
	Frequency		Frequency	
	N	%	N	%
Less than 18.5	0	0	0	0
18.5 -24.9	3	23.1	5	38.5
25.0 - 29.9	8	61.5	7	53.8
Above 30.0	2	15.4	1	7.7
Total	13	100	13	100

The study revealed that in the experimental group, 3 (23.1%) participants had a BMI of 18.5–24.9. It was also found that 8 (61.5%) respondents were overweight (25.0–29.9) and 2 (15.4%) participants were obese. While in control group 5 (38.5%) participants had a BMI of 18.5–24.9%, It was also found that 7 (53.8%) respondents were overweight (25.0–29.9) and 1 (7.7%) participants were obese. The mean BMI in the experimental group was 27.108, with a standard deviation of 3.0090. On the other hand, the control group mean was 25.308 and standard deviation was 2.5287 (Table no: 3).

Table 4: Frequency distribution of the participants by living area

Living area of the participant	Experimental Group		Control Group	
	Frequency		Frequency	
	N	%	N	%
urban area	12	92.3	7	53.8
semi urban	1	7.7	1	7.7
Rural area	0	0	5	38.5
Total	13	100	13	100

In terms of the type of living area in the experimental group, the respondent belonged to an urban area 12 (92%), and 1 (7.7%) lived in a semi-urban area. Another control group of respondents belonged to urban areas 7 (53.8%), 1 (7.7%) lived in semi-urban areas, and 5 (38.5%) lived in rural areas (Table no: 4).

Table 5: Frequency distribution of the participants by Educational qualification

Educational qualification of the participants	Experimental group		Control group	
	Frequency		Frequency	
	N	%	N	%
S.S.C	2	15.4	5	38.5
H.S.C	2	15.4	5	38.5
Graduate or post graduate	9	69.2	3	23.1
Total	13	100	13	100

The study showed that educational qualification in the experimental group, S.S.C. 2 (15.4%) respondents, H.S.C. 2 (15.4%) respondents, and graduates or postgraduates was 9 (69.2%). Another control group, S.S.C., had 5 (38.5%) respondents, H.S.C. had 5 (38.5%), and graduates or postgraduates had 3 (23.1%) (Table no: 5)

Table 6: Frequency distribution of the participants by Profession

Profession of the participant	Experimental group		Control group	
	Frequency		Frequency	
Profession	N	%	N	%
Teacher	2	15.4	1	7.7
Service Holder	0	0	6	46.2
Business	4	30.8	2	15.4
House Wife	5	38.5	3	23.1
Others	2	15.4	1	7.7
Total	13	100.0	13	100

This study showed that the professions of the respondents in the experimental group were teacher 2 (15.4%), service holder 0 (0%), business 4 (30.8%), and housewife 5 (38.5%). while the control group teacher was 1 (7.7%), service holder 6 (46.2%), business 2 (15.4%), housewife 3 (23.1%), and others 1 (7.7%) (Table no: 6)

Table 7: Frequency distribution of the participants by monthly income

Monthly income of the participant	Experimental group		Control group	
	Frequency		Frequency	
Income Range	N	%	N	%
Less than Taka 5000	3	23.1	2	15.4
Taka 6000 - 20000	0	0	3	23.1
Taka 21000 - 35000	3	23.1	4	30.8
Taka 36000 - 50000	4	30.8	2	15.4
More than Taka 50000	3	23.1	2	15.4
Total	13	100.0	13	100.0

The study revealed that in the experimental group, 3 (23.1%) participants had monthly income of Lowest thru 5000. It was also found that 3 (23.1%) respondents were 21000 thru 35000 and 3 (23.1%) participants were 51000 thru Highest. While the control group had 2 (15.4%) participants had monthly income of Lowest thru 5000. It was also found that 4 (30.8%) respondents were 21000 thru 35000 and 2 (15.4%) participants were 51000 thru Highest. The mean monthly income in the experimental group was 36923.08, with a standard deviation of 23232.382. On the other hand, the control group mean was 28076.92and standard deviation was 19847.173 (table no: 7).

Table 8: Frequency distribution of the participants by marital status

Marital status of the participant	Experimental group		Control group	
	Frequency		Frequency	
Marital status	N	%	N	%
Married	11	84.6	11	84.6
Unmarried	2	15.4	1	7.7
widow	0	0	1	7.7
Total	13	100.0	13	100.0

In this study, around 13 people were involved in the experimental group. There were 84.6% married and 15.4% unmarried. On the other hand, 13 people were involved in the control group. 84.6% were married, 7.7% were unmarried, and 7.7% were widows (Table no: 8).

Table 9: Frequency distribution of the participants by duration of work

Duration work of the participants	Experimental group		Control group	
	Frequency		Frequency	
Duration of work	N	%	N	%
< 6 hours	2	15.4	2	15.4
6 hours -10 hours	7	53.8	6	46.2
> 10 hours	4	30.8	5	38.5
Total	13	100.0	13	100.0

The study revealed that in the experimental group, 2 (15.4%) participants had duration of work of < 6 hours. It was also found that 7 (53.8%) respondents were 6 hours -10 hours and 4 (30.8%) participants were > 10 hours. While the control group had 2 (15.4%) participants had duration of work of< 6 hours. It was also found that 6 (46.2%) respondents were 6 hours -10 hours and 5 (38.5%) participants were > 10 hours. The mean duration of work in the experimental group was 8.31, with a standard deviation of 3.225. On the other hand, the control group mean was 8.00 and standard deviation was 3.512 (table no. 9).

Table 10: Frequency distribution of the participants by duration of pain

Duration pain of the participants	Experimental group		Control group	
	Frequency		Frequency	
Duration of pain	N	%	N	%
Lowest thru1year	8	61.5	7	53.8
1 year thru 5 years	2	15.4	2	15.4
6 years thru 10 years	0	0	2	15.4
11 years thru 15 years	3	23.1	0	0
16 years thru highest	0	0	2	15.4
Total	13	100.0	13	100.0

The study revealed that in the experimental group, 3 (23.1%) participants had duration of pain of 11 years thru 15 years. It was also found that 2(15.4%) respondents were 1 year thru 5 years and 8 (61.5%) participants were lowest thru1year. In control group had 2 (15.4%) participants had duration of pain of 16 years thru highest. It was also found that 2(15.4%) respondents were 1 year thru 5 years and 7 (61.5%) participants were lowest thru1year. The mean duration of pain in the experimental group was 8.31, with a standard deviation of 3.225. In the control group mean was 8.00 and standard deviation was 3.512 (table no. 10).

Table 11: Frequency distribution of the participants by causes of pain

Causes of pain of the participant	Experimental group		Control group	
	Frequency		Frequency	
	N	%	N	%
Bad posture	3	23.1	5	38.5
Heavy weight lifting	8	61.5	7	53.8
Long journey	2	15.4	1	7.7
Total	13	100	13	100

In this study, around 13 people were involved in the experimental group: (bad posture) 3 (23.1%), (heavy weight lifting) 8 (61.5%), and (long journey) 2 (15.4%). On the other hand, 13 people involved in the control group had bad posture (53.8%), heavy weight lifting (75.3%), and long journeys (7.7%) (Table no: 11).

4.2 Between groups different of Numeric pain rating scale:

4.2.1 Pre-test NPRS between two groups

Table 12: Mean pre-test pain between two groups

Group of study	Sample (n)	Mean± SD
Experimental	13	6.77±1.481
Control	13	7.00±1.414

4.2.2 Independent sample T-test between groups for Pre-Test NPRS

Table 13: Independent sample t test on pre-test Numeric Pain rating Scale between two groups

Variables	t	df	95% CI		Sig value, (p)
			Lower	Upper	
NPRS	.406	24	-941	1.403	.688

Experimental group mean pre-test overall pain was 6.77±1.481 and in control group means pre-test overall NPRS was 7.00±1.414. Independent sample-t test has been determined to measure the differences of pre-test numeric pain rating scale between control and experimental groups. There was no significant differences found on pre-test numeric pain rating scale because (*t=0.406, df=24, p= 0.688*) (Table no: 12, 13).

4.2.3 Post-test Numeric Pain Rating Scale between two groups

Table 14: Mean post-test Numeric Pain Rating Scale between two groups

Group of study	Sample (n)	Mean± SD
Experimental	13	1.08±.760
Control	13	1.69±.947

Table15: Independent sample T-tests on post-test Numeric Pain rating Scale between two groups

Variables	t	df	95% CI		Sig value, (p)
			Lower	Upper	
NPRS	1.827	24	-.080	1.310	.080

Experimental group mean post-test overall pain was 1.08±.760 and in control group mean post-test overall NPRS was 1.69±.947. Independent sample-t test has been determined to measure the differences of post-test numeric pain rating scale between control and experimental groups. There was no significant differences found on post-test numeric pain rating scale because (*t=1.827, df=24, p= .080*) (Table no: 14, 15).

4.3 Within group different of Numeric Pain Rating Scale

4.3.1 Pre-test and post-test NPRS in Experimental group

Table: 16 (paired sample-t test) NPRS in experimental group

Variables	95% CI		t	df	Sig value, (p)
	Lower	Upper			
NPRS	4.790	6.595	13.741	12	.000

Level of significance (<0.05)

4.3.2 Pre-test and post-test NPRS within Control group

Table: 17 paired sample-t test in control group

Variables	95% Cl		t	df	Sig value, (p)
	Lower	Upper			
NPRS	4.372	6.243	12.360	12	.000

Paired sample t test has been determined to measure the changes in NPRS between pre-test and post-test of NPRS followed by manipulation intervention in experimental and control group. In experimental group (*t-value =13.741, df =12, p= .000*) and control group (*t-value =12.360, df = 12, p= .000*) that means the null hypothesis has been accepted and alternative hypothesis has been rejected. Manipulation intervention has no significant effect on pain for the patients with prolapse lumber intervertebral disc (Table no: 16, 17).

4.4 Between Groups different of Disability Statuses

4.4.1 Pre-test Oswestry Disability Index between two groups

Independent sample t test has been determine to measure the pre-test ODI score between experimental and control group followed by ergonomic intervention.

Table: 18 Mean pre-test ODI between two groups

Group of study	**Sample (n)**	**Mean± SD**
Experimental	13	31.74385±10.99293
Control	13	32.95769±14.23535

Table: 19Independent sample t- test between groups for Pre-Test ODI

Variables	**t**	**df**	**95% CI**		**Sig value, (p)**
			Lower	**Upper**	
ODI	1.283	24	-4.66983	20.01906	.212

Level of significance (<0.05)

Pre-test mean ODI in experimental group was 31.74385±10.99293 and control group was 32.95769±14.23535. Regarding the (*t-value =1.283, df =24 p= 0.212*). The test has no significant effect result according to statistical test revealing change between pre-test of control and experimental group in ODI score (Table no: 18, 19).

4.4.2 Post ODI between two groups

Table: 20 Mean Post ODI between two groups

Group of study	Sample (n)	Mean± SD
Experimental	13	12.2054±8.08325
Control	13	18.6662±7.15362

Table: 21Independent sample t -test between groups for Post-Test ODI

Variables	t	df	95% CI		Sig value, (p)
			Lower	Upper	
ODI	2.158	24	.28197	12.63957	.041*

Level of significance (<0.05)

Post-test mean ODI in experimental group was 12.2054±8.08325 and control group was 18.6662±7.15362. The test has a significant result according to statistical test revealing changes between post-test of control and experimental group in ODI score; *(t= 2.158,df = 24, p value = 0.041).* That means the null hypothesis has been rejected and alternative hypothesis has been accepted. Manipulation intervention has a significant (0.041) effect on disability remission for the prolapse lumber intervertebral disc patient treated by manipulation therapy (Table no: 20, 21).

4.4.3 Pre-test Post-test ODI within Experimental group and control groups

Table: 22Pre-test and post-test ODI in (Experimental group)-Paired Sample T-Test

Variables	95% CI		t	df	Sig value, (p)
	Lower	Upper			
ODI	25.10089	38.38681	10.412	12	.000

Level of significance (<0.05)

Table: 23Pre-test and post-test ODI in (Control group)-Paired Sample t- test

Variables	95% Cl		t	df	Sig value, (p)
	Lower	Upper			
ODI	24.35536	41.56003	8.348	12	.000

Level of significance (<0.05)

Paired sample t test has been determined to measure the changes in ODI score between pre-test and post-test of ODI followed by manipulation intervention in experimental group. In experimental group (*t-value =10.412, p= .000*) and control group (*t-value =8.348, p= .000*) that means the null hypothesis has been accepted and alternative hypothesis rejected. Manipulation intervention has no significant effect on reduction of disability score for the patients with prolapse lumber intervertebral disc (Table no: 22, 23).

CHAPTER- V DISSCUSSION

The purpose of the study was to assess the effectiveness of spinal manipulation for patients with prolapse lumber intervertebral disc. It was a randomized controlled trial carried out with a sample size of 28. The study participants were allocated into experimental and control group by randomization. The participants in experimental group received manipulation with conventional physiotherapy. On the other hand the control group received only conventional physiotherapy. Pre and post intervention data were collected from the both groups by interviewer administered questionnaire.

The experimental group had 38.5% participants aged 45-54, with 23.1% aged 55 and above. The mean age was 44.08; while the control group had 30.8% aged 35-44 and 38.5% aged 45-54, with a mean age of 45.69. (Table no. 1).

The study included 60 participants in total, ranging in age from 36 to 59 years old with a mean age of 47.8 ± 4.32 years. Men made up thirty-seven (61.7%) of the participants, while women made up twenty-three (37.3%) (Danazumi, M.S. et al., 2021).

Respectively, in the experimental group, there were 9 (69.2%) males and 4 (30.8%) females. In the control group, 7 (53.8%) were male and 6 (46.2%) were female (Table 2).

Colakovic & Avdic said that in their study found 45% (n=27) male and 55% (n=33) male. Among them, in experimental group18.33% (n=11) were male and 31.66% (n=19) were female, and in control group 26.66% (n=16) were male and 23.33% (n=14) were female (Colakovic & Avdic, 2013).

The study found that 23.1% of participants in the experimental group had a BMI between (18.5-24.9), with 61.5%) being overweight (25.0-29.9) and 15.4% being obese. While 38.5% of participants in the control group had a BMI between (18.5-24.9), while 53.8% were overweight (25.0-29.9) and 7.7% were obese. The experimental group had a mean BMI of 27.108, with a standard deviation of 3.0090, while the control group had a mean of 25.308 with a standard deviation of 2.5287 (table no: 3).

(Hossain, M.A. et al., 2021) said that the control group reported height and weight as 61.38± 5.205 inches and 63.97± 8.959 Kg; and experimental group reported 60.50 ± 5.160 inches and 64.06± 8.180 Kg respectively.

The mean duration of work in the experimental group was 8.31, with a standard deviation of 3.225. On the other hand, the control group mean was 8.00 and the standard deviation was 3.512. It was found that experimental group duration of work is more then control group (table no: 9).

The study found that experimental group 23.1% of participants experienced pain for 11-15 years, 15.4% experienced it for 1-5 years, and 61.5% experienced it for 1 year or less. The control group had participants with pain duration ranging from 11 yearto 16 years, while the majority (61.5%) experienced pain within 1 year. The experimental group experienced mean pain duration of 8.31 years, while the control group had a mean duration of pain 8.00 years (table no: 10).

The study found that experimental group mean pre-test overall pain was 6.77±1.481 and control group means pre-test overall NPRS was 7.00±1.414. Independent sample-t test has been determined to measure the differences of pre-test numeric pain rating scale between control and experimental groups. There was no significant differences found on pre-test numeric pain rating scale because the level of significant is (<0.05).

In experimental group mean post-test overall pain was 1.08±.760 and control group mean post-test overall NPRS was 1.69±.947and. Independent sample-t test has been determined to measure the differences of post-test numeric pain rating scale between control and experimental groups. There was no significant differences found on post-test numeric pain rating scale because the level of significant is (<0.05).

Paired sample t test has been determined to measure the changes in NPRS between pre-test and post-test of NPRS followed by manipulation intervention in experimental and control group. In experimental group (*t =13.741, df =12, p= .000)* and control group (*t =12.360, df = 12, p= .000)* that means the null hypothesis has been accepted and alternative hypothesis has been rejected. Manipulation intervention has no significant effect on pain for the patients with prolapse lumber intervertebral disc.

(Castro-Sanchez et al, 2016) Said that For measurement the pain intensity Numerical Pain Rate Scale (NPRS) was used. Patients undergoing spinal manipulation saw statistically, but not clinically, significantly larger decreases in terms of pain compared to those receiving functional method. Of ODI (post-treatment: 2.9; at 1 month: 1.4) and RMQ (standardized mean difference in score changes between groups at post-treatment: 0.1; at 1 month: 0.1).

While there was no improvement in pain, fear of movement, quality of life, isometric trunk flexor resistance, or spinal mobility, spinal manipulative therapy demonstrated a higher reduction in disability in individuals with chronic LBP when compared to functional method. There were no clinically significant short-term advantages of spinal manipulative therapy versus functional method therapy due to changes in impairment, which were, however, not clinically significant. Furthermore, neither treatment produced a clinically significant advantage because neither group saw a minimal clinically substantial difference as a result of the treatment (Castro-Sanchez et al, 2016).

The researcher found that Pre-test mean ODI in experimental group was 3174385±10.99293 and control group was 3295769±14.23535. The test result was *(t = 1.283, df = 24, p= 0.212)*. The test has no significant result according to statistical test revealing change between pre-test of control and experimental group in ODI score.

Post-test mean ODI in control group was 18.6662±7.15362 and experimental group was 12.2054±8.08325. The test has a significant result according to statistical test revealing changes between post-test of control and experimental group in ODI score ;*(t= 2.158,df = 24, p = 0.041)*. That means the null hypothesis has been rejected and alternative hypothesis has been accepted. Manipulation intervention has a significant on disability remission for the prolapse lumber intervertebral disc patient treated by manipulation therapy.

(Castro-Sanchez ,A. M. et al, 2016) Said that Additionally, ODI was seen. In favor of the spinal manipulative group, between-groups ODI effect sizes were large (SMD: 0.91) immediately following treatment and moderate (SMD: 0.62) during the 1-month follow-up. Researcher found that Regression analysis demonstrated that the ODI significantly improved over time in this regard (manipulative: F=104.66, df=1, p.001; functional: F=32.15, df=1, p.001). At all follow-up intervals, patients who underwent spinal manipulative therapy demonstrated a higher reduction in impairment (within-groups change score of 4.1) than patients who got the functional technique intervention (within-groups change score of 2.7).

Paired sample t test has been determined to measure the changes in ODI score between pre-test and post-test of ODI followed by manipulation intervention in experimental group. In experimental group (*t =10.412, df=12, p= .000)* and control group *(t =8.348, df=12, p= .000)* that means the null hypothesis has been accepted and

alternative hypothesis rejected. Manipulation intervention has no significant effect on reduction of disability score for the patients with prolapse lumber intervertebral disc.

(Hossain, M.A.,et al, 2020) said that the effectiveness of McKenzie Manipulative Therapy for LDH patients was examined in comparison to a group of traditional physiotherapy treatments. According to the statistical analysis, there was a statistically significant difference between the two groups for the ODI, with the McKenzie group scoring lower (F=107.1), suggesting that the McKenzie group intervention was more successful than the control group at reducing disability over the course of the twelve treatment sessions and follow-up at six months (F=287.5, P.001). All of the Dallas Pain Questionnaire's factors showed comparable results. Similar scales should be used, according to the evidence, to assess impairment states during physiotherapy therapies.

CHAPTER-VI CONCLUSION AND RECOMMENDATION

Conclusion:

One of the most prevalent conditions that cause leg pain and/or low back pain is prolapse lumber intervertebral disc (PLID).The prevalence of symptomatic prolapse lumber intervertebral disc ranges from 1%to 3% over the course of a lifetime. Despite the fact that 20% to 40% of imaging studies performed on asymptomatic people reveal PLID physically. Although it can also happen to teens and older persons, the age group with the highest occurrence is between 30 and 50 years old. (Raoof, Gharib and Adel, 2015)

Many therapeutic interventions are used for management of PLID but the results are conflicting. Spinal manipulations are commonly used for the treatment of PLID. The benefits and outcome of these interventions are conflicting; however, some researcher recommended its use in case of PLID. Reviews have generally found that manipulation is more effective compared the clinical effectiveness of manipulative therapy and conventional physiotherapy and existing studies have needed for discrepant result.

The study general objective was to assess the effectiveness of Spinal manipulation for the patients with prolapsed lumber intervertebral disc (PLID). The study was a randomized controlled trial, study area was Manikganj and Mirpur area. Study period was 1st July 2022 to 30th June 2023 and study population were PLID patients. Total sample size was 28.

The result of this study revealed that the spinal manipulation along with other conventional physiotherapy intervention has no effect on significant effect on pain but it showed significant effect on disability after twelve session of treatment for patient with prolapse lumber intervertebral disc. Considering the assessment, the pain in different positions reduced in both group while comparing to the initial assessment but, between group comparisons showed no significant difference. Initial and after twelve session of intervention, the between group comparisons found no significant change on Numeric pain rating scale but significant on Oswestry Disability index whereas, within group comparison found significant change on Numeric pain rating scale and Oswestry Disability index. Manipulation is a newly developed treatment approach. So, further study is needed to improve the evidence based clinical practice, as well as knowledge and skill.

Recommendation:

So, investigator recommended some further steps for future research which include; different musculoskeletal problems with different measurement tools need to be included in future studies, asses range of motion (ROM) and psychological state of the participants, similar studies with large sample size and follow up session need to be involved in future studies. Study regarding the specific Disc manipulation technique with specific doses, financial analysis need to be included. Further study should be done in more specific treatment or placebo treatment in control group compared with spinal manipulation approach to find out the effectiveness of spinal manipulation along with other conventional physiotherapy in the treatment of prolapse lumber intervertebral disc.

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Appendix – A

Ethical Review Board (ERB) Permission Letter

SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY
Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref : *Date :* .....

Ref.No: *SCMST/PT/ERB-2017-18/1-2023/34*

3rd January'2023

To

Md. Nuruzzaman

4th Professional B.Sc. in Physiotherapy

Saic College of Medical Science and Technology (SCMST)

Mirpur-14, Dhaka-1216.

Sub: Permission to collect data

Dear Nuruzzaman,

Ethical review board (ERB) of SCMST pleased to inform you that your proposal has been reviewed by ERB of SCMST and we are giving you the permission to conduct study entitled "Effectiveness of spinal manipulation along with other conventional physiotherapy for patients with prolapse lumbar intervertebral disc (PLID)" and for successful completion of this study you can start data collection from now.

Wishing you all the best.

Thanking You,

11.01.23

Head of ERB
Ethical Review Board
Saic College of Medical Science and Technology

11. 01. 23

Principal
Saic College of Medical Science and Technology
Mirpur-14, Dhaka-1216

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1216.Mobile:01936005804
E-mail: simt140@gmail.com, Web:www.saicmedical.edu.bd

Appendix - B

Permission letter for data collection

SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref : *Date :* .....

Ref.No: *SCMST/PT/ERB-2017-18/1-2023/34(a)*

15th January'2023

To

1. Coordinator, Academy of Physiotherapy Pain and Rehabilitation Centre, Mirpur-10, Dhaka-1216.
2. Outdoor Incharge, Saic Physiotherapy and Rehabilitation Services, Mirpur-14, Dhaka.
3. The Chairman, Unique Pain and Paralysis Centre, Mirpur-11, Dhaka.

Sub: Permission to collect data.

Dear Sir,

Ethical review board (ERB) of SCMST pleased to inform you that Md. Nuruzzaman of final year B.Sc. in Physiotherapy student from Saic College of Medical Science and Technology doing a thesis entitle of "Effectiveness of spinal manipulation along with other conventional physiotherapy for patients with prolapse lumbar intervertebral disc (PLID)" which has been reviewed by ERB of SCMST and we are giving permission to him to conduct this study. His data collection area is within Dhaka, so he wants to take data from your department.

I hope you will give kind permission to collect data to complete his study successfully and oblige thereby.

Thanking You,

15/01/23

Head of ERB
Ethical Review Board
Saic College of Medical Science and Technology

15.01.23

Principal
Saic College of Medical Science and Technology
Mirpur-14, Dhaka-1216

Allowed to collect data
12-02-'23

Allowed
15/01/2023

Physio Md. Shahidul Islam
BSPT, MSPT (DU)
Manual Therapy (India)
Consultant & Clinical Head
Saic Physiotherapy & Rehabilitation Services

ACADEMY OF PHYSIOTHERAPY

Approved by ERB
Allowed to collect data
15/01/23

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1206. Mobile: 01936005804
E-mail: simt140@gmail.com, Web:www.saicmedical.edu.bd

Appendix - C

Questionnaire Bangla and English

সম্মতিপএ

আসসালামআলাইকুম,

আমি মো: নূরূজ্জামান ৪র্থ বর্ষ ঢাকা বিশ্ববিদ্যালয়ের চিকিৎসা অনুষদের অধীনে সাইক কলেজ অফ মেডিকেল সাইন্স এন্ড টেকনোলজি (এসসিএমএসটি) এর বি.এস.সি.ইন ফিজিওথেরাপি বিভাগ এর একজন শিক্ষার্থী । অধ্যায়নের অংশ হিসেবে আমাকে একটি গবেষণা সম্পাদন করতে হবে এবং এটা অমার প্রাতিষ্ঠানিক কাজের একটা অংশ। এই গবেষণার জন্য আপনাকে কিছু প্রশ্ন করা হবে যা ১৫-২০ মিনিটের মত সময় লাগবে। নিম্মোক্ত তথ্যাদি পাঠ করার পর অপনাকে অধ্যায়নে অংশগ্রহনের জন্য অনুরোধ করা হলো।

আমার গবেষণার শিরোনাম **" প্রলাপ্সড লাম্বার ইন্টারভারটিব্রাল ডিস্ক রোগিদের ক্ষেএে গতানুগতিক ফিজিওথেরাপির সাথে ম্যানিপুলেশন এর কার্যকারীতা "**। এই গবেষণার মাধ্যমে আমি প্রলাপ্সড লাম্বার ইন্টারভারটিব্রাল ডিস্করোগের চিকিৎসার জন্য গতানুগতিক ফিজিওথেরাপির সঙ্গে ম্যানিপুলেশন এর কার্যকারিতা খুজে বের করার চেষ্ঠা করবো। আমার গবেষণার উদ্দেশ্য হলো থেরাপি দেবার পূর্বে ও পরে রোগিদের ব্যাথা , নড়াচড়া ও প্রতিবন্ধকতা পরিমাপ করা। আমি যদি আমার গবেষণাটি সার্থকভাবে সম্পূর্ণ করতে পারি তবে যেসব রোগিরা প্রলাস্পড লাম্বার ইন্টারভারটিব্রাল ডিস্করোগে ভুগছেন তারা উপকৃত হবেন এবং এটি হবে একটি পরিক্ষামূলক প্রমাণ।

আমার গবেষণা প্রকল্প বাস্তবায়ন করার জন্য, আমি আপনার কাছ থেকে কিছু তথ্য সংগ্রহ করব। এজন্য আপনার সাথে বেশ কয়েকবার দেখা করব। আমার গবেষণায় অংশগ্রহণে আপনার কোন ক্ষতি বা বিপদ হবে না। আপনি যে কোন সময় নিজেকে এ গবেষনা থেকে প্রত্যাহার করতে পারেন। এই গবেষণার প্রাপ্ত তথ্য সম্মূর্ণভাবে গোপণীয় থাকবে এবং অংশগ্রহনকারীর ব্যাক্তিগত তথ্য আপনার অনুমতি ব্যতিরেকে অন্য কোথাও প্রকাশ করা হবে না।

আপনার গবেষণা সম্পর্কে যদি কোন জিজ্ঞাসা থাকে তবে আপনি অনুগ্রহপুর্বক যোগাযোগ করতে পারেন আমার সুপারভাইজার সহকারী অধ্যাপক ডাঃ বাহাউদ্দিন বাইজীদ স্যার এর সাথে, ফিজিওথেরাপি বিভাগ সাইক কলেজ ওফ মেডিকেল সাইন্স এন্ড টেকনোলজি,মিরপুর ,ঢাকা ১২১৬ এ।

শুরু করার আগে আপনার কি কোন প্রশ্ন আছে?

আমি কি শুরু করতে পারি? ☐ হ্যা ☐ না

অংশগ্রহণকারীর স্বাক্ষর ও তারিখ .....

স্বাক্ষীর স্বাক্ষর ও তারিখ .....

গবেষকের স্বাক্ষর ও তারিখ.....

প্রশ্নাবলী (বাংলা)

এই প্রশ্নপএটি তৈরি করা হয়েছে কোমরব্যাথার রোগীদের ব্যাথা ও অক্ষমতা পরিমাপ করার জন্য।

পর্ব-ক: ব্যাক্তিগত তথ্যাবলি

কোড নং:

রোগির নাম : ফোন নম্বর:

ঠিকানা: তারিখ:

পর্ব-খ: আর্থ সামাজিক তথ্য

নং	প্রশ্ন	উত্তর
১	লিঙ্গ ঃ ১। পুরুষ ২। মহিলা ৩। অন্যান্য	
২	আপনার বয়স কত?	
৩	বি এম আই	
৪	বসবাসের স্থান : ১.শ্রহর ২.মফস্বল ৩.গ্রাম	
৫	শিক্ষাগত যোগ্যতা : ১.প্রাতিষ্ঠানিক শিক্ষা নেই ২. প্রাইমারি ৩.মাধ্যমিক ৪. উচ্চ মাধ্যমিক ৫..স্নাতক অথবা স্নাতকোওর	

৬	পেশা : ১. কৃশক ২. দিন মজুর ৩. শিক্ষক ৪. চাকরিজীবি ৫.ব্যবসায়ী ৬. গৃহিণী ৭.অন্যান	
৭	মাসিক আয়	
৮	বৈবাহিক অবস্থা ১. বিবাহিত ২. অবিবাহিত ৩. বিবাহ বিচ্ছেদ ৪. বিধবা	
৯	সর্বমোট কর্মঘন্টা	
১০	ব্যথার স্থায়িত্ব	
১১	ব্যথার কারণ: ১.আঘাতের কারণে ২.খারাপ ভঙ্গিমার কারণে ৩.ভারি ওজন উত্তোলন ৪.দীর্ঘ যাএা ৫.অন্যান্য	

পর্ব-গঃ ব্যাথা বিষয়ক প্রশ্নাবলী

প্রশ্নাবলীর এই অংশ রোগির দ্বারা পূরণ করা হবে। নিম্নলিখিত প্রশ্নে আপনার ব্যাথার পরিমান লাইনে গোল দাগ দিয়ে চিহ্নিত করুন। এই মুহূর্তে আপনার কোমর ব্যাথার তীব্রতা কতটুকু ?

এন পি আর এস	চিকিৎসার পূর্বে	চিকিৎসার পরে	ফলাফল
	☐	☐	☐

অস্ওয়েস্ট্রি প্রতিবন্ধিতা সূচক (বিবৃতি ২.১ এ)

আপনার পিঠের / পায়ের বিড়ম্বনা কিভাবে প্রতিদিনের জীবন পরিচালনা করতে আপনার সামর্থ্যকে প্রভাবিত করে তা জানার জন্য এই প্রশ্নটি পরিকল্পনা করা হয়।

অনুগ্রহপূর্বক সবগুলো প্রশ্নের উওর দিন। প্রতিটি অংশে শুধুমাএ একটি বাক্স/উওর চিহ্নিত করুন যা আজ আপনার অবস্থাকে সর্বপেক্ষা কাছাকাছি বর্ণনা করে

নং	প্রশ্ন	চিকিৎসার পূর্বে	চিকিৎসার পরে	ফলাফল
০১	**অংশ ১- ব্যথার তীব্রতা** ☐ এ মুহূর্তে আমার কোন ব্যথা নেই। [০] ☐ এ মুহূর্তে ব্যথা অত্যত্ব কম। [১] ☐ এ মুহূর্তে ব্যথা মুটামুটি। [২] ☐ এ মুহূর্তে ব্যথা যথেষ্ঠ পরিমাণে তীব্র। [৩] ☐ এ মুহূর্তে ব্যথা অত্যন্ত তীব্র । [৪] ☐ এ মুহূর্তে ব্যথা এমন যে তা কল্পনার সর্বোচ্চ খারাপ। [৫]			
০২	**অংশ ২- ব্রক্তিগত যত্ন ধৌতকরণ, পোশাক পরিধান ইত্যাদি)** ☐ কোন ধরণের ব্যথা ছাড়াই আমি আমার নিজের স্বাভাবিক যত্ন নিতে পারি। [০] ☐ আমি আমার নিজের যত্ন নিতে পারি, কিন্তু এটি অত্যত্ব ব্যাথাদায়ক। [১] ☐ আমার নিজের যত্ন নেওয়া ব্যথাদায়ক এবং এজন্যে আমি ধীর এবং সতর্কতা অবলম্বন করি।[২]			

	☐ আমার কিছু সাহায্যের দরকার হয়, কিন্তু আমি আমার অধিকাংশ ব্যক্তিগত কাজ নিজেই স্পাদন করতে পারি। [৩] ☐ প্রতিদিন আমার নিজের অধিকাংশ কাজের জন্য অন্যের সাহায্য প্রয়োজন হয়। [৪] ☐ আমি আমার পোশাক -পরিচ্ছদ পরিধান করতে পারি না, ধৌতকরণ করা যথেষ্ঠ কষ্ঠদায়ক এবং আমি বিছানাতেই থাকি। [৫]			
০৩	**অংশ ৩- উত্তোলন** ☐ আমি কোন বাড়তি ব্যথা ছাড়াই ভারি ওজন উত্তোলন করতে পারি। [০] ☐ আমি ভারি ওজন উত্তোলন করতে পারি, কিন্তু এটা বাড়তি ব্যথা সৃষ্টি করে। [১] ☐ ব্যথার কারণে আমি মেঝে থেকে ভারী ওজন উত্তোলনে ব্যথার সম্মুখীন হই, কিন্তু এগুলো যদি সুবিধা জনক অবস্থানে যেমন, টেবিলে রাখা হয়, তাহলে আমি তা উত্তোলন করতে পারি ।[২] ☐ ব্যথা অমাকে ভারি ওজন উত্তোলনে বাধা সৃষ্টি করে, কিন্তু এগুলো যদি সুবিধা জনক অবস্থানে রাখা হয় তাহলে আমি হালকা থেকে মাঝারি ধরণের ওজন উত্তোলন করতে পারি। [৩] ☐ আমি কেবল অত্যত্ব হালকা ওজন উত্তোলন করতে পারি। [৪] ☐ আমি একেবারেই কোনকিছু উত্তোলন বা বহন করতে পারি না। [৫]			
০৪	**অংশ - ৪ হাটা-চলা** ☐ ব্যথার কারণে আমার যে কোন দূরত্বে হাটতে সমস্যা হয় না। [০] ☐ ব্যথার কারণে আমি ১ মাইলের অধিক হাটতে পারি না। [১] ☐ ব্যথার কারণে আমি ১ মাইলের চার ভাগের এক ভাগের অধিক হাটতে পারি না। [২] ☐ ব্যথার কারণে আমি ১০০ গজের অধিক হাটতে পারি না। [৩] ☐ আমি কেবল লাঠি বা ক্রাচ্ ব্যবহার করে হাটতে পারি। [৪] ☐ অধিকাংশ সময়েই আমি বিছানায় থাকি এবং আমাকে হামাগুড়ি দিয়ে টয়লেটে যেতে হয়। [৫]			

০৫	**অংশ ৫- বসে থাকা** ☐ আমি যে কোন চেয়ারে যতক্ষণ খুশি ততক্ষণ বসতে পারি। [০] ☐ আমি আমার পছন্দের চেয়ারে যতক্ষণ খুশি ততক্ষণ বসতে পারি। [১] ☐ ব্যথার জন্য আমি ১ ঘন্টার বেশি বসে থাকতে পারি না। [২] ☐ ব্যথার জন্য আমি ১/২ ঘন্টার বেশি বসে থাকতে পারি না। [৩] ☐ ব্যথার জন্য আমি ১০ মিনিটের বেশি বসে থাকতে পারি না। [৪] ☐ ব্যথার কারণে আমি মোটেই বসে থাকতে পারি না। [৫]			
০৬	**অংশ ৬- দাঁড়ানো** ☐ আমি কোন বাড়তি ব্যাথা ছাড়া যতক্ষণ খুশি দাড়িয়ে থাকতে পারি। [০] ☐ আমি যতক্ষণ খুশি দাড়িয়ে থাকতে পারি, কিন্তু এটি আমার বাড়তি ব্যথার সৃষ্টি করে। [১] ☐ ব্যথার জন্য আমি ১ ঘন্টার বেশি দাড়িয়ে থাকতে পারি না। [২] ☐ ব্যথার জন্য আমি ১/২ ঘন্টার বেশি দাড়িয়ে থাকতে পারি না। [৩] ☐ ব্যথার জন্য আমি ১০ মিনিটের বেশি দাড়িয়ে থাকতে পারি না। [৪] ☐ ব্যথার জন্য আমি একেবারেই দাড়িয়ে থাকতে পারি না। [৫			
০৭	**অংশ ৭- ঘুমানো** ☐ ব্যথার কারণে আমার ঘুম কখনই ব্যহত হয় না। [০] ☐ ব্যথার কারণে আমার ঘুম মাঝে মাঝে ব্যহত হয়। [১] ☐ ব্যথার কারণে আমার ঘুম ৬ ঘন্টারও কম হয়। [২] ☐ ব্যথার কারণে আমার ঘুম ৪ ঘন্টারও কম হয়। [৩] ☐ ব্যথার কারণে আমার ঘুম ২ ঘন্টারও কম হয়। [৪] ☐ ব্যথার কারণে আমি মোটেই ঘুমাতে পারি না। [৫]			

০৮	**অংশ ৮- যৌন জীবন (যদি প্রযোজ্য হয়)** ☐ আমার যৌন জীবন স্বাভাবিক এবং কোন অতিরিক্ত ব্যথার সৃষ্টি করে না। [০] ☐ আমার যৌন জীবন স্বাভাবিক , কিন্তু এতে কিছুটা অতিরিক্ত ব্যথার সৃষ্টি হয়। [১] ☐ আমার যৌন জীবন প্রায় স্বাভাবিক , কিন্তু তা অত্যন্ত ব্যথাদায়ক। [২] ☐ আমার যৌন জীবন ব্যথার কারণে তীব্রভাবে সীমাবদ্ধ। [৩] ☐ আমার যৌন জীবন ব্যথার কারণে প্রায়ই অনুপস্থিত। [৪] ☐ ব্যথার কারণে আমি আদৌ কোন যৌন জীবন যাপন করতে পারি না। [৫]			
০৯	**অংশ ৯- সামাজিক জীবন** ☐ আমার সামাজিক জীবন স্বাভাবিক এবং তা কোন অতিরিক্ত ব্যথার সৃষ্টি করে না। [০] ☐ আমার সামাজিক জীবন স্বাভাবিক, কিন্তু ব্যথার পরিমাণ বাড়ায়। [১] ☐ আমার অধিক শক্তি প্রয়োজনীয় আগ্রহসমূহকে (যেমন, খেলাধুলা) সীমাবদ্ধ করা ছাড়া আমার সামাজিক জীবনে ব্যথার তেমন কোন তাৎপর্যপূর্ণ প্রভাব নেই। [২] ☐ ব্যথা আমার সামাজিক জীবনকে সীমাবদ্ধ করেছে এবং আমি প্রায়শই বাইরে যাই না। [৩] ☐ ব্যথা আমার সামাজিক জীবনকে গৃহে সীমাবদ্ধ করেছে। [৪] ☐ ব্যথার কারণে আমার কোন সামাজিক জীবন নেই। [৫]			
১০	**অংশ ১০- ভ্রমণ /ঘুরে বেড়ানো** ☐ কোন ধরণের ব্যথা ছাড়াই আমি যে কোন স্থানে ভ্রমন করতে পারি। [০] ☐ আমি যে কোন স্থানে ভ্রমণ করতে পারি, কিন্তু এটা অতিরিক্ত ব্যথার সৃষ্টি করে। [১] ☐ ব্যথার অবস্থা খারাপ থাকে, কিন্তু আমি ২ ঘন্টা পর্যন্ত ভ্রমণ করতে পারি। [২]			

	☐ ব্যথা আমার ভ্রমণকে ১ ঘন্টার কম সময়ের মধ্যে সীমাবদ্ধ করে। [৩] ☐ ব্যথা আমাকে ৩০ মিনিটের নিচের অল্প প্রয়োজনীয় ভ্রমণসমূহে সীমাবদ্ধ করে ॥৪ ☐ ব্যথা আমাকে চিকিৎসা গ্রহন ব্যতীত যে কোন ধরণের ভ্রমণ প্রতিরোধ করে। [৫]			

ফল :

আপনার অসওয়েস্ট্রি প্রতিবন্ধিতা সূচক ঃ

হিসাব : ...../..... শতকরা হারে : হিসাব × ১০০%

চিকিৎসার আগে	চিকিৎসার পরে	ফলাফল
☐ %	☐ %	☐ %

Consent Form

Assalamualaikum ,

I am Md Nuruzzaman, the 4th year B.Sc(Hon's) in Physiotherapy student of Saic College of Medical Science and Technology (SCMST) under Medicine faculty of University of Dhaka. To obtain my Bachelor degree, I shall have to conduct a research and it is a part of my study. The participants are requested to participate in the study after reading the following. It is about 15-20 minutes. My research title is **"Effectiveness of Spinal Manipulation for Patient With Prolapse Lumber Intervertebral Disc (PLID): A Randomized Control Trail"** Through this study I Will find the effectiveness of Spinal Manipulation along With other conventional physiotherapy for the treatment of Prolapse Lumber Intervertebral Disc. If I can complete the study successfully, the patient may get benefits of improve musculoskeletal physiotherapy service. To implement my research project, I need to collect data from the musculoskeletal patients. Therefore, you could be one of my valuable subjects for my study.

I am committed that the study will not pose any harm or risk to you. You have the absolute right to withdraw or discontinue at any time without any hesitation or risk. I will keep all the information confidential which I obtain from you and personal identification of the participant would not be published anywhere. If you have any query about the study, you may contact with me or my supervisor Associate professor Dr.Bahauddin Bayzid course coordinator Saic College of Medical Science and Technology, Mirpur,14.

Do you have any questions before I start?

So, may I have your consent to proceed with the interview?

Yes..... No…….

Signature of the participant & Date……..

Signature of the researcher & Date……..

Signature of the witness & Date……

Questionnaire (English)

This questionnaire is developed to measure pain and disability of Prolapse Lumber Intervertebral Disc (PLID) Patients.

Section –A: Personal Information

Code no: | | |

Patient's Name: **Phone no:**

Address: **Date:**

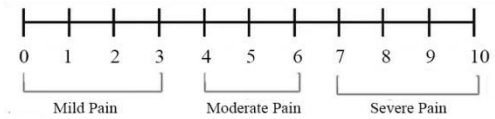
Section-B: Socio-Demographic Information

No.	Questionnaire	Answer
1	Gender: 1.Male 2.Female 3.Other	
2	How old are you?	
3	BMI	
4	Living Area: 1.Urban 2.Semi Urban 2.Rural	
5	Educational Qualification: 1. Illiterate 2. Primary 3. S.S.C 4. H.S.C 5. Graduate or Post Graduate	

6	Profession : 1. Farmer 2. Day Labor 3. Teacher 4. Service Holder 5.Business 6. House Wife 7. Others	
7	Monthly Income	
8	Marital Status 1.Married 2.Unmarried 3.Divorce 4.Widow	
9	Duration of Work	
10	Duration of Pain	
11	Causes of pain 1.Injury 2.Bad Posture 3.heavy weight lifting 4.Long Journey 5.Others	

Section-C: Pain Related Question)

This Part of Questionnaire will filed by the patient. Mark out your pain intensity with circle on the question written below. How severe is your back pain now?

NPRS	Pre Test	Post Test	Outcome
	☐	☐	☐

Oswestry Low Back Pain Disability Questionnaire

Sources: Fairbank JCT & Pynsent, PB (2000) The oswestry Disability Index. Spine, 25(22):2940-2953.

Davidson M & Keating J (2001) A comparison of five low back disability questionnaires: reliability and responsiveness. Physical Therapy 2002;82;8-24.

The Oswestry Disability Index (also known as the Oswestry Low Back Pain Disability Questionnaire) is an extremely important tool that researchers and disability evaluators use to measure a patient's permanent functional disability. The test is considered the 'gold standard' of low back functional outcome tools[1]

Interpretation:

Simply add up your points for each section and plug it in to the following formula in order to calculate your level of disability: **point total /50×100= % disability (aka: 'point total' divided by '50' multiply by'100 = percent disability)**

Example: on my last ODI scored a 18. So, 18/50 × 100= 36% disability:

ODI Scoring:

0% to 20%: minimal disability:	The patient can cope with minimal activities. Usually no treatment is indicated apart from advice on lifting sitting sitting and exercise.
21%-40%:moderate disability:	The patient experiences more pain difficulty with sitting, lifting and standing. Travel and social life are more difficult and they may be disabled from work. Personal care, sexual activity and sleeping are not grossly affected and the patient can usually be managed by conservative means.
41%-60%:severe disability	Pain remains the main problem in this group but activities of daily living are affected. These patients require a detailed investigation.
61%-80%: crippled :	Back pain images on all aspects of patients life. Positive intervention is required.
81%-100%:	These patients are either bed –bound or exaggerating their symptoms.

Oswestry Low Back Pain Disability Questionnaire

Instructions

This questionnaire has been designed to give us information as to how your back or leg pain is affecting your ability to manage in everyday life. Please answer by checking ONE box in each section for the statement which best applies to you. We realize you may consider that two or more statements in any one section apply but please just shade out the spot that indicates the statement which most clearly describe your problem.

No	Question	Pre-Test	Post-Test	Outcome
01	**Section 1: Pain Intensity** ☐ I have no pain at the moment.[0 points] ☐ The pain is very mild at the moment.[1 points] ☐ The pain is moderate at the moment.[2 points] ☐ The pain is fairly severe at the moment. [3 points] ☐The pain is very severe at the moment. [4 points] ☐The pain is worst imaginable at the moment. [5 points]			
02	**Section 2: Personal Care** ☐ I can look after myself normally without causing extra pain. [0 points] ☐ I can look after myself normally but it causes extra pain. [1 points] ☐ It is painful to look after myself and I am slow and careful. [2 points] ☐ I need some help but manage most of my personal care.[3 points] ☐ I need help every day in most aspects of self care. [4 points] ☐ I do not get dressed wash with difficulty and stay in bed. [5 points]			

03	**Section 3: Lifting** ☐ I can lift heavy weights without extra pain. [0 points] ☐ I can lift heavy weights but it gives extra pain. [1 points] ☐ Pain prevents me from lifting heavy weights off the floor but I can manage if they are Conveniently positioned for example on a table. [2 points] ☐ Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned. [3 points] ☐ I can lift very light weights. [4 points] ☐ I can not lift or carry anything at all. [5 points]			
04	**Section 4- Walking *** ☐ Pain does not prevent me walking my distance. [0 points] ☐ Pain prevents me from walking more than 2 kilometers. [1 points] ☐ Pain prevents me from walking more than 1 kilometers . [2 points] ☐ Pain prevents me from walking more than 500 meters. [3 points] ☐ I can walk using a stick or crutches. [4 points] ☐ I am in bed most of the time. [5 points]			

05	**Section 5- Sitting** ☐ I can sit in any chair as long as like. [0 points] ☐ I can only sit in my favorite chair as long as I like. [1 points] ☐ Pain prevents me from sitting more than 1 hour. [2 points] ☐ Pain prevents me from sitting more than 30 minutes. [3 points] ☐ Pain prevents me from sitting more than 10 minutes. [4 points] ☐ Pain prevents me from sitting at all. [5 points]			
06	**Section 6 – Standing** ☐ I can stand as long as I Want without extra pain. [0 points] ☐ I can stand as long as I want but it gives me extra pain. [1 points] ☐ Pain prevents me from standing more than 1 hours.[2 points] ☐ Pain prevents me from standing more than 30 minutes. [3 points] ☐ Pain prevents me from standing more than 10 minutes. [4 points] ☐ Pain prevents me from standing at all. [5 points]			
07	**Section 7 – Sleeping** ☐ My sleep is never disturbed by pain. [0 points] ☐ My sleep is occasionally disturbed by pain. [1 points] ☐ Because of pain I have less than 6 hours sleep. [2 points]			

	☐ Because of pain I have less than 4 hours sleep. [3 points] ☐ Because of pain I have less than 2 hours sleep. [4 points] ☐ Pain prevents me from sleeping at all. [5 ponts]			
08	**Section 8 – Sex life (if applicable)** ☐ My sex life is normal and causes no extra pain. [points 0] ☐ My sex life is normal but causes some extra pain. [1 points] ☐ My sex life is nearly normal but is very painful. [2 points] ☐ My sex life severely restricted by pain. [3 points] ☐ My sex life is nearly absent because of pain [4 points] ☐ Pain prevents any sex life at all. [5 points]			
09	**Section 9- Social life** ☐ My social life is normal and gives me no extra pain. [0 points] ☐ My social life is normal but increases the degree of pain. [1 points] ☐ Pain has no significant on my social life apart from limiting my more energetic interests eg. sports [2 points] ☐ Pain has restricted my social life and I do not go out as often. [3 points] ☐ Pain restricted my social life to my home. [4 points] ☐ I have no social life because of pain. [5 points]			

10	**Section 10 –Travelling** ☐ I can travel anywhere without pain. [0 points] ☐ I can travel anywhere but it gives me extra pain. [1 points] ☐ Pain is bed but I manage journeys over two hours. [2 points] ☐ Pain restricts me to journeys of less than one hours. [3 points] ☐ Pain restricts me to short necessary journeys under 30 minutes. [4 points] ☐ Pain prevents me from travelling except to receive treatment. [5 points]			

Result:

Your ODI Index:

Score: ...../..... Transform to percentage: Score × 100 %

Before Treatment	After Treatment	Outcome
☐ %	☐ %	☐ %

Appendix - D

Gant Chart

Activities/ Month	July 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23
Proposal Presentation												
Introduction												
Literature Review												
Methodology												
Data Collection												
Data Analysis												
Result												
1st Progress Presentation												
Discussion												
Conclusion And Recommendation												
2nd Progress Presentation												
Communication With Supervisor												
Final Submission												