Faculty of Medicine

University of Dhaka

Effectiveness of McKenzie treatment for Prolapsed Lumber Intervertebral Disc (PLID) patients to musculoskeletal unit at CRP: A Randomized Controlled Trail

By

Mohammed Anwar Hossain
Master of Science in Physiotherapy
Registration No: 81
Roll No: 202

Department of Physiotherapy

Bangladesh Health Professions Institute (BHPI)

May 2016

Faculty of Medicine

University of Dhaka

Effectiveness of McKenzie treatment for Prolapsed Lumber Intervertebral Disc (PLID) patients to musculoskeletal unit at CRP: A Randomized Controlled Trail

By

Mohammed Anwar Hossain
Master of Science in Physiotherapy
Registration No: 81
Roll No: 202

Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Physiotherapy

Department of Physiotherapy

Bangladesh Health Professions Institute (BHPI)

May 2016

We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for acceptance of this thesis entitled, "**Effectiveness of McKenzie treatment for Prolapsed Lumber Intervertebral Disc (PLID) patients to musculoskeletal unit at CRP: A Randomized Controlled Trail",** submitted by Mohammed Anwar Hossain, for the partial fulfillment of the requirements for the degree of Master of Science in Physiotherapy.

Professor Dr. Md. Forhad Hossain
Department of Statistics
Jahangirnagar University

Nasirul Islam
Associate Professor and Acting Principal,
BHPI

Professor Dr. K.M. Shahidul Islam
Professor and Head
Department of Microbiology
Dhaka Medical College

Firoz Ahmed Mamin
Assistant Professor of Physiotherapy,
BHPI.

Date of approval: 2nd July, 2016

Declaration Form

- This work has not previously been accepted in substance for any degree and is not concurrently submitted in candidature for any degree.

- This dissertation is being submitted in partial fulfillment of the requirements for the degree of MSc in Physiotherapy.

- This dissertation is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references.

  A Bibliography is appended.

- 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 and it will be duly acknowledged as undergraduate thesis.

Signature:

Name: Mohammad Anwar Hossain

Date:

Acknowledgement

I am immensely grateful to my supervisor, **Professor Dr. Md. Forhad Hossain,** Department of statistics, Jahangirnagar University; for his guidance, cordial cooperation, support and encouragement during the entire period of the study.

I would like to express my deepest gratitude to the Bangladesh Health Professions Institute, to give me the opportunity to perform this study. I would like to thank my honorable teacher **Firoz Ahmed Mamin**, Assistant Professor of Master of Science in Physiotherapy program, BHPI and **S.M. Ferdous Alam**, Assistant Professor, Department of Rehabilitation Science and other board members for their support and guidance. I also pay my thanks to **Salma Jahan**, Clinical Physiotherapist, and Department of Physiotherapy for helping me at the data analysis section. I would pay to special gratitude to the staffs of the Musculoskeletal Unit of CRP Savar & Mirpur for helping me in data collection.

I would like to express my gratitude to men and women with PLID, who gave me their valuable time and provided the information, related to my study and helped me to make my work successful. I would like to express my heartiest thanks to **Md. Nazmul Hassan**, Intern Physiotherapist for continuous support and assistance during this research study.

Table of contents

List of Tables

List of figures

List of Abbreviations or Symbols

ADL	Activity of Daily Living
BHPI	Bangladesh Health Professions Institute.
CRP	Centre for the Rehabilitation of the Paralysed
PT	Physiotherapy
SPSS	Statistical Package for the Social Sciences
USA	United States of America
WHO	World Health Organization
MDT	Mechanical diagnosis and treatment
LBP	Low Back Pain
PLID	Prolapsed lumber intervertebral disc
BMRC	Bangladesh Medical Research Association
ODI	Oswestry disability index
IBR	Institutional Review Board
LRS	Lumbar radicular syndrome

ABSTRACT

Low back pain as well as Lumbar disc herniation became more common determination for patients in search of primary care services confronting outpatient physical therapists. McKenzie method is commonly used for treating low back pain as well as PLID.

To explore the effectiveness of McKenzie Physiotherapy treatment over basic physiotherapy treatment along with medication (painkiller) for the PLID patients, a study was conducted with a design of randomized control trial. Total 20 samples were selected from hospital patient for this study attending Centre for the rehabilitation of the paralysed (CRP) in between February-June, 2016 from musculoskeletal unit at Savar and Mirpur. Data was collected by using four 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 16.0 which focused through column, pie chart, line diagram and paired t-test and also unrelated t-test of the parametric test.

A significant improvement of spinal motion, reduction of pain in different position and disability were demonstrated in both groups but the results show the better improvement among most of the indicators in the McKenzie treatment group ($p < 0.05$ or higher than $p<0.05$) in final assessment and two months after follow up which indicate that the effectiveness of McKenzie treatment is superior to the basic physiotherapy with medicine for PLID patients. So, McKenzie treatment approach may be considered as beneficial for PLID patients. Therefore, Physiotherapist may suggest applying this intervention for PLID patients to improve their condition.

Key words: **PLID, McKenzie approach, Basic Physiotherapy**

CHAPTER-I INTRODUCTION

1.1 Background

More than 80% of the population affected by low back pain (LBP) in some time in their life and similar statistics also are found in United Kingdom (UK), United State of America (USA), Australia, Canada and also other developed countries (Freburger, et al., 2009 and An, et al., 2003). The internationally prevalence of low back pain varies, but estimations for lifetime prevalence of this condition have been reported between 49 to 80% (Maniadakis and Gray, 2000). The incidence of sciatica due to lumbar disc prolapsed is about 5 per 1000 persons in a year in the Netherlands (Luijsterbur, et al., 2007). Thirty one studies have reported the prevalence of back pain in Indian population among the various occupations that has been found to vary from 6.2% (in general population) to 92% (in construction workers) (Bindra, et al., 2015).

Lumbar disc herniation is defined as the localized displacement or disruption of disc material beyond the margins of the intervertebral disc space, is considered to be the most common cause of lumbosacral radiculopathy (Hahne, et al., 2010). Lumbar radicular syndrome (LRS) is based on a lumbar disc prolapse (Erdogmus, et al., 2007). LRS is characterized by irradiating pain over the area of the buttocks or legs served by 1 or more spinal nerve roots of the lumbar vertebrae or sacrum, combined with neurologic deficits associated with nerve root compression. LRS has a major effect on healthcare utilization and costs (Erdogmus, et al., 2007 and Luijsterbur, et al., 2007). Low back pain is the second most common determination for patients in search of primary care services (Werneke, et al., 2010). Lumbar disc herniation is one of the most common problems confronting outpatient physical therapists. More than one quarter of outpatient physical therapy referrals and almost one half of outpatient physical therapy

visits are for treatment of LBP (Mielenz, et al., 1997). Herniated lumbar disc is the most common specific cause of low back pain. Young and middle-aged individuals are the most frequent sufferers of this condition (Sedighi and Haghnegahdar, 2014).

In the Netherlands (16 million inhabitants), the annual cost of direct and indirect medical care for herniated lumbar discs was U.S. $ 1.6 billion in the mid-1990s; and in the United Kingdom, those 1% of all patients with low back pain who undergo surgery account for approximately 30% of healthcare costs for spinal disorders (Erdogmus, et al., 2007). Estimates on the incidence of lumbar disc herniation operations ranging from 25 to 40 operations per 100,000 inhabitants in Europe to 70 in the United States, respectively (Celal, et al., 2007). According to US National Center for Health Statistics reports, 14% of new patients that went to a hospital for treatment were patients with low back pain, which represents 13 million people (Njomo, 2011). About 3% of all patients discharged from hospitals have symptomatic low back pain. The expense of treating low back pain is higher than $100 billion each year (Peng, 2013). Chronic LBP is the higher significant financial burden more than 10 billion (US dollars) per annum in the worldwide (Werneke, et al., 2010). In the Netherlands annually between 60,000 and 75,000 new cases of LSRS are diagnosed by the General Practitioner (GP). The presumed direct medical costs of treatment of LSRS are € 133 million each year. Most of these costs are attributable to in-hospital treatment; only a small portion is incurred by GP's or physiotherapists (€ 3.2 million) (Peul, et al., 2005).

In 2007, Bartynski and Petropoulou mentioned in their study that lower back region pain is created due to disc degeneration, spondylolisthesis, lumbar stenosis, epidural hematoma and other causes. The most common cause of radicular pain is due to sciatica of a lumbar intervertebral disc herniation in adult working populations (Atlas, et al., 2005). Rundell, et al. (2009) mentioned in their study that disc herniation is one of the

most costly and complex health conditions affecting the developed countries. The natural course of sciatica due to herniated discs and there is evidence that many herniation are physiologically reabsorbed after several months. However, because of a large proportion of patients with herniated discs suffer from severe pain and knowledge disagreeable sensory and motor disturbances, health care systems often arbitrate to relieve these symptoms (Albert and Mannicle, 2012). All of health care professionals felt great challenges to dealing with disc herniation in lumber region in their practice (Mikhail, et al., 2005). It is extensively established that herniation is a multidimensional disorder that is dependent on physical factors, lifestyle and psychosocial factors (O'Sullivan, et al., 2011).

The management of PLID is difficult (Todd, 2010). The conservative treatment approach is the best treatment approach for PLID patients' management (Siddiq, et al., 2011). The conservative approach consists of medication, rest and physiotherapy. Bed rest is the oldest and simplest of conservative treatments for lumbar disc herniation (Brukner, 2012). Conservative care that includes a large variety of treatments such as patients education, analgesics, rest, exercises, traction, manipulation, mobilization, epidural injections, and passive conservative treatments for sciatica, which includes epidural steroids, manipulation, traction, and NSAIDs. The physiotherapy intervention plays important roles for disc herniation patient (Albert and Mannicle, 2012). The Physiotherapy treatment is included physical therapy, back exercises, bed rest, spinal manipulation, narcotic analgesics, and epidural steroids. The manual therapy or exercise therapy is the safe and cost effective method for patient (Atlas, 2001).

According to many studies the first step of the physiotherapy treatment pyramid is education of the patient (Menon, 2009). The patients must be accomplished about proper way to do different activities and lifestyles habits. Adequate information should

be provided about course of the pain, how to cope the pain, how to enhance the activities and lifestyle to return to normal activity rapidly and how to reduce the frequency etc. (Turk and Burwinkle, 2006). Exercise remedies for mechanical low back pain to progress alignment and posture. One is that exercises are more effective (Stein and Hughes, 2016).

A reducible derangement typically demonstrates one direction of repeated movement (directional preference) which decreases or centralizes (moves towards the midline) referred symptoms, or abolishes midline symptoms (Long, et al., 2004), and the opposite repeated movement which produces or increases or peripheralizes (moves more distally) the symptoms. In the lumbar spine, movements typically include flexion in lying or standing; extension in lying or standing; and lateral movements of either side gliding or rotation. They are standard movements in the MDT system and are described fully in the text books (McKenzie, 1981, 1990; McKenzie and May, 2003).

Dunsford, et al. (2011) mentioned that in the treatment of the McKenzie method, extension principles are commonly used for treating low back pain as well as PLID patients and also escorted by radicular limb pain. Several studies justified that McKenzie exercises were perfect treatment for increasing flexibility of spine as well as decreasing pain (Lawrence, 2008).

Weinstein, et al. (2008) detected that several researches were shown the evidence on conservative treatments which is manual therapy for herniated lumbar discs were consistently efficacious. Several recent study reviews are shown manual therapy or conservative physiotherapy where are included exercises, mobilization, McKenzie approach treatment, manipulation, strengthening programs, advice and other manual therapy techniques have a strong evidence of effectiveness for chronic low back pain

patients and moderate evidence of effectiveness in acute LBP due to sciatica (Aure, et al., 2003).

Senna and Machaly, (2011) expressed their randomized controlled trail that they were shown the most of the studies investigated about the therapeutic effects of spinal manipulation which was effects only for short term for the patient with lumber disc herniation and non-specific chronic low back pain. But maintained longer period of time that was more beneficial and also cost effective manual therapy treatment approach. According to Mamivaara, et al. (1995), rest and exercise is effective for a low back pain patient. Bed rest and back extension exercise both are used for low back pain and both are controversial but a controlled trial doing some employees' patient whose has low back pain and their lumber disc herniation.

1.2 Rationale

Prolapse lumber intervertebral disc (PLID) is one of the most common health problems in globally. PLID has become now a major medical, social and economic problem and the costs are comparable to those associated with coronary heart disease, diabetes or depressions. Thus diminishing the cost of PLID is a major health problem issue in current situation. Moreover a large part of population has lack of physical fitness, didn't regular physical exercise and lack of normal posture and leading of a sedentary life are most common prevalent predisposing characteristics of lumber disc prolapse in Bangladesh. It is the number one factor for activity limitation.

PLID itself is a frequent cause of reduction of the mobility of the lumbar spine that causes impairment of spinal mobility. It is the number one factor of activity limitation in patients less than 45 years old and more common in female than male. Limitation of lumbar mobility interfere with the attainment of important functional skills and activities of daily living activities such as dressing, picking up objects from the floor etc.

PLID affects daily movements such as standing up, walking, lateral bending and forward flexion. These forms of functional disabilities have profound effects on the quality of life. The other factors contributing to the long-term disability are age, location of symptoms, socioeconomic and psychological factors (distress, depression, beliefs, job dissatisfaction and mental stress at work).

Treatment of the PLID patient is dilemma between conservation treatment approaches. Several study mentioned in different types of treatment is effective but not concluded effectively. So researcher is to try the find out the effectiveness treatment for PLID patients.

The study is to find out the effectiveness of McKenzie approach of physiotherapy treatment for PLID patients. In our country physiotherapy treatment is not properly advice to patients for their recovery, but many of patients have very good result and full recovery their condition. In this circumstance the researcher wishes to find out the efficacy physiotherapy treatment for such a kind patients.

1.3 Hypothesis

Null Hypothesis

H_o: μ_1-μ_2 = 0 or μ_1=μ_2, where the experimental group and control group initial and final mean difference is same.

Alternative Hypothesis

H_a: μ_1- $\mu_2 \neq 0$ or $\mu_1 \neq \mu_2$, where the experimental group and control group initial and final mean difference is not same.

1.4 Objectives

1.4.1 General objective

- To identify the effectiveness of McKenzie physiotherapy treatment for PLID patients.

1.4.2 Specific Objectives

- To find out effectiveness McKenzie physiotherapy treatment for PLID patients.
- To find out the different working posture affecting of the PLID.
- To evaluate the outcome of pain in different functional position after receiving treatment.
- To determine the disability level due to PLID.
- To identify the fear and avoidance level of the PLID patients.
- To explore socio-demographic (age, gender, occupation, educational status) characteristics of patients with PLID.

1.5 Operational definition

PLID

Prolapse lumber intervertebral disc is a medical condition affecting the lumber due to trauma, lifting injuries or idiopathic causes, in which a tear in the outer fibrosis of an intervertebral disc allows the soft central portion to bulge out beyond the damaged outer ring.

McKenzie Treatment approach

The McKenzie System of Mechanical Diagnosis and Therapy (MDT) involves a detailed history and an examination in which baseline symptoms, both with function and at rest, are established and then re-evaluated following the patient performing repeated end range loading movements to the affected area.

Basic Physiotherapy Treatment

Basic physiotherapy treatment comprises pelvic floor muscles strengthening; back muscles and leg muscle strengthening with postural and home advice.

ADL

Activities of Daily living (ADL) means activities of personal care and activity such as dressing, bathing, eating, grooming, cleaning, grooming etc.

Physical Exercise

Exercise is physical activity that is planned, structured, and repetitive for the purpose of conditioning any part of the body which is used to improve health, maintain fitness and is important as a means of physical rehabilitation.

Poor Posture

Abnormal curvature of cervical, thoracic and lumbar spine, like lordosis or kyphosis or slouched.

CHAPTER-II LITERATURE REVIEW

The review of the scientific study is to evaluate the effectiveness of Physiotherapy treatment approach for the lumber disc prolapsed or disc herniation patient. The establishment of the scientific validity, and also scientifically and statistically proved the Physiotherapy options in this circumstances and up-to-date appropriate physiotherapy therapy treatment options are existing in the world wide.

Albert and Mannicle, (2012) in their study monitored 181 severe sciatica patients, who were randomized into groups of either symptom guided exercise or sham exercise to find out active conservation treatment programs were effective for severe sciatica patients. Symptom-guided exercise consisted of back related exercises: directional end-range exercises and postural instructions guided by individual patient's directional preference (McKenzie concept), stabilizing exercises and back extensors. Home exercises programs were handed out to all patients. Sham exercises consisted of optional exercises that were not back related but low dose exercises to simulate the increase in systemic blood circulation. In their study main outcome measures were Danish version of RMDQ (23 questions) to assess activity limitation, Low back pain rating scale used to measure current leg pain, Global improvement and number of neurological signs were measured by 5-point Liker Scale, Generic function (QUALY) was measured by Euro QOL (EQ-5D), Used Patients' self-reported follow up questionnaire for sick leave and Patients' satisfaction, Patients' expectations of outcome were measured by patients' self-report. In result both active treatment programs had improved but global improvement (most variables), activity limitations were significantly improved at end of treatment and after one year follow up. Root compression signs (Neurological sign) were statistically significant ($P < .001$) at one

year after follow up. Fewer sick leaves taken symptoms guided active exercise group (23.9%) compared sham exercise group (43%). Both groups were satisfaction. Nerve root neurological signs were measured specifically, not mentioned after the treatment the session and also one year follow up, only overall measured. Age range was large and all participants were consecutively enlisted using standardized, pretested procedure and examined that it may selection bias. On the research protocol, permitted to take medicine (mild analgesics and NSAIDs), not analyzed how many patients were taken this medicine in steps of the study in both groups. Only Root compression, sick leave, vocational status and little discuss about activity limitation were supported in the discussion, others like current leg pain, Global improvement did not support clearly**.** The process of sample allocation, randomization and group in the study and age range and women which might be influenced results. Evidence provided the clear each variable way to testing and purpose of testing. Clearly mentioned the reason of the participants and dropouts in the result and every variable's finding also describes properly. This study proved scientifically that conservative active physiotherapy treatment process is beneficial for severe sciatica patient. Physiotherapeutic treatment especially McKenzie approach is beneficial in such a type of patients. This treatment is cheap, uses low technology, and has no side effects, easy to perform and good patients' satisfaction that is very suitable for sciatica patients.

This randomized controlled trail has proved that the physiotherapy is very much effective in scientifically for the patient with disc herniation, although both groups are designed by different physiotherapy therapy techniques especially McKenzie treatment approach.

In 1981, Robin McKenzie proposed the classification system based on treatment for LBP known as Mechanical Diagnosis and Therapy, or the McKenzie method

(McKenzie and May, 2003). Of the large number of classification schemes developed in the last 20 years (Petersen, et al., 2003) the McKenzie method has the greatest empirical support (*e.g.*, validity, reliability and generalizability) among the systems based on clinical features. According to this method, the classification of LBP patients is based on patterns of pain response noted during the assessment (McKenzie and May, 2003). The centralization phenomenon is the most important pattern of pain response observed in McKenzie's assessment, as well as the most studied feature of the McKenzie method (Wetzel and Donelson, 2003; Aina, et al., 2004) Centralization is defined as the situation in which referred pain arising from the spine is reduced and transferred to a more central position when movements in specific directions are performed (also called directional preference) (McKenzie and May, 2003).

McKenzie has extended and the use of spinal mobility exercises based on a consideration of movement direction in the clinical assessment and treatment of LBP (McKenzie and May, 2003; Werneke, et al., 2010). McKenzie's protocol for the initial back assessment involves several repeated spinal movements; 10 or more, performed in various positions and directions such as flexion in lying (FIL) and extension in lying (EIL). Moreover, the prescription for home exercises may include 10 or more repetitions of these directional exercises, performed every 2 hours, thus accumulating 80 to 100 repetitions per day (Petersen, et al., 2011; May and Aina, 2012). McKenzie lumbar spine mobility exercises have been considered safe and of light intensity (Bybee, et al., 2007). Based on McKenzie's protocol, FIL and EIL are performed as progressive dynamic exercises. FIL involves large muscle groups including the abdominals and those of the pelvic floor and upper and lower extremities. During FIL, abdominal stabilization is required to lift the lower extremities to bring the knees to the chest. This results in an increase of intra-thoracic and intra-abdominal pressure, in turn

reducing venous return and cardiac output. Compared with FIL, EIL involves fewer upper extremity muscles contracting concentrically to extend and eccentrically lower the trunk. The increase in HR and SBP per unit of workload however is greater during upper-extremity than lower-extremity exercise and is proportional to the torque produced (Barak, et al., 2010; Åstrand, 2003).

Directional preference (based on the McKenzie approach) exercises utilizing repeated end range movements in a specific direction are also recommended in the APTA guidelines (Childs, et al., 2008). Efficacy for MDT and motor control exercises for treatment of chronic LBP has been demonstrated in systematic reviews of the literature (Machado, et al., 2006). Two specific types of exercises utilized by therapists for managing chronic LBP are Mechanical Diagnosis and Therapy (MDT) commonly known as the McKenzie method and motor control exercises (Haladay, et al., 2013). The principle that underpins MDT is to identify the non-specific mechanical syndromes that spinal pain can be classified into from a thorough examination of the patient (Clare, et al., 2004). Each of the three syndromes: derangement, dysfunction and posture syndrome have typical and distinctive mechanical presentations. Derangement syndrome is characterized by a varied clinical presentation and typical responses to loading strategies, which may consist of changes in pain location centrally or peripherally and in intensity. These findings guide the therapist to implement the most appropriate mechanical therapy according to the patient's classification (McKenzie and May, 2003).

The McKenzie method is a commonly used classification- based approach for the management of LBP (Gracey, et al., 2002; Jackson, 2001). Classification in the McKenzie method follows a comprehensive clinical examination including examination of posture and range of movement (Clare, et al., 2004). Findings from this

examination determine the classification of LBP into one of three syndromes: derangement syndrome, dysfunction syndrome, or postural syndrome (Clare, et al., 2004; Machado, et al., 2005; Hayden, et al., 2005 & Assendelft, et al., 2003). The core component of treatment in the McKenzie method is exercise, which consists of sustained postures or repeated movements. This method also includes other components such as education and postural training. Studies have generally shown the McKenzie approach for back pain to be most useful in acute, sub-acute or even chronic disc-related pain with associated pain to the limbs. The mechanical assessment determines the direction of pain (central vs. peripheral). When the centralization is obtained, a favorable response to treatment is expected (Werneke, et al., 1999). Previous studies have found that the lack of centralization may be a reliable predictor of the outcome of conservative treatment and the need for surgical intervention (Clare, et al., 2004, Machado, et al., 2005, Machado, et al., 2010). Evidence shows that the effectiveness of some interventions is supported (e.g. exercise) (Hayden, et al., 2005) while other interventions are not effective for chronic LBP (e.g. EPAs). Studies on the efficacy of electro physical agents in chronic LBP are lacking and there is little evidence of their effectiveness in physiotherapy practice (Airaksinen, et al., 2006). A randomized controlled trial was conducted to compare McKenzie therapy to the electro physical agent's therapy; consisted of heat, ultrasound (US), and interferential current (IFT) to determine which was more effective at reducing pain and disability.

Engbert and Weber, (2011) monitored in their study that the efficacy whether therapeutic climbing exercise or standard exercise to find out therapeutic climbing exercises to increase muscular strengthening and, perceived physical and mental well-being and abilities in activities of daily living (ADL) of chronic low back pain patients compared with the standard exercise therapy. This study focused on the psychological

effects of therapeutic exercise climbing compared with standard exercise therapy. The study was Randomized Controlled clinical trial, pretest and posttest design with single blind. 14 (43% female; mean age=51.9 years) patients with chronic low back pain which were allocated for therapeutic climbing exercises group, were given the training included the standard warm up, coordination, stabilization, and trunk muscle exercises. 14 (43% female; mean age=50.4 years) patients with chronic low back pain which were allocated for standard exercise therapy group and consisted of worm up, strengthening, stretching, mobilization, coordination, and stabilization for the abdominal, back, pelvic, and lower limb muscles. So in total 28 samples were included in this study. SF-36 questionnaire were used for measuring the physical and mental health status and FFbH-R questionnaire were used for measuring functional disabilities. Data were collected at baseline measurement as a pretest measurement, at the end of the four weeks treatment session as a post test. The therapeutic climbing exercise group had significantly improved in five subscales out of eight of SF-36 about physical health and mental health (physical functioning $P < .005$, health perception $P < .007$, Vitality $P < .009$, social functioning $p < .04$ and mental health $P < .012$) within the groups. The standard exercise group had significantly improved in four subscales out of eight of SF-36 about physical health and mental health {role limitations (physical) $P < .041$, Vitality $P < .011$, social functioning $p < .022$, role limitations (emotional) $P < .005$} within the groups. The therapeutic climbing exercise group compared with standard exercise group had significantly improved in two subscales out of eight subscales of SF-36 about physical health and mental health (physical functioning $P < .010$ and general health $P < .018$) between the groups, others did not find the significant result in this study. Abilities in ADL measured by FFbH-R, there is no significance difference the therapeutic climbing exercise group and standard exercise group within group and between the groups.

Patients with chronic low back pain may be benefited of the therapeutic climbing exercise. Significant improvements in physical functioning and general health perception which may be associated to a stronger progression from pain to physical capabilities of patients in therapeutic climbing exercise. In this study sample size was the small which was difficult inference the result in the population. Participants were not allowed to participate in the sports and dropped out was high in climbing group which also might be influences the result.

In interpretation of above two studies has used physiotherapy treatment nearly same including worm up, strengthening, stretching, mobilization, coordination, and stabilization for the abdominal, back, pelvic, and lower limb muscles used both studies. Actually manual various treatment options were not specified. The methodological used Modified Roland disability questionnaire and SF-36 questionnaire, but different version used in both study. The result of two studies was shown the significant improvement in experimental group compared with control group, but control group also improvement, but not statistically significance.

Luijsterburg, et al. (2007) in their study investigated an economic evaluation alongside a randomized clinical trial in primary care. A total of 135 patients were randomly allocated to physical therapy and general practitioners' care (n= 67) or general practitioners'(GP) care alone (n = 68) to evaluate the cost-effectiveness of physical therapy and general practitioner care for patients with an acute lumbosacral radicular syndrome (LRS or sciatica). All patients were treated by the GP according to their clinical guidelines. GPs gave information and advice about LRS and, if necessary, they prescribed medication and Physiotherapy treatment consisted of exercise therapy as well as giving information and advice about LRS. Global perceived effect (GPE) was measured by 7-point scale, generic preference-based measured of health using by EQ-

5D. The economic evaluation was performed from a societal perspective, meaning that all relevant costs and effects are measured. The costs for paid work were calculated by using the friction cost approach. The outcome measures and costs were assessed at baseline and cumulative at 3, 6, 12, and 52 weeks after randomization using questionnaires. At 1-year follow-up, there was a significant difference on perceived recovery in favor of the patients that received physical therapy. The additional physical therapy did not have an incremental effect on quality of life. The treatment of patients with LRS with physical therapy and general practitioners' care is not more cost-effective than general practitioners care alone. Weber, et al. (1993) monitored 208 LBP patients with radiating pain and clear clinical signs of nerve root compression (L_5 and S_1 level), who were randomized into groups of either non-steroidal anti-inflammatory drug (NSAID) treatment (Piroxicam) or placebo medicine. The results in the placebo group may be assumed to be close to the natural course. The purpose of this was to provide insight into natural history of acute sciatica with nerve root symptoms within 14 days after onset and find out the efficacy of non-steroid anti-inflammatory drug (Piroxicam). The visual analog scale (VAS 100mm) was used for measure back and leg pain, modified Roland disability questionnaire (17 questions) was used for measuring functional ability and satisfactory questionnaire was used for follow up (4 point likert scale). Both groups improved significantly within 4 weeks. At 4-week, 3-month, and 1-year follow-up, there were no differences between the groups in any of the outcome measures. The sample size was reasonable and age range was questionable (17 to 75 years). The outcome measures were weak. This study did not involve individuals with radicular pain caused by lumbar disc herniation or spinal stenosis or multilevel spinal disease. The population did not include patients with upper lumbar radicular symptoms (L_1-L_4).

The efficacy of physiotherapy management for chronic LBP due to lumber disc herniation patients mentioned Aure, et al. (2003) in their randomized controlled trail with one year follow up study. 49 patients with CLBP patients allocated in this study, manual therapy (MT) group was 22 and exercise therapy (ET) group was 27. Manual therapy consisted of spinal manipulation, mobilization and stretching, and five general exercises like spine, abdomen, and lower limbs regions. Exercise therapy consisted of worm up, strengthening, mobilization, coordination, and stabilizing exercises for the abdominal, back, pelvic and lower limbs muscles. outcomes measures by modified Schober test used for measuring spinal range of motion, 100 Visual Analog Scale (VAS) used for measuring pain intensity, Oswestry LBP disability Questionnaire used for measuring functional disability, Dartmouth COOP Function Charts used for general health and self-reported used for return to work. They found that both treatment group significantly improvement, the manual therapy group showed significantly larger than the exercise group.

Senna and Machaly, (2011) shown in their study which was "Does Maintained Spinal Manipulation Therapy for Chronic Nonspecific Low Back Pain Result in Better Long-Term Outcome?" to fulfill the aims to assess the effectiveness of spinal manipulation therapy (SMT) for the management of chronic nonspecific low back pain (LBP) and to determine the effectiveness of maintenance SMT in long-term reduction of pain and disability levels associated with chronic low back conditions after an initial phase of treatments. The study design was single placebo randomized controlled trail with single blind to establishment their purpose. They are randomly allocated sixty patients, with chronic, nonspecific LBP lasting at least 6 months, were to receive either (1) 12 treatments of sham SMT over a 1-month period, (2) 12 treatments, consisting of SMT over a 1-month period, but no treatments for the subsequent 9 months, or (3) 12

treatments over a 1-month period, along with “maintenance spinal manipulation” every 2 weeks for the following 9 months. The measured the outcome were pain and disability scores, generic health status, and back-specific patient satisfaction at baseline and at 1-, 4-, 7-, and 10-month intervals. The results were shown that patients in second and third groups experienced significantly lower pain and disability scores than first group at the end of 1-month period (P = 0.0027 and 0.0029, respectively). Only the third group that was given spinal manipulations (SM) during the follow-up period was shown more improvement in pain and disability scores at the 10-month evaluation.

The strong evidence to emerge from this review was obtained by gathering the results of several clinically and statistically studies that compared McKenzie physiotherapy approach with others Physiotherapy options in people with lumbar disc herniation associated with radiculopathy. Analyzed studies indicated that others physiotherapy interventions are less effective than McKenzie physiotherapy interventions for producing improvements in lumber disc prolapsed pain intensity, leg pain intensity, function, and global improvement.

CHAPTER-III METHODOLOGY

3.1 Study design

The aim of this study is to find out the effectiveness of McKenzie physiotherapy treatment for prolapsed lumber intervertebral disc (PLID) patients with surgery advised or planned to musculoskeletal unit at CRP-Savar and Mirpur. Experimental design of quantitative research which was Randomized Controlled Trail (RCT) sign was chosen because the experimental study is the best way to find out the effectiveness of the study. The researcher has conducted the study with experimental group and control group with an aim to compare in between experimental group and control group (Bowling, 1997). It was a double blinded study where the assessor and participants were blinded.

3.2 Study area

Data was collected from the outpatient, Musculoskeletal Physiotherapy unit of Centre for the Rehabilitation of the Paralyzed (CRP), Savar and CRP Mirpur, Dhaka. Because these patients came at CRP from all over the Bangladesh from all economic groups for comprehensive rehabilitation, so it reflects the entire population.

3.3 Study population

Patient with PLID with advised or planed surgery to musculoskeletal unit at CRP-Savar and CRP- Mirpur by Orthopaedics or Neurology consultant were the population.

3.4 Study duration

The duration of the study was November, 2015 to June, 2016.

3.5 Sample Size

Researcher has taken 20 participants as sample. Obviously this is a small sample but still we believe they will be provided a representative picture of the study. Due to time limitation the researcher has to choose 20 participants to conduct this study; within the short time it could not be possible to conduct the study with a large number subjects.

3.6 Sampling Scheme

The study group subjects were studied in such a way that those patients coming to CRP at Savar and CRP at Mirpur with in a particular time period. As these patients attained in these CRP randomly without the choice of CRP authority or the researcher's choice, so they may be considered as a random sample.

3.7 Inclusion criteria

- Lumber disc prolapse patients were given advised surgery or planned by orthopaedic consultant or neurology consultant.
- Age between 18 to 55 years- This age group patients were usually affected by PLID
- Both male and female were given same priority.
- MRI was determined by the diagnosis of PLID.
- Those who were motivated and given consent to include in the study.

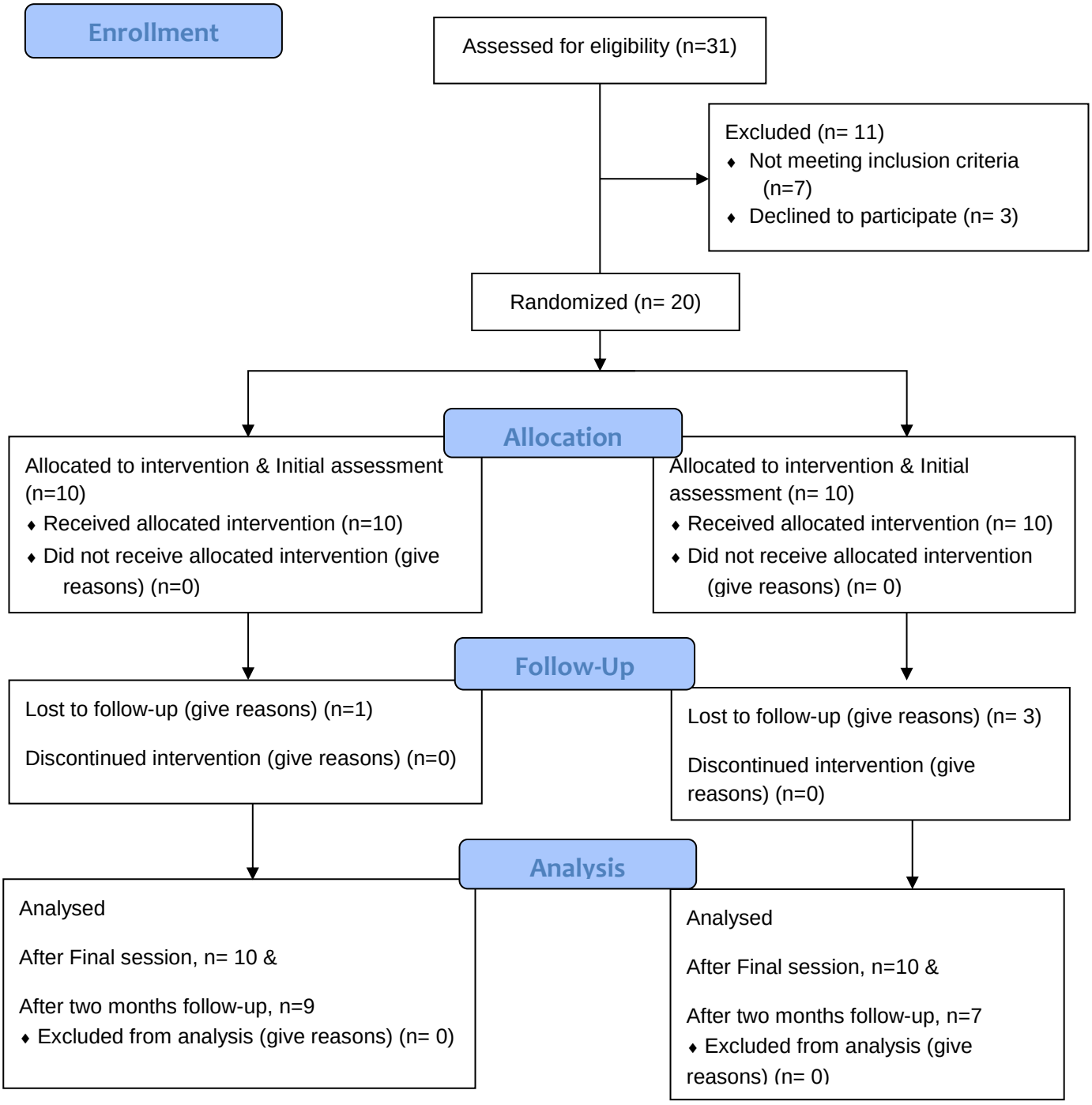
3.8 Exclusion Criteria

- Patients who were suffering from serious pathological disease e.g. tumours, tuberculosis and others pathological problems.
- Age level below 18years and after 55 years- Without this group was not usually affected by PLID.

3.9 Method of data collection

The researcher used the internationally accepted structured questionnaire for collecting data.

Flow Diagram



3.9.1 Measurement

To conduct this study, the researcher collected data through using different types of data collection tools. The researcher has used Dallas pain scale by using Visual Analogue Scale (VAS) for pain measurement in different working position and also activities, Oswestry Low Back Pain Disability Questionnaire were used for disability measurement, Fear-Avoidance Beliefs Questionnaire (FABQ) was used for using fear and avoidance behaviors measurement during activity and work, and Sciatica Bothersome scale was used for leg pain measurement and structural questionnaire was used for socio-demographic indicators.

3.9.1a Dallas pain questionnaire (DPQ)

The DPQ was a 15-item instrument to assess pain and intensity, personal care, lifting, standing, sitting, walking and sleeping; work and leisure activities and each item was scored with a Visual Analog Scale (VAS). This questionnaire slightly modified for suitable this study. Scale extremities are labeled with specific words (e.g. ‘no pain in left/all the time severe pain in right). For every specific question, the patient marks the point on the scale which represents his/her condition.

3.9.1b Oswestry disability index

The Oswestry disability index (ODI) was included 10 sections of questions. The sections had selected from experimental questionnaires that aimed to assess several aspects of daily living. The ODI domains were the following: pain intensity, personal care, lifting, walking, sitting, standing, sleeping, sex life and social life. Each section contained six statements that were scored from 0 (minimum degree of difficulty in that activity) to 5 (maximum degree of difficulty). If more than one statement was marked

in each section, the highest score should be taken. The total score is obtained by summing up the scores of all sections, giving a maximum of 50 points.

3.9.1c Fear-Avoidance Beliefs Questionnaire (FABQ)

The Fear-Avoidance Beliefs Questionnaire (FABQ) was a questionnaire based on the Fear-Avoidance Model and developed chronic pain from such conditions. The FABQ measures patients' fear of pain and consequent avoidance of physical activity because of their fear (Waddell, 1993). This questionnaire consisted of 16 items, with each item was scored from 0-6. Higher scores on the FABQ were indicative of greater fear and avoidance beliefs. Within the FABQ, two subscales existed, the Work Subscale and the Physical Activity Subscale, which facilitated the identification of the patient's beliefs about how work and physical activity were affected their current PLID. The FABQ has been proven to be a reliable and valid assessment tool based on patients with chronic low back pain. In recent research, the FABQ is being used in populations with acute low back pain to identify the risk of long-term disability (Fritz and George, 2002).

3.9.1d Sciatica bothersome index

Sciatica bothersome index was an index based on patients reporting of symptoms which reflected the trouble patient was going through with his/her leg symptoms. The index had been used to find the status of the patient discomfort. It had also been used to assess the outcome of the treatment. PLID was radiating pain in the lower limb due to compression or irritation of the nerve roots (especially sciatica nerve) or lumbar nerve roots. Sciatica Bothersome index was included self-reported ratings of symptom intensity of Leg pain, Numbness or tingling in the leg, Weakness in the leg and Back

or leg pain while sitting. Each symptom item was rated on a scale from 0 to 6, with 0 being not bothersome, 3 somewhat bothersome and 6 extremely bothersome.

3.9.2 Measurement tools

The organized material was questionnaires, consent forms, paper, pen & a pencil. All questionnaires designed to conduct the interviews.

3.9.3 Data collection procedure

The researcher collected data through structured questionnaires, face to face interviews with closed ended question. Because structural questionnaire was helpful for the researcher to obtain all the required information at the same time giving freedom to the participants to responds and illustrates the concept (Minichiello, et al., 1997). A structured closed ended questionnaire was developed for socio-demographic indicators by the researcher himself to find out the actual information from every aspect of the participant. Others questionnaire was followed by individuals' questionnaire items and slightly changed for correlation with research topics. The interview contacted every day by face to face interviews after treatment session. Only Dallas pain questionnaire and Oswestry Disability Questionnaire were measured every treatment session. Others questionnaire were measured initial day and after eight session treatment. The duration of interview was only 10 minutes for every day. Data was collected in initial day as initial assessment and final assessment was taken after 8 session of treatment and also follow up data was collected after two month of treatment by over phone. The researcher was to determine 20 participants understanding of the questions by observed their facial expressions. Questionnaires used both English and Bengal for easy understanding of the participants.

3.10 Intervention

The experimental group participants were received only McKenzie approaches physiotherapy treatment. The physiotherapy treatment was given McKenzie concept directional treatment procedures according to patients condition and basic physiotherapy treatment like pelvic floor, back muscles strengthening and leg muscle strengthening, postural advice and also given the home advice. In control group participants were given basic physiotherapy treatment and medicine (painkiller). They both group received treatment weekly four days in two weeks. Treatment has given five physiotherapists who were well trained in McKenzie treatment approach. The researchers arranged special training about research protocol and also McKenzie physiotherapy treatment approaches. Postural advice/education was given in sitting and standing in both group participants.

3.11 Data Analysis

Data was analyzed by using SPSS version 16.00 to compute the descriptive statistics using pie chart, bar chart, linear line diagram and also percentage and parametric tests were conducted using paired t-test and unrelated t-test.

The researcher had calculated the variables mean, mean difference, standard deviations, standard error, degree of freedom and significant level to show that experimental group and control group mean difference in within group was significantly different than the standard table values. In the between group, the data shows that the mean difference was greater than the control group. The researcher had tested mean variables stating problem to test using t statistic, which is paired t-test and also unrelated t-test that was predicted as normally distributed if $df \geq 30$.

Estimated predictor

Hypothesis test of mean difference between the experimental group and the control group, within groups and also between groups, assuming normal distribution of the parent population, two different and or independent variables, variables were quantitative by estimated predictor of paired t-test or unrelated t-test.

Hypothesis Test

Paired t test

Paired t-test was used to compare difference between means of paired variables. Selection of test of hypothesis is mean difference under t distribution.

Assumption

Paired variables

Variables were quantitative

Parent population of sample observation follows normal distribution.

Null and alternative hypothesis

Ho: $\mu_{1-} \mu_2 = 0$ or $\mu_1 \geq \mu_{2;}$ where the experimental group and control group initial and final mean difference was same.

Ha: $\mu_{1-} \mu_2 \neq o$, $\mu_{1<} \mu_{2;}$ where the experimental group and control group initial and final mean difference was not same.

Here,

Ho= Null hypothesis

Ha= Alternative hypothesis

μ_1= Mean difference in initial assessment

μ_2= Mean difference in final assessment

Formula: test statistic t is follows:

$$t = \frac{\bar{d}}{SE\ (\bar{d})} = \frac{\bar{d}}{\frac{SD}{\sqrt{n}}}$$

Where,
$\bar{d}$= mean of difference (d) between paired values,
SE ($\bar{d}$)= Standard Error of the mean difference
SD= standard deviation of the differences *d* and
n= number of paired observations.

Calculation of paired t value of the general pain intensity as below-

$$t = \frac{\bar{d}}{SE\ (\bar{d})} = \frac{\bar{d}}{\frac{SD}{\sqrt{n}}} = \frac{4.3}{\frac{2.385}{\sqrt{10}}} = \frac{4.3}{0.754} = 5.701$$

Level of Significant

The researcher has used 5% level of significant to test the hypothesis. Calculated t value and compared with standard t value in with appropriate degrees of freedom; the null hypothesis will be rejected when observed t-value is large than the standard t-value and alternative hypothesis is accepted. On the other hand, reversed decision has taken when the calculated value of t is smaller than the standard t-value. All these decisions are taken with a prefixed level of significance (for this case this is 5%)

In this way researcher had calculated paired t-value and significant level and have presented in the following tables-

Table III.I: Dallas Questionnaire (Initial and final assessment-Paired t-test)

		Experimental Group			**Control Group**	
Serial No.	Variables	T	Sig. (2-tailed)	df	t	Sig. (2-tailed)
Pair 1	Pain intensity	5.701	.000	9	5.717	.000
Pair 2	Pain intensity at night	4.470	.002	9	3.575	.006
Pair 3	Interfere with lifestyle	2.948	.016	9	3.678	.005
Pair 4	Pain severity at forward bending activity	4.360	.002	9	4.635	.001
Pair 5	Back Stiffness	3.870	.004	9	.164	.874
Pair 6	Interfere with Walking	4.190	.002	9	3.480	.007
Pair 7	Hurt when Walking	4.167	.002	9	3.952	.003
Pair 8	Pain keep from standing still	4.217	.002	9	2.700	.024
Pair 9	Pain keep from twisting	1.855	.097	9	.899	.392
Pair 10	Sit in upright hard chair	1.200	.261	9	2.596	.029
Pair 11	Sit in soft arm chair	1.366	.205	9	2.803	.021
Pair 12	Pain in lying	1.976	.080	9	3.922	.004
Pair 13	Pain limit normal lifestyle	3.336	.009	9	3.152	.012
Pair 14	Interfere with work	4.147	.002	9	1.971	.080
Pair 15	Change of workplace	3.516	.007	9	2.290	.048

Table III.II: Dallas Questionnaire (Initial and follow-up-Paired t-test)

		Experimental Group			Control Group	
Serial No.	Variables	t	Sig. (2-tailed)	df	t	Sig. (2-tailed)
Pair 1	Pain intensity	6.805	.000	8	6.305	.000
Pair 2	Pain intensity at night	5.057	.001	8	4.108	.006
Pair 3	Interfere with lifestyle	4.238	.003	8	5.841	.005
Pair 4	Pain severity at forward bending activity	6.897	.000	8	6.403	.001
Pair 5	Back Stiffness	4.035	.004	8	1.094	.874
Pair 6	Interfere with Walking	5.458	.001	8	3.760	.007
Pair 7	Hurt when Walking	7.470	.000	8	3.043	.003
Pair 8	Pain keep from standing still	5.980	.000	8	2.693	.024
Pair 9	Pain keep from twisting	2.942	.019	8	.952	.392
Pair 10	Sit in upright hard chair	2.040	.076	8	2.911	.029
Pair 11	Sit in soft arm chair	1.713	.125	8	2.248	.021
Pair 12	Pain in lying	2.826	.022	8	3.273	.004
Pair 13	Pain limit normal lifestyle	5.481	.001	8	3.197	.012
Pair 14	Interfere with work	6.475	.000	8	2.699	.080
Pair 15	Change of workplace	4.267	.003	8	1.722	.048

Table III.III: Dallas Questionnaire (Final and Follow up-Paired t-test)

		Experimental Group			Control Group	
Serial No.	Variables	t	Sig. (2-tailed)	df	t	Sig. (2-tailed)
Pair 1	Pain intensity	2.790	.024	8	2.391	.054
Pair 2	Pain intensity at night	1.844	.102	8	1.610	.159
Pair 3	Interfere with lifestyle	2.900	.020	8	2.471	.048
Pair 4	Pain severity at forward bending activity	2.485	.038	8	1.146	.296
Pair 5	Back Stiffness	2.404	.043	8	.803	.453
Pair 6	Interfere with Walking	3.828	.005	8	1.798	.122
Pair 7	Hurt when Walking	3.939	.004	8	1.924	.103
Pair 8	Pain keep from standing still	1.972	.084	8	1.559	.170
Pair 9	Pain keep from twisting	2.925	.019	8	1.282	.247
Pair 10	Sit in upright hard chair	2.482	.038	8	1.611	.158
Pair 11	Sit in soft arm chair	1.764	.116	8	1.529	.177
Pair 12	Pain in lying	2.085	.071	8	.888	.409
Pair 13	Pain limit normal lifestyle	2.382	.044	8	1.473	.191
Pair 14	Interfere with work	3.222	.012	8	1.537	.175
Pair 15	Change of workplace	.639	.541	8	1.685	.143

Table III.IV: Oswestry Disability Index (Initial and Final Paired t-test)

		Experimental Group			Control Group	
Serial No.	Variables	t	Sig. (2-tailed)	df	t	Sig. (2-tailed)
Pair 1	ODI (%) (Initial-Final)	3.714	.005	9	3.265	.010

Table III.V: Fear avoidance belief questionnaire (Initial and Final- Paired-t-test)

		Experimental Group			Control Group	
Serial No.	Variables	T	Sig. (2-tailed)	df	t	Sig. (2-tailed)
Pair 1	Fear-avoidance belief about physical activity (Initial-Final)	2.126	.062	9	2.940	.016
Pair 2	Fear-avoidance beliefs about work (Initial-Final)	3.651	.005	9	1.742	.115

Table III.VI: Bothersome Questionnaire (Initial and Final Paired-t test)

		Experimental Group			Control Group	
Serial No.	Variables	T	Sig. (2-tailed)	df	t	Sig. (2-tailed)
Pair 1	Feeling of leg pain (Initial-Final)	4.583	.001	9	5.667	.000
Pair 2	Feeling of numbness Tingling sensation in leg (Initial-Final)	5.622	.000	9	3.353	.008
Pair 3	Feeling of weakness in leg (Initial-Final)	2.689	.025	9	1.769	.111
Pair 4	Feeling of back pain or leg pain in sitting (Initial-Final)	3.308	.009	9	2.409	.039

Unrelated t test

Unrelated t test was used to compare difference between two means of independent variables. Selection of test of hypothesis was two independent mean differences under independent t distribution.

Assumption

Different and independent variables

Variables were quantitative

Normal distribution of the variables

Formula: test statistic t is follows:

$$\boldsymbol{t = \frac{\bar{x}_1 - \bar{x}_2}{S\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}}}$$

Where,
$\bar{\boldsymbol{x}}_{\boldsymbol{1}}$ = Mean of the Experimental Group,
$\bar{\boldsymbol{x}}_{\boldsymbol{2}}$ = Mean of the Control Group,
$\boldsymbol{n_1}$ = Number of participants in the Experimental Group,
$\boldsymbol{n_2}$ = Number of participants in the Control Group
$\boldsymbol{S}$ = Combined standard deviation of both groups

Calculation unrelated t value for general pain intensity:

Where, S= $\sqrt{\frac{\sum (\bar{x}_E - x_1)^2 + \sum (\bar{x}_C - x_2)^2}{n_1+n_2-2}} = \sqrt{\frac{39.382+11.782}{10+10-2}} = \sqrt{\frac{51.164}{18}} = \sqrt{2.842} = 1.686$

Here,

$\bar{\boldsymbol{x}}_{\boldsymbol{E}}$ = Mean of the experimental Group
$\bar{\boldsymbol{x}}_{\boldsymbol{C}}$ = Mean of the control group

$\boldsymbol{x_1}$ = Individual value of the experimental group
$\boldsymbol{x_2}$ = Individual value of the control group
$\boldsymbol{n_1}$ = Number of participants in the Experimental Group
$\boldsymbol{n_2}$ = Number of participants in the Control Group

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}} = \frac{3.33-2.73}{1.686\sqrt{\frac{1}{10}+\frac{1}{10}}} = \frac{0.60}{1.686\times\sqrt{0.20}} = \frac{0.60}{1.686\times0.447} = \frac{0.60}{0.754} = 0.796$$

In this way researcher has calculated all the t-value and have presented in the following tables –

Table III.VII: Dallas Questionnaire (Final and Follow-up- Un-paired-t test)

	Final			Follow-up		
	t	df	Sig. (2-tailed)	t	df	Sig. (2-tailed)
Pain intensity	.796	18	.437	.463	14	.650
Pain intensity at night	.694	18	.497	.530	14	.605
Interfere with lifestyle	.281	18	.782	.132	14	.897
Pain severity at forward bending activity	1.371	18	.187	.711	14	.489
Back Stiffness	.322	18	.752	.666	14	.516
Interfere with Walking	1.064	18	.301	1.039	14	.317
Hurt when Walking	1.391	18	.181	.132	14	.897
Pain keep from standing still	.191	18	.850	.419	14	.682
Pain keep from twisting	.947	18	.356	.859	14	.405
Sit in upright hard chair	1.040	18	.312	.965	14	.351
Sit in soft arm chair	.495	18	.627	.715	14	.487
Pain in lying	1.011	18	.325	.973	14	.347
Pain limit normal lifestyle	.213	18	.833	.407	14	.690
Interfere with work	.455	18	.655	.403	14	.693
Change of workplace	.659	18	.518	.746	14	.468

Table III.VIII: Fear avoidance belief questionnaire (Unpaired-t test)

	t	df	Sig. (2-tailed)
Fear-avoidance belief about physical activity	-1.126	18	.275
Fear-avoidance beliefs about work	2.425	18	.026

Table III.IX: Bothersome Questionnaire (Unpaired t-test)

	t	df	Sig. (2-tailed)
Feeling of leg pain	.323	18	.751
Feeling of numbness Tingling sensation in leg	.142	18	.889
Feeling of weakness in leg	-.332	18	.743
Feeling of back pain or leg pain in sitting	.466	18	.647

Oswestry Disability Questionnaire calculation

The score was expressed as a percentage with the following formula: (total score/ (5 × number of questions answered) × 100%. For example, if all 10 sections are completed the score is calculated as follows: 16 (total scored)/50 (total possible score) × 100 = 32%. If one section is missed (or not applicable) the score is calculated as follows: 16 (total scored)/45 (total possible score) × 100 = 35.5%. For every specific question, the patient marks the point on the scale which represents his/her condition. For scoring, 0 points are assigned to the left-hand segment, 1 point to the next segment, 2 points to the

next segment and so on to the last segment. Item scores are added and multiplied by a constant to obtain the percentage of pain interference with each of four daily living aspects evaluated by DPQ. The constant used for daily activities section is 3, while the constant used for work/leisure activities, anxiety/depression and social interest section is 5. The DPQ can be answered in 3–5 min and scored in less than 1 min.

3.12 Quality control and assurance

The investigator had enough knowledge in the designated study, hence the study area and underneath issues had been keenly explored by him. The format of the questionnaire was purely structural, thus it enabled a definitive answer. The questionnaire was developed according to the literature search; follow the international accepted questionnaire and peer reviewed for reliable questionnaire. The investigator tried to avoid selection bias due to strictly maintained inclusion and exclusion criteria.

The study was avoided conflict the selection of the participants. The data was collected by experience physiotherapist who was identified lumbar disc prolapsed patients as a participants.

3.13 Ethical considerations

- Research proposal was submitted for approval to the administrative bodies of ethical committee of CRP.
- The beginning the data collection, researcher was obtain the permission from the concerned authorities for data collection and ensuring the safety of the participants.
- The investigator followed the guideline given by local ethical review committee.

- Followed the WHO, BMRC, CRP ethical guidelines.
- Strictly maintained the confidentiality.
- Informed consent was taken individually from the participants.
- Every participant had to right to proceed or withdrawal from the study anytime.

3.14 Informed Consent

Before conducting research with the respondents, it is necessary to gain consent from the subjects (Baily, 1997). For this study researcher was given consent form to every participants and the purpose of the research and consent forms was explained to the subject verbally. Researcher mentioned those participants were fully voluntary and they had the right to withdraw at any time. Researcher insured them confidentiality would be maintained. Information might be published in the way of presentation or writing format but they did not be identified. The study results may not have any direct effects on them but the members of Physiotherapy population may be benefited from the study in future. They will not be embarrassed by the study. At any time the researcher would be available to answer any additional questions in regard to the study.

Table no. IV.I: Baseline Data

	Experimental Group		Control Group	
	Mean with SD	Min.-Max.	Mean with SD	Min.-Max.
Age (yr.)	36.60(±7.43)	27-55	43.20 (±10.48)	32-55
Gender	1.40(±0.516)	1-2	1.40 (±0.516)	1-2
Height of the patient (meter)	1.64 (±0.079)	1.47-1.75	1.65 (±0.079)	1.47-1.73
Weight of the Patient (kg)	65.30 (±8.82)	51-82	68 (±12.67)	55-89
Occupational Status	5.50 (±3.21)	2-10	6.20 (±3.01)	1-9
Family size	1.20 (±0.422)	1-2	1.30 (±0.483)	1-2
Number of children	1.80 (±1.69)	0-6	2.30 (±0.949)	1-4
Living place	1.50 (±0.527)	1-2	1.60 (±0.516)	1-2
Educational status	3.50 (±1.65)	1-5	3.00 (±1.247)	1-5
Smoking	1.90 (±0.316)	1-2	1.80 (±0.422)	1-2
Body Mass Index	24.13 (±2.29)	19.29-26.72	24.97 (± 3.29)	21.87-31.67
	Initial	Final	Initial	Final
ODI	45.00 (±26.35)	27.20 (±23.16)	38.00 (±19.79)	22.40 (±7.11)

4.1 Socio-Demographical variables

4.1.1 Age of the Participants

Among the participants, ages were in between 27-55 with mean age was 39.9 years (36.6 years in experimental group and 43.2 years in control group) where 25% (n=5) was 32 years (10% in experimental group and 15% in control group), 20% (n=4) was 38 years (all in experimental group) and 20% (n=4) (5% in experimental group and 15% in control group) was 55 years.

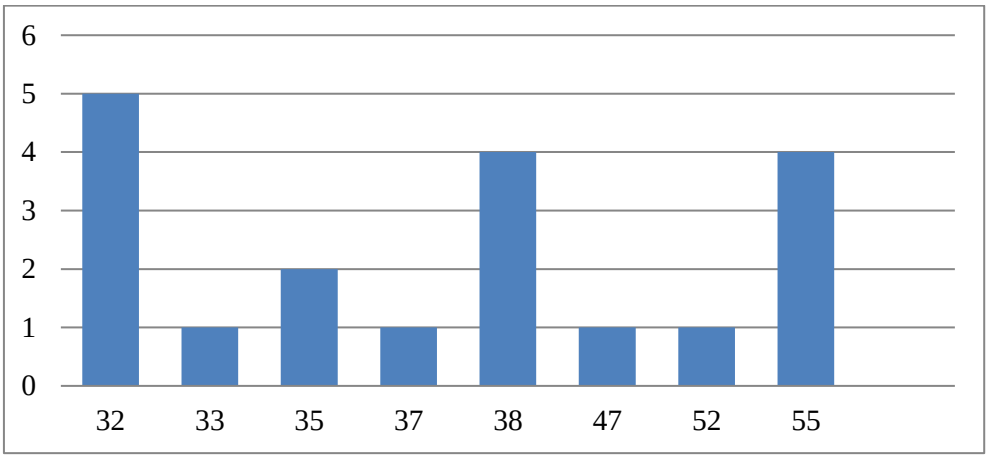


Figure 4.1.1: Age of the participants

4.1.2 Gender of the participants

Among all participants 60 %(n=12) were Male (30% in experimental and 30% in control group) and 40 % (n=8) were female (20% in experimental and 20% in control group).

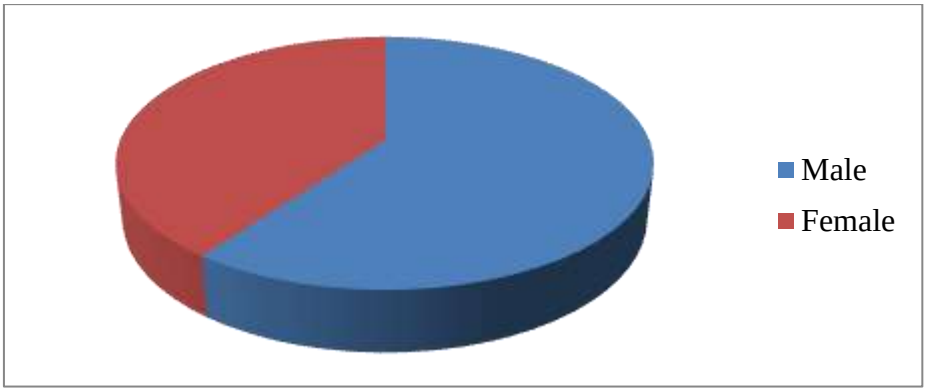


Figure 4.1.2: Gender of the participants

4.1.3 Occupation of the Participants

Among the participants, 30% (n=6) were housewives (10% in experimental group and 20% in control group), 25% (n=5) were service holder (15% in experimental group and 10% in control group), 20% (n=4) were businessman (20% in experimental group and 20% in control group) and 25% (n=5) were the others.

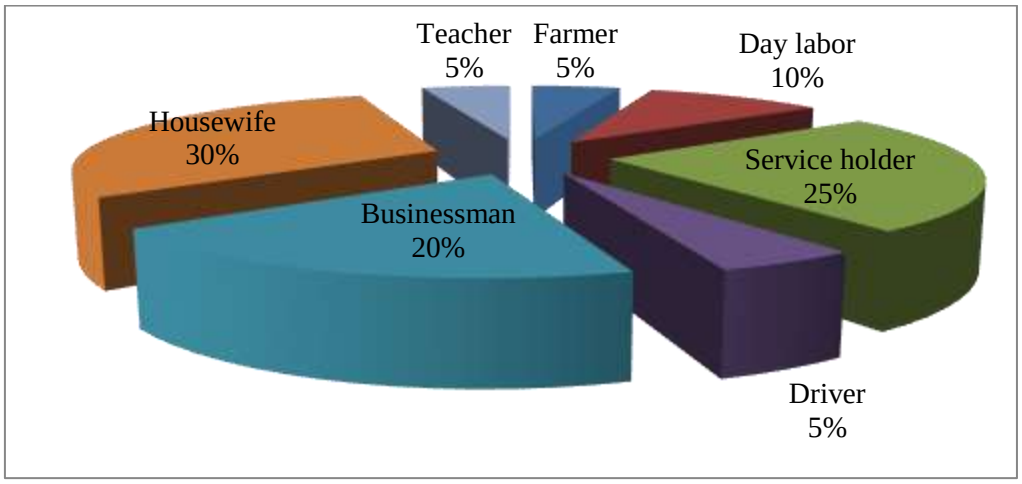


Figure 4.1.3: Occupation of the participants

4.1.4 Family Size

In this study, among the participants, 75% (n=15) has small family (40% in experimental group and 35% in control group) where 25% (n=5) were with large family (10% in experimental group and 15% in control group).

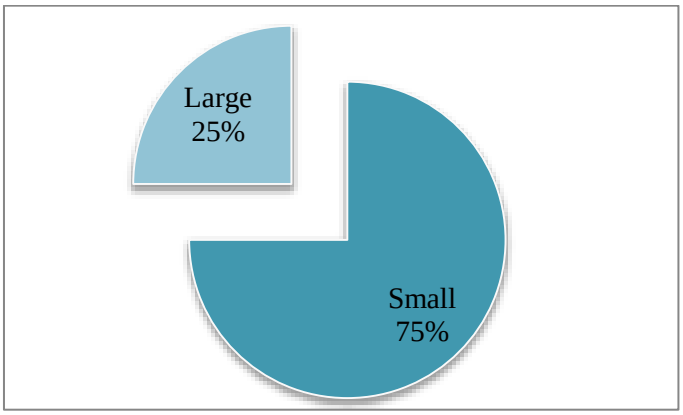


Figure 4.1.4: Family size of the participants

4.1.5 Number of children

Among all the participants (n=20), 60 % (n=12) had 2 children (25% in experimental group and 35% in control group) and 15% where 10% had no children (all in experimental group).

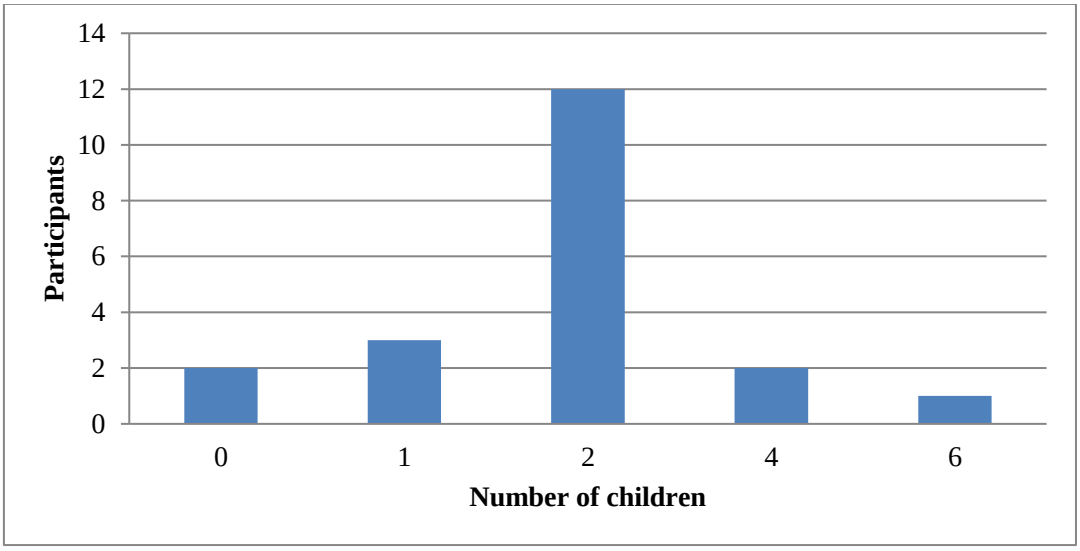


Figure 4.1.5: Number of children among the participants

4.1.6 Place of Living

In this study, 55% (n=11) participants were living in rural (25% in experimental group and 30% in control group) and 45% (n=9) participants were living in urban area (25% in experimental group and 30% in control group).

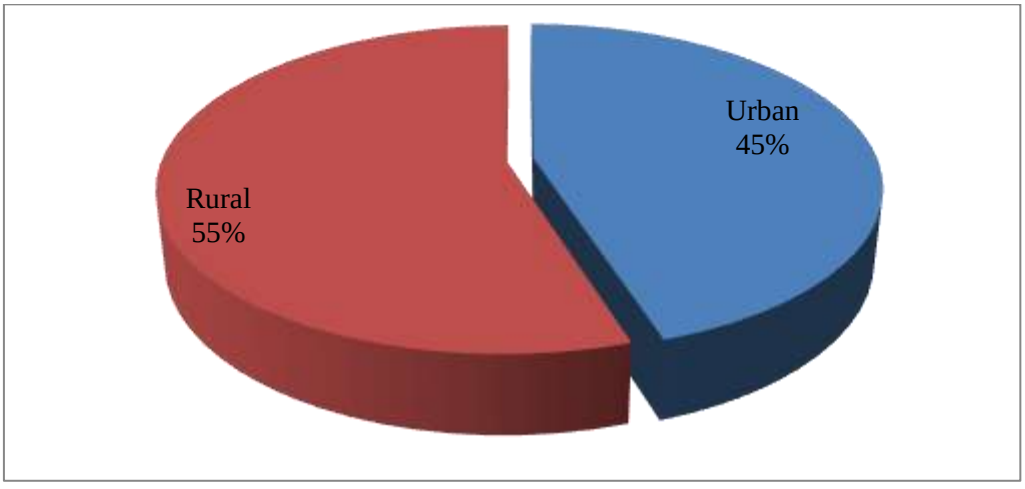


Figure 4.1.6: Living place of the participants

4.1.7 Educational Status

In this study, among the 20 participants, 15% (n=3) were illiterate (10% in experimental group and 5% in control group), 20% (n=4) had completed primary studies (5% in experimental group and 15% in control group), 15 %(n=3) has completed secondary studies (5% in experimental group and 10% in control group), 25% (n=5) has completed higher secondary (10% in experimental group and 15% in control group) and 25% (n=5) completed graduation and further studies (20% in experimental group and 5% in control group).

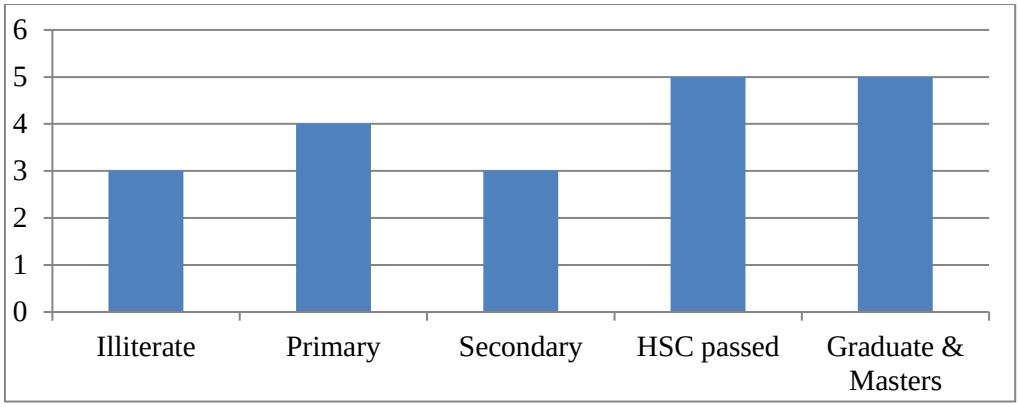


Figure 4.1.7: Educational status of the participants

4.1.8 Smoking Habit

Among the 20 participants, 15 % (n=3) were smoker (5% in experimental group and 10% in control group) and 85% were non-smoker (45% in experimental group and 40% in control group).

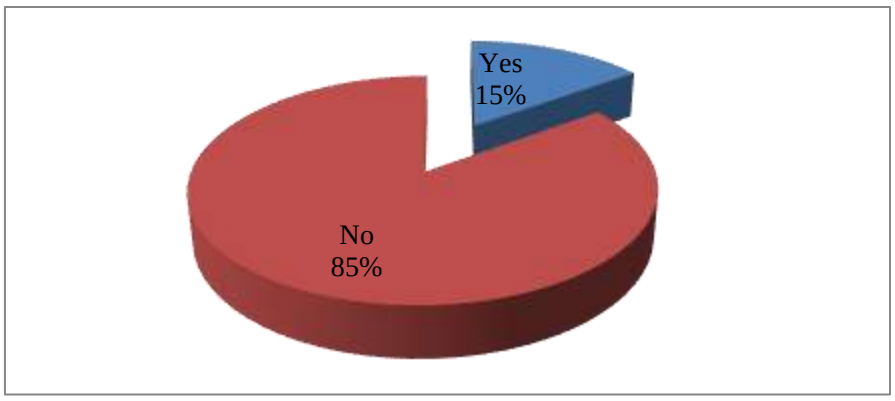


Figure 4.1.8: Smoking habit among the participants

4.1.9 Body Mass Index

In this study, among the all participants (n=20), the highest Body Mass Index (BMI) was 31.673 (26.728 in experimental group and 31.673 in control group) and the lowest was 19.296 (19.296 in experimental group & 21.866 in control group) with the mean BMI of 24.55 (SD ± 2.79) (±2.29 in experimental group and ±3.29 in control group) where 10% (n=2) people are with BMI of 22.701(5% in experimental group and 5% in control group). No participants are with underweight, 35% participants (n=7) are overweight (20% in experimental group & 15% in control group), 5% (n=1) with obesity (in control group) and rest of the others (60%; n=12) are with normal weight.

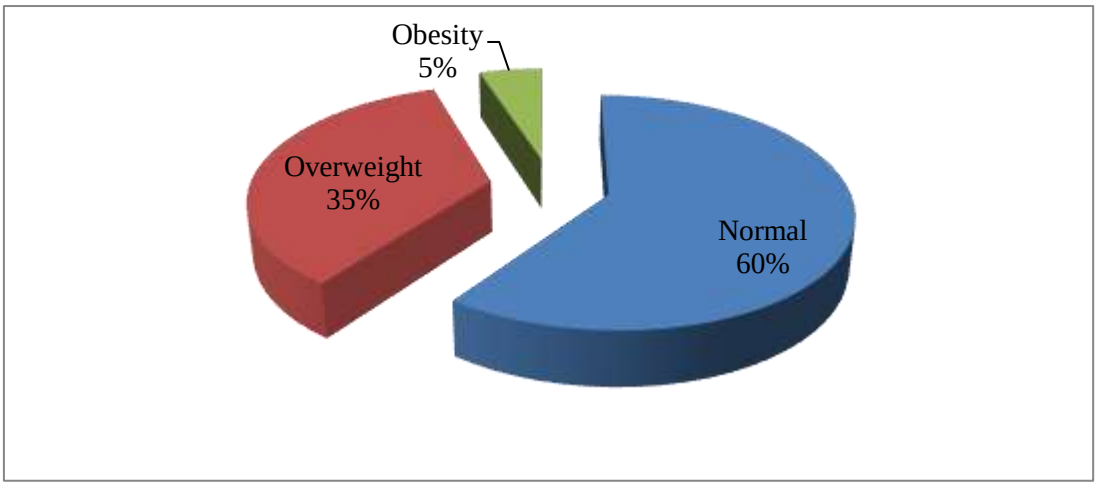


Figure 4.1.9: Body mass index of the participants

4.2 Dallas questionnaire

4.2.1 General pain intensity

This study found that in the general pain intensity, observed t value was 5.701 (4.3±2.385) in the experimental group at two tailed paired t test while this same variable for control group observed value was 5.717 (4.02±2.224) in within group. 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in general pain intensity in both groups which were greater than standard t value that meant null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of general pain intensity were significant at 0.001% level, but the mean difference of the experimental group was greater than the control group mean that means McKenzie treatment for PLID patients was more effective than basic physiotherapy treatment pain with pain killer for reducing general pain intensity. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom standard table value was 2.101 and at the same significant level and same degree of freedom observed t value was 0.796. The observed t value was less than the table value that meant null hypothesis was accepted and alternative hypothesis was rejected which meant there was no difference McKenzie treatment group and basic physiotherapy treatment with medicine (pain killer) group treatment in between group.

The scatter line chart (mentioned below) formed by mean of general pain intensity upon day-to-day (1-8days) progression that revealed mean of the experimental group (McKenzie) reduced more than control group (Basic Physiotherapy with medicine) mean.

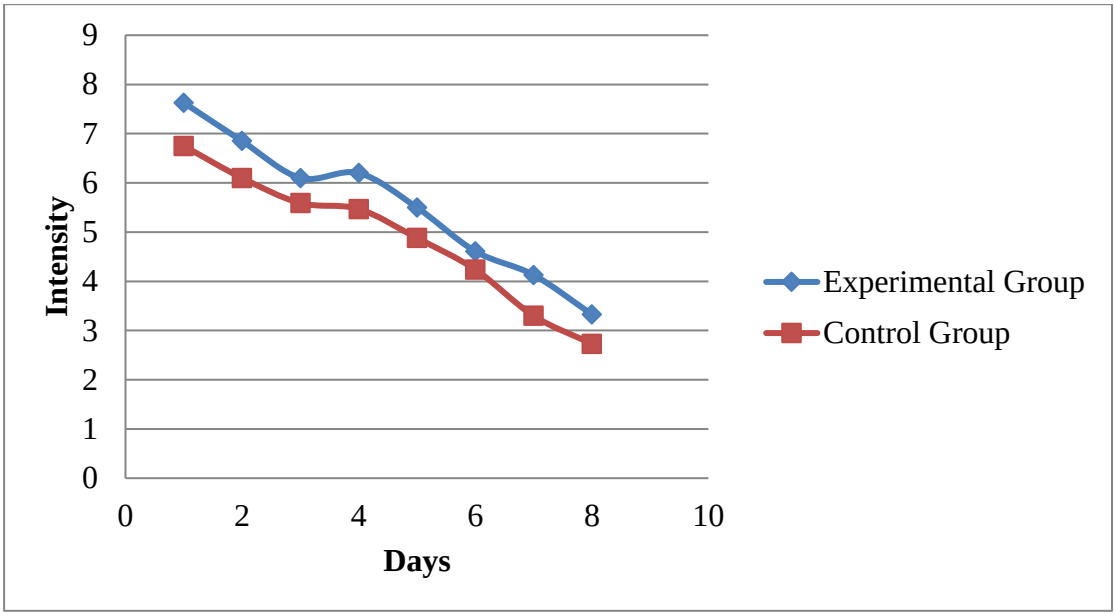


Figure 4.2.1: General pain intensity among the participants

4.2.2 Night pain intensity

This study found that in the night pain intensity, observed t value was 4.470 (3.78±2.674) in the experimental group at two tailed paired t test while this same variable for control group observed value was 3.575 (3.41±3.016). 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in night pain intensity in both groups which were greater than standard t value that meant null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of night pain intensity were significant at 0.002% and 0.006% level. The significant level and mean difference of the experimental group

was greater than the control group mean and significant level that means McKenzie treatment for PLID patients was more effective to reduce night pain intensity than basic physiotherapy treatment with pain killer. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom standard table value was 2.101 and observed t value was 0.694. The observed t value was less than the table value that meant null hypothesis was accepted and alternative hypothesis was rejected which means there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

The scatter line chart (mentioned below) formed by mean of night pain intensity upon day-to-day (1-8days) progression which shown mean of the experimental group reduced more than control group mean.

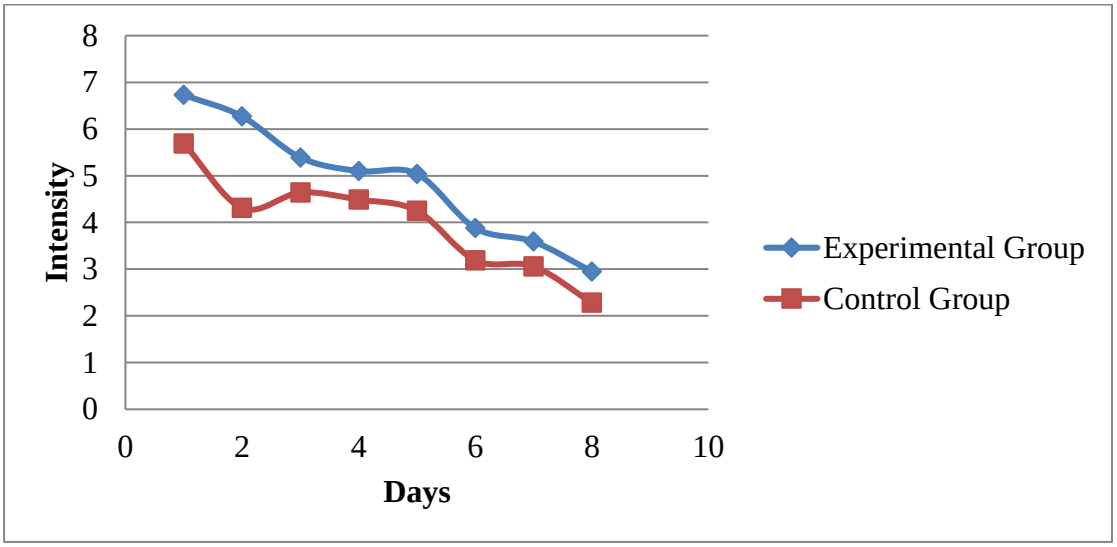


Figure 4.2.2: Night pain intensity among the participants

4.2.3 Pain interfere with Lifestyle

This study found that in the lifestyle interference, observed t value was 2.948 (2.85±3.057) in the experimental group at two tailed paired t test while this same variable for control group observed value was 3.678 (2.72±2.338). 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in the life style interference in both groups which were greater than standard t value that meant null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of lifestyle interference were statistically significant at 0.016% and 0.005%. The mean difference of the experimental group was greater than the control group mean that means McKenzie treatment for PLID patients were superior to basic physiotherapy treatment with pain killer in reducing interfere with lifestyle. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom standard table value was 2.101 and observed t value was 0.281. The observed t value was less than the table value that means null hypothesis was accepted and alternative hypothesis was rejected which means; there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

The scatter line chart (mentioned below) formed by mean of lifestyle interference upon day-to-day (1-8days) progression which shown mean of the experimental group progressed better in comparison with control group mean.

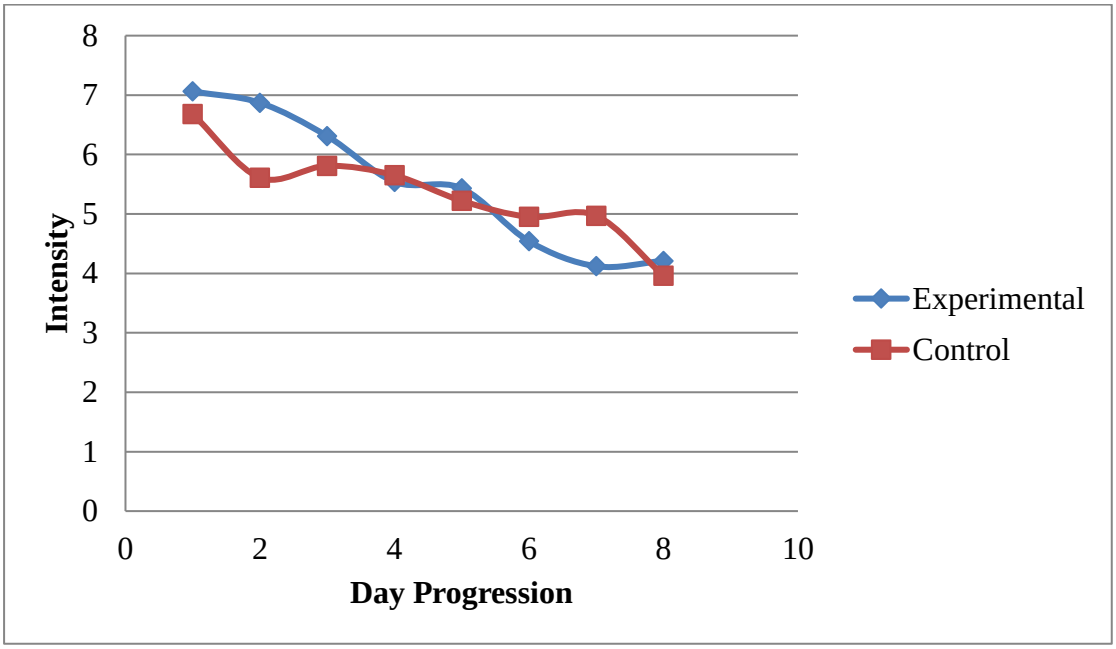


Figure 4.2.3: Pain interfering with lifestyle of the participants

4.2.4 Pain at forward bending activity

This study found that in the pain intensity at forward bending, observed t value was 4.36 (3.31±2.40) in the experimental group at two tailed paired t test while this same variable for control group observed value was 4.635 (3.39±2.313). 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in pain at forward bending activity in both groups which were greater than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of forward bending activity were significant at 0.002 % and 0.001%. The mean difference of the experimental group was slightly less than the control group mean that means basic physiotherapy treatment and

pain killer for PLID patients was slightly better reducing pain at forward bending activity than McKenzie treatment. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom standard table value was 2.101 and observed t value was 1.371. The observed t value was less than the table value that means null hypothesis was accepted and alternative hypothesis was rejected which means; there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

The scatter line chart (mentioned below) formed by mean of pain intensity at forward bending activities upon day-to-day (1-8days) progression which shown mean of the experimental group and control group were very similar but mean of the control reduced slightly more based on mean difference.

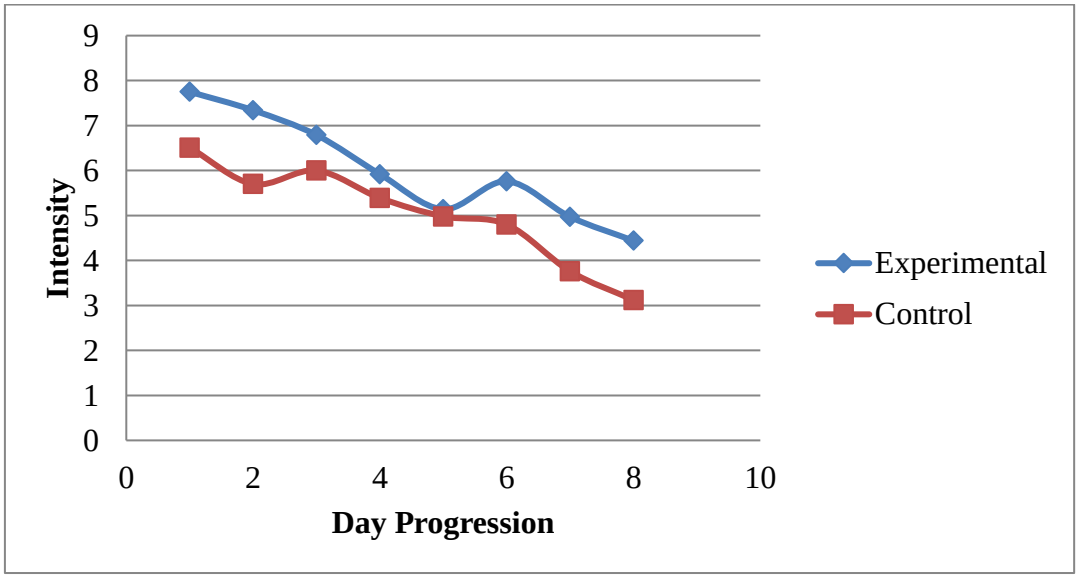


Figure 4.2.4: Severity of pain at forward bending activities

4.2.5 Back Stiffness

This study found that in the back stiffness, observed t value was 3.870 (3.28±2.68) in the experimental group at two tailed paired t test while this same variable for control group observed value was 0.164 (0.160±3.09). 5% level of significant at 9 (nine) degrees of freedom standard t value is 2.262 and observed t value in back stiffness in both groups which were greater than standard t value in experimental group and less in the control group that means null hypothesis had rejected in experimental group and accepted in control group; and alternative hypothesis was accepted in experimental group and rejected in the control group. In experimental group was significant at 0.004% level. So, McKenzie treatment was significantly reducing back stiffness for PLID patients. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom standard table value was 2.101 and observed t value was 0.322. The observed t value was less than the table value that means null hypothesis was accepted and alternative hypothesis was rejected which there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in the between group.

The scatter line chart (mentioned below) formed by mean of back stiffness upon day-to-day (1-8days) progression which shown mean of the experimental group progressed better in comparison to the control group.

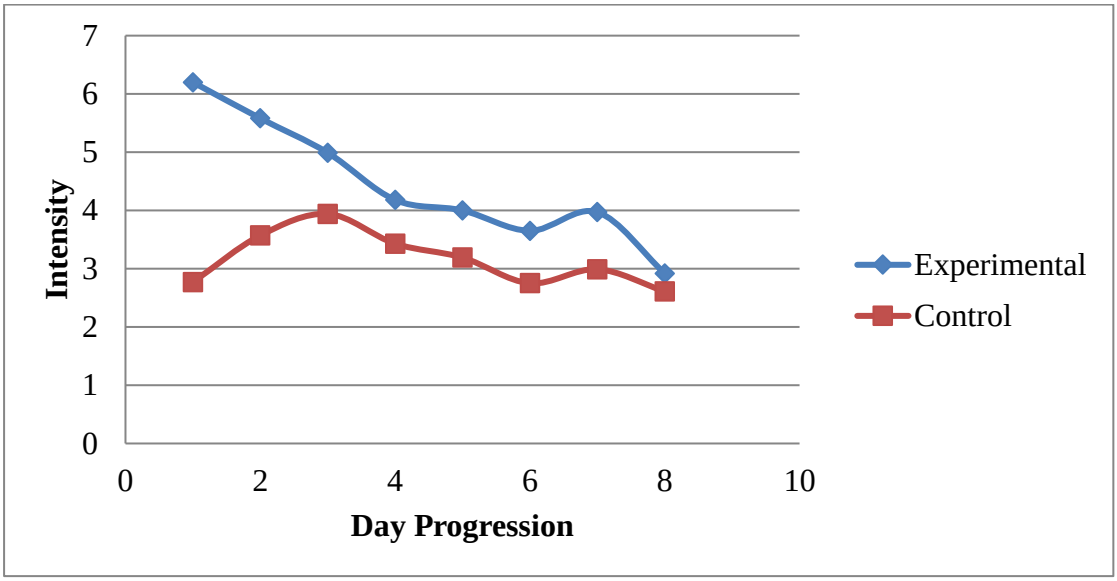


Figure 4.2.5: Feeling of back stiffness

4.2.6 Interfere with walking

This study found that in the Interfere with walking, observed t value was 4.190 (3.09±2.33) in the experimental group at two tailed paired t test while this same variable for control group observed value was 3.480 (3.55±3.226). 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in interfere with walking both groups which were greater than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted. Both groups in aspect of walking interference were significant at 0.002% and 0.007% level. The mean difference and significant level of the experimental group were greater than the control group mean and significant level that means McKenzie treatment for PLID patients was more effective in improving walking than basic physiotherapy treatment and pain killer.

The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom observed t value was 1.064, but standard table value was 2.101. The observed t value was less than the table value that means null hypothesis was accepted and alternative hypothesis was rejected which there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

The scatter line chart (mentioned below) formed by mean of walking interference upon day-to-day (1-8days) progression which shown mean of the experimental group and control group were very similar but mean of the control reduced slightly more based on mean difference.

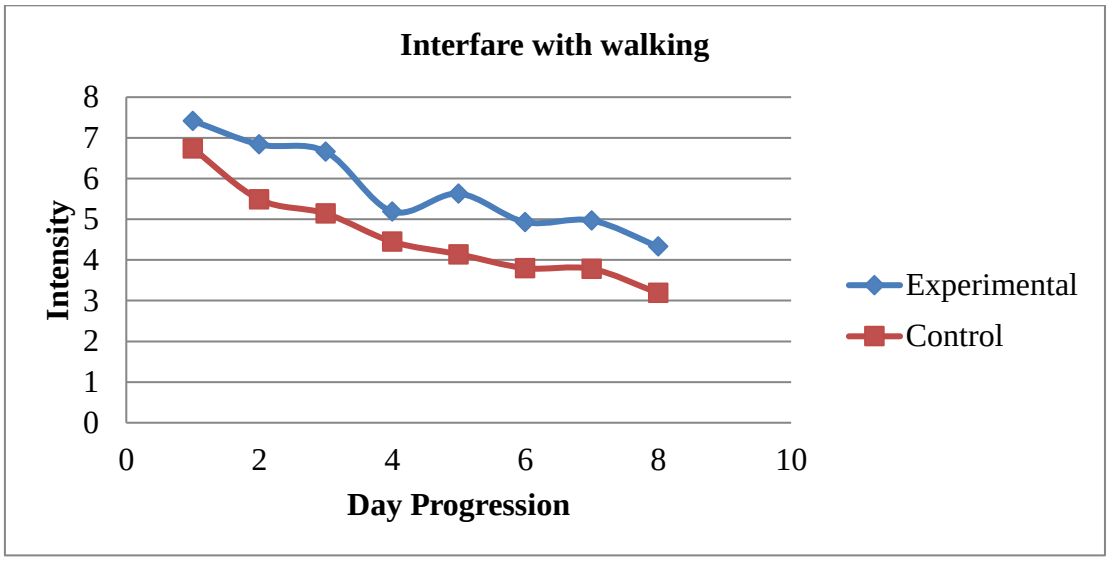


Figure 4.2.6: Interfere with walking

4.2.7 Hurt when walking

This study found that in the Hurt when walking, observed t value was 4.167 (3.02±2.292) in the experimental group at two tailed paired t test while this same variable for control group observed value was 3.952 (3.3±2.64). 5% level of significant at 9 (nine) degrees of freedom standard t value is 2.262 and observed t value in hurt

when walking in both groups which were greater than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of hurt when walking were significant at 0.002% and 0.003% level. The mean difference and significant level of the experimental group were greater than the control group mean and significant level that means McKenzie treatment for PLID patients were more effective reducing hurt when walking than basic physiotherapy treatment with pain killer. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom observed t value was 1.391 and standard table value was 2.101. The observed t value was less than the table value that means null hypothesis had accepted and alternative hypothesis was rejected which means; there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

The scatter line chart (mentioned above) formed by mean of hurt when walking upon day-to-day (1-8days) progression which shown mean of the experimental group and control group were very similar but mean of the control reduced slightly more finally based on mean difference.

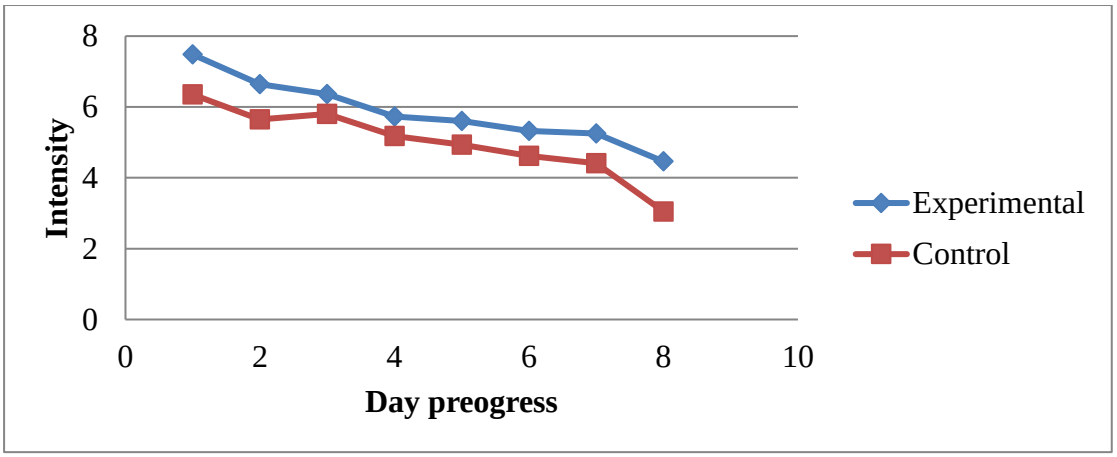


Figure 4.2.7: Hurt during walking

4.2.8 Standing still

This study found that in standing still, observed t value was 4.217 (3.45±2.587) in the experimental group at two tailed paired t test while this same variable for control group observed value was 2.7 (2.74±3.209). 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in standing still in both groups which were greater than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of standing still were significant at 0.002% and 0.024% level. The mean difference and significant level of the experimental group was greater than the control group mean and significant level that means McKenzie treatment for PLID patients was more effective reducing pain in standing position than basic physiotherapy treatment with pain killer. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom observed t value was 0.191, but standard table value was 2.101. The observed t value was less than the table value that means null hypothesis was accepted and alternative hypothesis was rejected which there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

The scatter line chart (mentioned below) formed by mean of standing still upon day-to-day (1-8days) progression which shown mean of the experimental group progressed better finally in comparison to the control group based on mean difference.

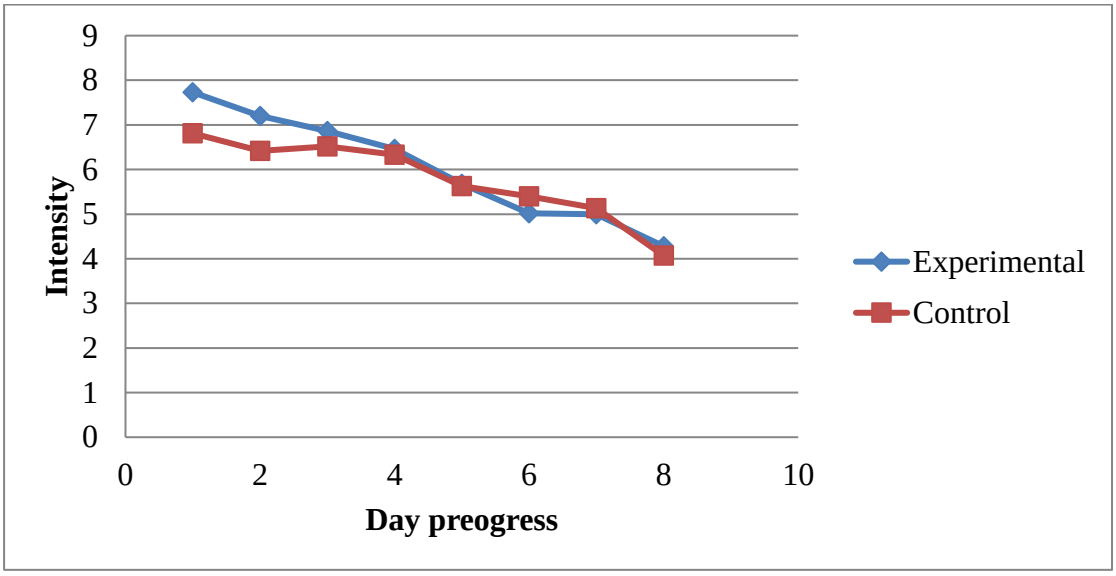


Figure 4.2.8: Pain keeps from standing still

4.2.9 Twisting

This study found that in pain keep when twisting, observed t value was 1.855 (1.73±2.95) in the experimental group at two tailed paired t test while this same variable for control group observed value was 0.899 (0.81±2.851). 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in pain keep when twisting in both groups which were less than standard t value that meant null hypothesis was accepted and alternative hypothesis was rejected in both group in the within group. Both groups were not statistically significant. The mean difference of the experimental group was greater than the control group mean that means McKenzie treatment for PLID patients was more effective during twisting activities than basic physiotherapy treatment with pain killer. The Unrelated/independent t test in between

group at 5% level of significant and 18 degrees of freedom observed t value was 0.947 and standard table value was 2.101. The observed t value was less than the table value that means null hypothesis was accepted and alternative hypothesis was rejected which means there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

The scatter line chart (mentioned below) formed by mean of Pain keep from twisting upon day-to-day (1-8days) progression which shown mean of the experimental group progressed better finally in comparison to the control group based on mean difference.

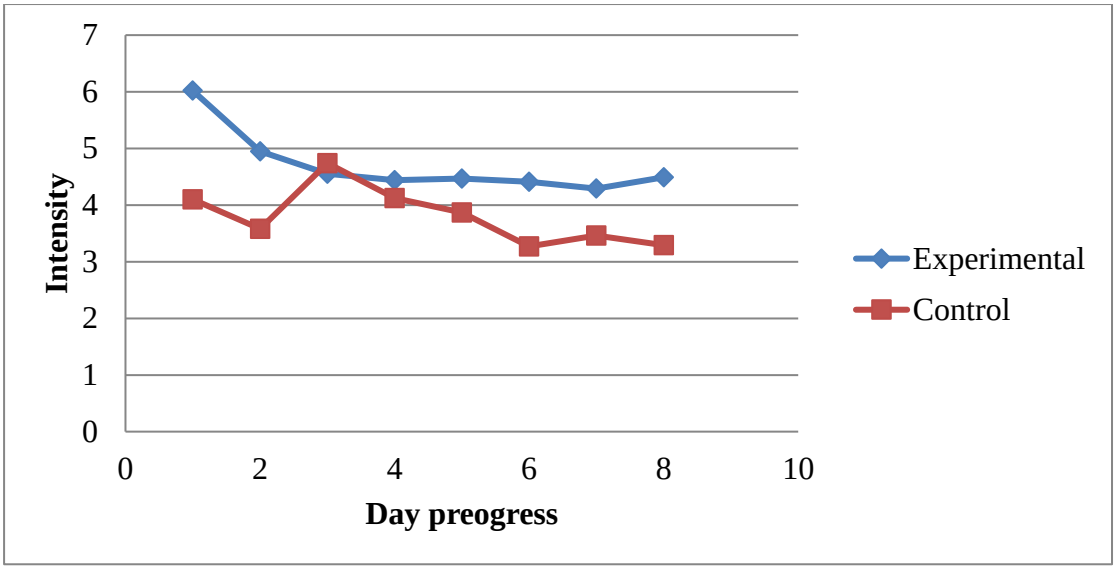


Figure 4.2.9: Pain keeps from twisting

4.2.10 Upright Hard Chair Sitting

This study found that in upright hard chair sitting, observed t value was 1.2 (1.73±2.95) in the experimental group at two tailed paired t test while this same variable for control group observed value was 2.596 (2.58±3.143). 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in general pain intensity was 1.2 in experimental group and 2.596 in control group. The observed t value in experimental was less than the standard t value, so null hypothesis was accepted and alternative hypothesis was rejected, that indicated that McKenzie treatment approach was not so much effective for reducing pain in this position. The observed t value in control group was greater than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group. In control group in aspect of hard chair sitting is significant at 0.023% level that means basic physiotherapy treatment with medicine for PLID patients was significantly effective than McKenzie treatment. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom observed t value was 1.040 and standard table value in 18 degree of freedom was 2.101. The observed t value was less than the table value that means null hypothesis was accepted and alternative hypothesis was rejected which there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

The scatter line chart (mentioned below) formed by mean of sitting on hard chair upon day-to-day (1-8days) progression which shown mean of the experimental group progressed less in comparison to control group based on mean difference.

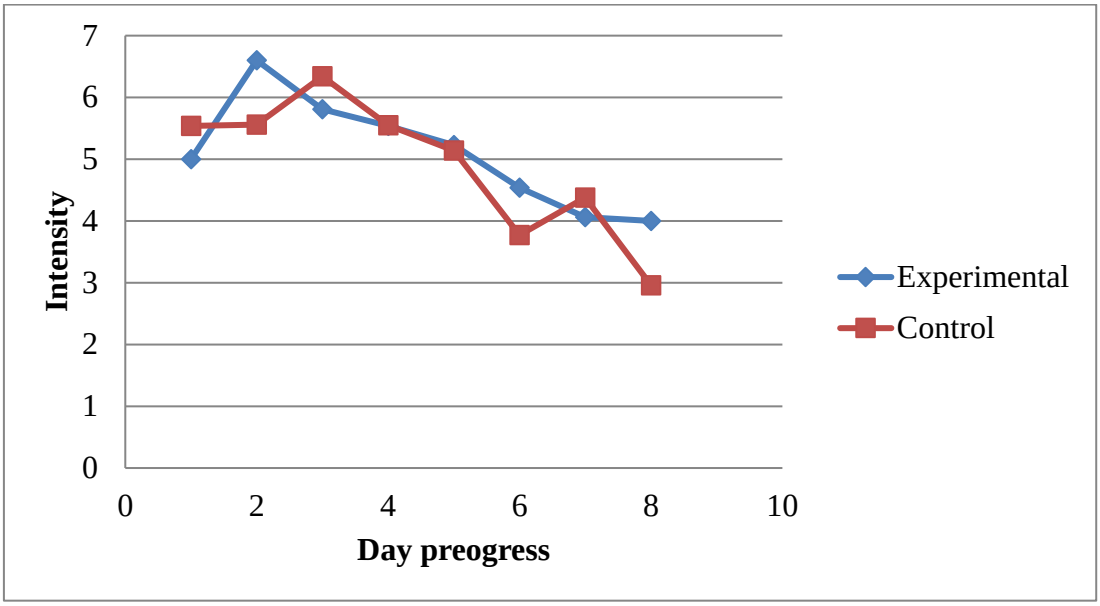


Figure 4.2.10: Sit in an upright hard chair

4.2.11 Soft Arm Chair Sitting

This study found that in soft arm chair sitting, observed t value was 1.366 (1.68±3.89) in the experimental group at two tailed paired t test while this same variable for control group observed value was 2.803 (1.99±2.245). 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in soft arm chair sitting was 1.366 in experimental group and 2.803 in control group. The observed t value in experimental was less than the standard t value, so null hypothesis was accepted and alternative hypothesis was rejected, that indicated that McKenzie treatment approach was not effective for reducing pain in this position. The observed t value in control group was greater than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group. In control group in aspect of soft arm chair sitting was significant at 0.021% level that means basic

physiotherapy treatment with medicine for PLID patients was significantly effective than McKenzie treatment in aspect of soft chair sitting position. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom observed t value was 0.495, but standard table value was 2.101. The observed t value was less than the table value that meant null hypothesis was accepted and alternative hypothesis was rejected which there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

The scatter line chart (mentioned below) formed by mean of sitting on soft chair upon day-to-day (1-8days) progression which shown mean of the experimental group and control group were very similarly progressed but mean of the control reduced slightly more finally based on mean difference.

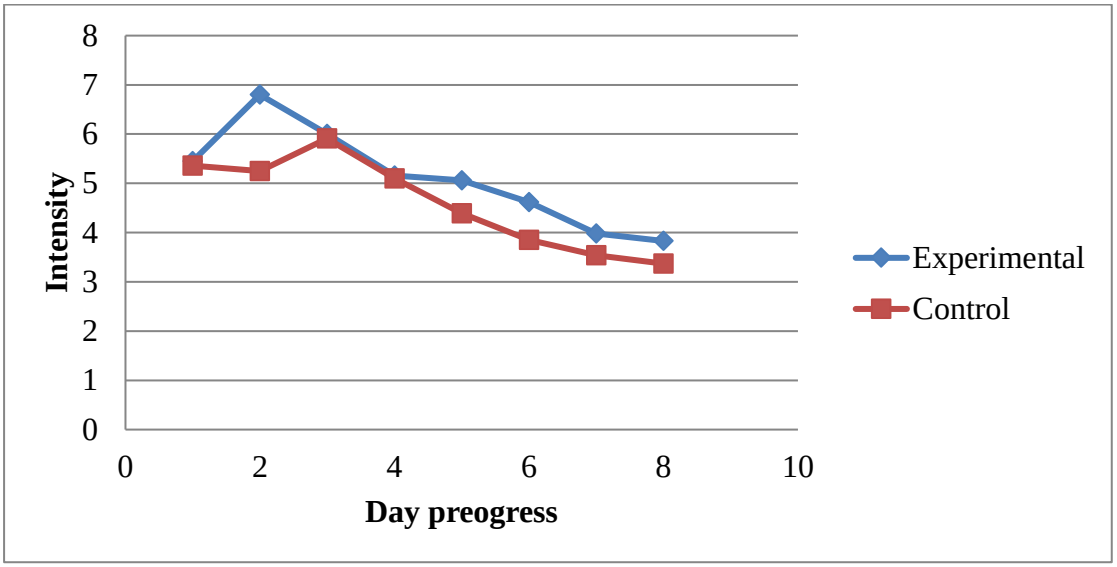


Figure 4.2.11: Sit in a soft arm chair

4.2.12 Lying in Bed

This study found that pain in soft bed lying, observed t value was 1.976 (2.21±3.537) in the experimental group at two tailed paired t test while this same variable for control group observed value was 3.922 (2.29±1.847). 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262. The observed t value in experimental was less than the standard t value, so null hypothesis was accepted and alternative hypothesis was rejected, that indicated that McKenzie treatment approach was not more effective for reducing pain in this position. The observed t value in control group was greater than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group. In control group in aspect of pain in soft bed was significant at 0.023% level that means basic physiotherapy treatment with medicine for PLID patients was significantly effective in this position than McKenzie treatment. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom observed t value was 1.011, but standard table value was 2.101. The observed t value was less than the table value that meant null hypothesis was accepted and alternative hypothesis was rejected which there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

The scatter line chart (mentioned below) formed by mean of Lying on bed upon day-to-day (1-8days) progression which shown mean of the experimental group and control group were very similarly progressed based on mean difference.

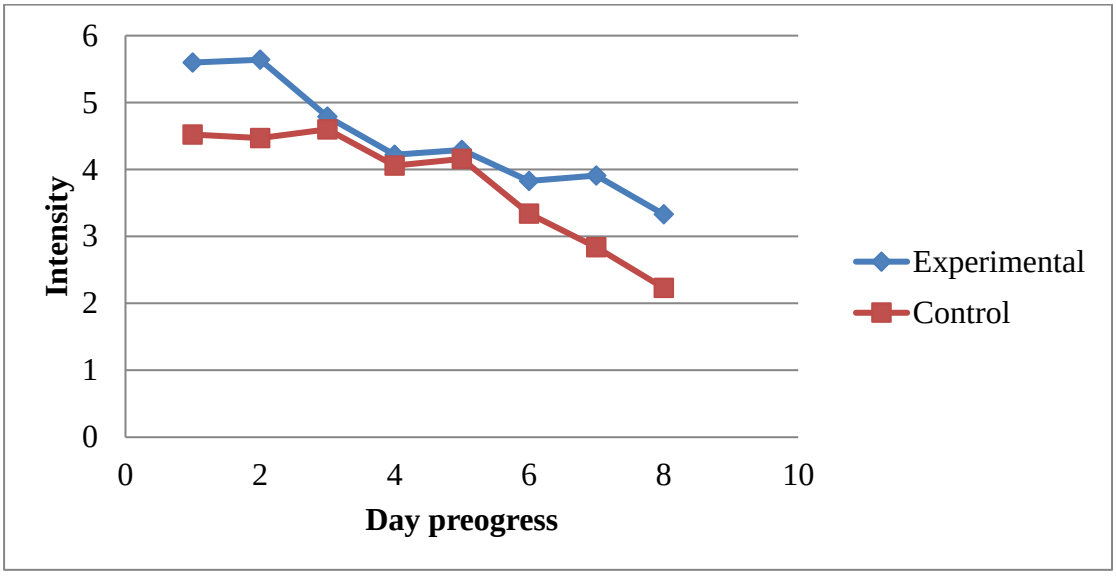


Figure 4.2.12: Pain when lying in a bed

4.2.13 Pain Limit Normal Lifestyle

This study found that pain in the life style limitation, observed t value was 3.336 (2.81±2.66) in the experimental group at two tailed paired t test while this same variable for control group observed value was 3.152 (2.25±2.257) in tailed test . 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in pain in the life style limitation in groups which were greater than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of pain in lifestyle limitation were significant at 0.009% and 0.012% level. The mean difference and level of significant of the experimental group was greater than the control group mean and significant level that means McKenzie treatment for PLID patients were more returning in their normal

lifestyle than basic physiotherapy treatment with pain killer. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom observed t value was 0.213, but standard table value was 2.101. The observed t value was less than the table value that means null hypothesis was accepted and alternative hypothesis was rejected which there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

The scatter line chart (mentioned below) formed by mean of Lifestyle limitation upon day-to-day (1-8days) progression which shown mean of the experimental group progressed better finally in comparison to the control group based on mean difference.

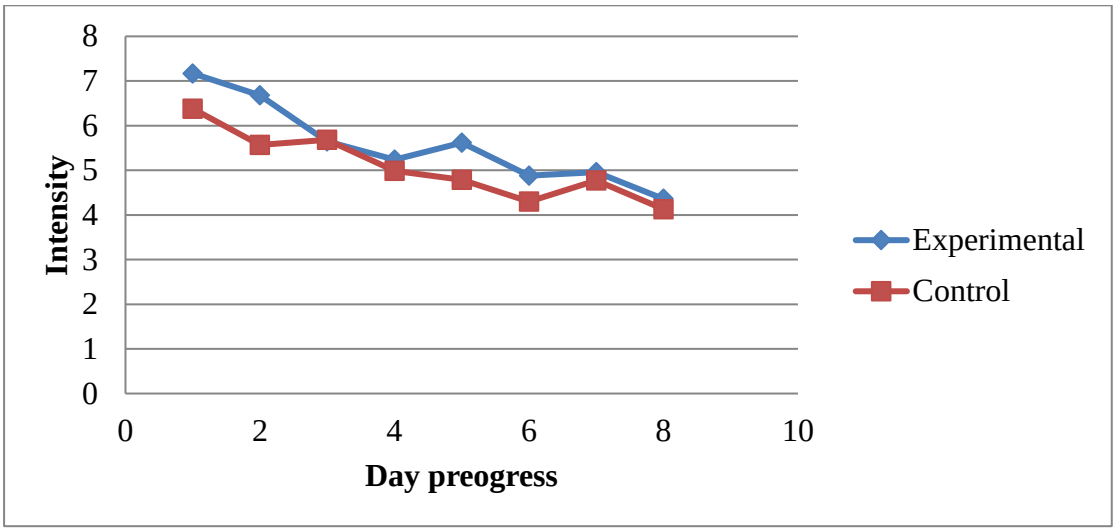


Figure 4.2.13: Limitation of normal lifestyle due to pain

4.2.14 Pain Interfere with work

This study found that pain interfere with work, observed t value was 4.147 (2.86±2.18) in the experimental group at two tailed paired t test while this same variable for control group observed value was 1.971 (2.13±3.417). 5% level of significant at 9 (nine) degrees of freedom standard t value was 2. 262. The observed t value was greater than standard t value that means null hypothesis was rejected and alternative hypothesis was

accepted in the within group in experimental group and significant level was at 0.002%. So McKenzie treatment approach was significantly reducing pain interfere with work for PLID patients. On the other hand, in control group observed t value was less than the standard table value which means that null hypothesis was accepted and alternative hypothesis was rejected. So, basic physiotherapy therapy with painkiller was not significantly effective for PLID patients in this indicator. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom observed t value was 0.455, but standard table value was 2.101. The observed t value was less than the table value that means null hypothesis was accepted and alternative hypothesis was rejected which there was no difference in working position pain by McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

The scatter line chart (mentioned below) formed by mean of work interference upon day-to-day (1-8days) progression which shown mean of the experimental group progressed better finally in comparison to the control group based on mean difference.

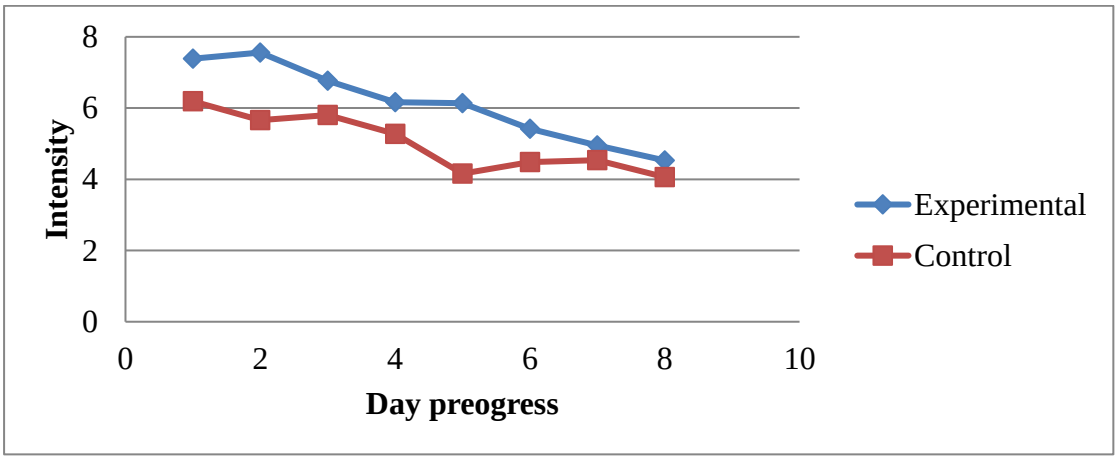


Figure 4.2.14: Pain interfere with work

4.2.15 Change of workplace

This study found that in workplace change, observed t value was 3.516 (2.98±2.68) in the experimental group at two tailed paired t test while the same variable for control group observed value was 2.290 (2.07±2.859). 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in workplace change in both groups which were greater than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the both groups. Both groups in aspect of changing workplace were significant at 0.007 and 0.05% level. The mean difference and significant level of the experimental group was greater than the control group mean and significant level that means McKenzie treatment for PLID patients was more effective when change of workplace than basic physiotherapy treatment with pain killer. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom observed t value was 0.659, but standard table value was 2.101. The observed t value was less than the table value that means null hypothesis was accepted and alternative hypothesis was rejected which there was no difference changing workplace by McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

The scatter line chart (mentioned below) formed by mean of workplace changing upon day-to-day (1-8days) progression which shown mean of the experimental group progressed better finally in comparison to the control group based on mean difference.

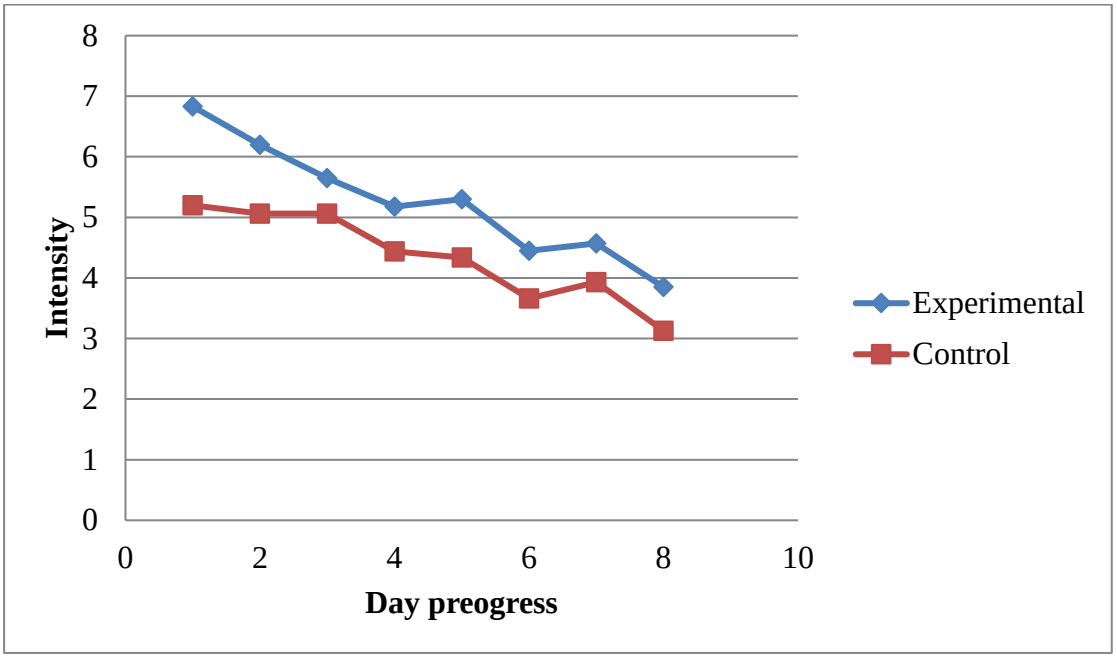


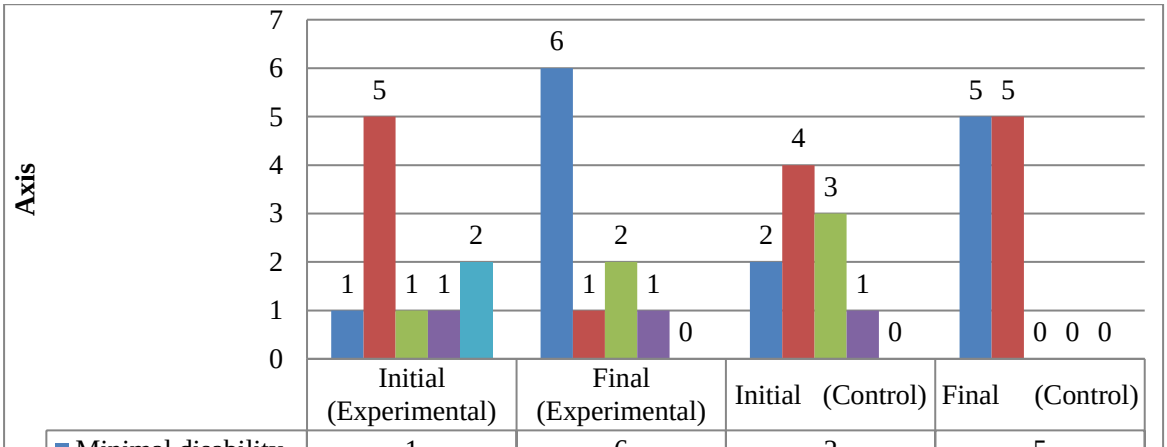
Figure 4.2.15: Change of workplace due to pain

Follow up after two months

Intitial assessment and after two month follow up revealed that all of the indicators of Dallas pain questionaire were significant at 5% level or higher level of significant except sit in upright hart chair and sit in soft arm chair at the McKenzie treatment group. On the other hand, back stiffness, pain keep in twisting and inference in walk was not significant within the control group. Beside this, final assessment and after two month follow up revealed that all of the indicators of Dallas pain questionaire were significant at 5% level or higher level of significant except pain at night, pain keep from standing still, sit in soft arm chair, pain in lying and change of workplace at the McKenzie treatment group. But, all of the indicators were not significant except infere with lifestyle within the control group. So, significant level of most of the indicators were higher in Mckenzie treatment group than the basic physiotherapy treatment group along with painkiller in within group. But after two months follow up all of the indicators was found statistically not significant in between group but all the value were positive which indicates that the experimental group were higher level of significance than the control group.

4.3 Oswestry Low Back Pain Disability Questionnaire

In this study, among the participants of experimental group (n=10), 20% participants (n=2) had bed-bounded disability at the initial assessment where there was no participants was found in that group of disability in the final assessment and no participants has found with crippled disability in the follow-up whilst 60% participants were with mild level of disability and 10% has lost to the follow-up. On the other hand, there were no participants (n=0) with bed-bounded disability among the control group (n=10). Beside this, 30% participants (n=3) were with severe disability and 10% participant (n=1) was with crippled disability in the initial assessment whilst no participants (n=0) were with those group of disability after the final assessment. 50% participants were with mild disability where 30% lost to the follow-up in this group (n=10).



	Initial (Experimental)	Final (Experimental)	Initial (Control)	Final (Control)
Minimal disability	1	6	2	5
Moderate Disability	5	1	4	5
Severe Disability	1	2	3	0
Crippled	1	1	1	0
Bed-bounded	2	0	0	0

Figure 4.3.1: Disability among the participants

The scatter line chart (mentioned below) formed by mean of Oswestry disability index upon day-to-day (1-8days) progression which shown mean of the experimental group progressed better finally in comparison to the control group based on mean difference.

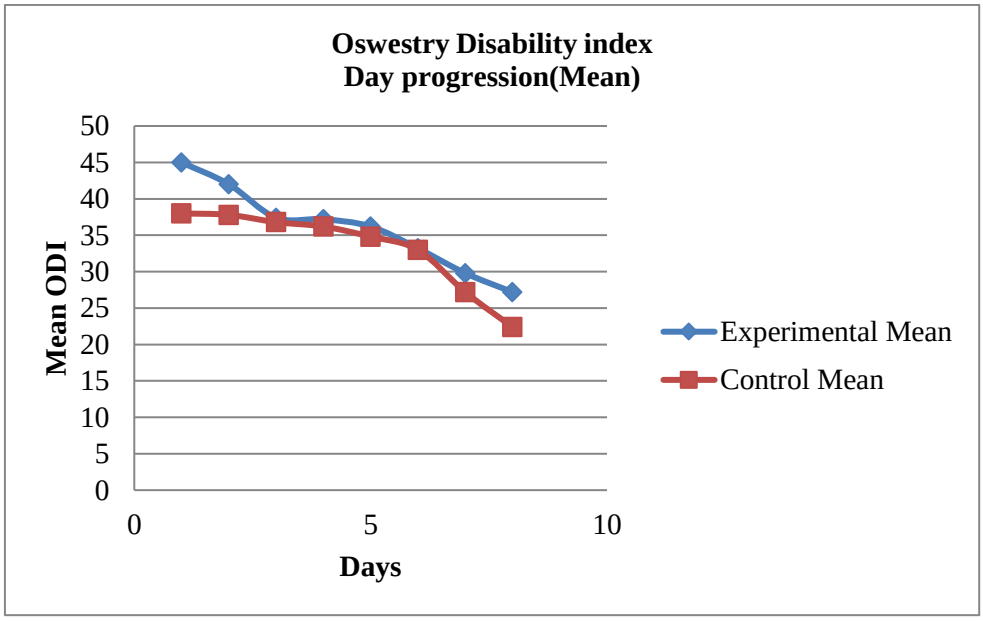


Figure 4.3.2: Mean disability in day progression

In this study, among the participants, rate of mean disability (from initial assessment to follow-up) decreased more in experimental group (from 45% to 19.33%) in comparison to the control group (from 38% to 20%).

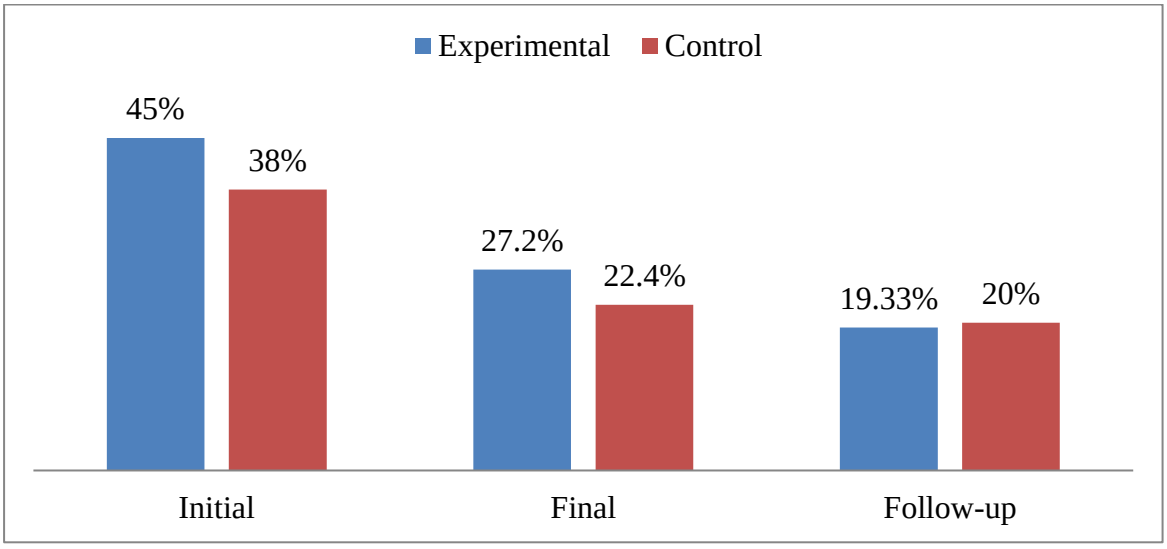


Figure 4.3.3: Mean disability

In Oswestry low back pain disability questionnaire, observed paired t test value was 3.714 (17.8±15.157) in experimental group and 3.265 (15.6±15.108) in control group and 9 degrees of freedom at 5 % significant level standard table value was 2.262 which was lesser than the observed t valve that null hypothesis was rejected and alternative hypothesis was accepted in within group. Both groups were significant at 0.005% and 0.01% level. Both groups were statistically significant but experimental group (0.005) was higher significant level than control group (0.01) which indicated that McKenzie treatment approach more reduced disability for PLID patients than basic physiotherapy with pain killer.

4.4 Fear-avoidance belief questionnaire

4.4.1 Fear-avoidance belief about work (Item: 6+7+9+10+11+12+15)

This study finds that in fear-avoidance belief about work, observed t value was 3.651 (3.1±2.685) in the experimental group at two tailed paired t test while this same variable for control group observed value was 1.742 (3.1±5.626). 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in fear-avoidance belief about work was 3.651 in experimental group and 1.742 in control group which were greater than standard t value in experimental group and less than in control group that means null hypothesis was rejected in experimental group and excepted in control group and alternative hypothesis was accepted in experimental group and rejected in control group in the within group. Experimental group in aspect of fear-avoidance belief about work was significant at 0.005% level. The experimental group was significant that means McKenzie treatment approach for PLID patients were effective for reducing fear avoidance beliefs about work than basic physiotherapy treatment with pain killer. The Unrelated/independent t test in between group at 5%

level of significant and 18 degrees of freedom standard table value was 2.101 and observed t value was 2.425. The observed t value was greater (significant level 0.026%) than the table value that meant null hypothesis was rejected and alternative hypothesis was accepted which means McKenzie treatment was statistically significant, so McKenzie treatment approach was very much effective for reducing fear avoidance beliefs about work than basic physiotherapy treatment with medicine (pain killer) in between group.

4.4.2 Fear-avoidance belief about physical activity (Item: 2+3+4+5)

This study finds that in fear-avoidance belief about physical activity, observed t value was 2.126 (2.5±3.719) in the experimental group at two tailed paired t test while this same variable for control group observed value was 2.940 (1.7±1.829). 5% level of significant at 9 (nine) degrees of freedom standard t value is 2.262 and observed t value in pain at forward bending activity was 2.126 in experimental group and 2.940 in control group which are greater than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of forward bending activity were significant at 0.062 % and 0.016%. The mean difference of the experimental group is slightly less than the control group mean that meant basic physiotherapy treatment and pain killer for PLID patients was slightly better than McKenzie treatment during forwarding activity. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom standard table value was 2.101 and observed t value was -1.126. The observed t value was less than the table value that means null hypothesis was accepted and alternative hypothesis was rejected which means; there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

4.5 Sciatica Bothersome Questionnaire

4.5.1 Leg Pain

This study found that in the 'Leg pain' domain, observed t value was 4.583 (1.4±0.966) in the experimental group at two tailed paired t test while this same variable for control group observed value was 5.667 (1.7±0.949) in within group. 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in 'Leg pain' domain was 4.583 in experimental group and 5.667 in control group which were greater than standard t value that meant null hypothesis was rejected and alternative hypothesis was accepted. Both groups in aspect of 'Leg Pan domain' are significant at 0.001% level, but the mean difference of the control group was greater than the experimental group mean that means; basic physiotherapy treatment pain with killer for PLID patients was more effective than McKenzie treatment. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom standard table value was 2.101 and observed t value was 0.323. The observed t value was less than the table value that meant; null hypothesis was accepted and alternative hypothesis was rejected which meant; there was no difference McKenzie treatment approach and basic physiotherapy treatment with medicine (pain killer) group treatment in between group.

In this study, among the all the participants (n=20), 70% (n=14) was feeling extremely bothersome in 'leg pain' domain (35% in experimental group and 35% in control group) at the initial day whilst there was no participants with feeling extremely bothersome in the final day.

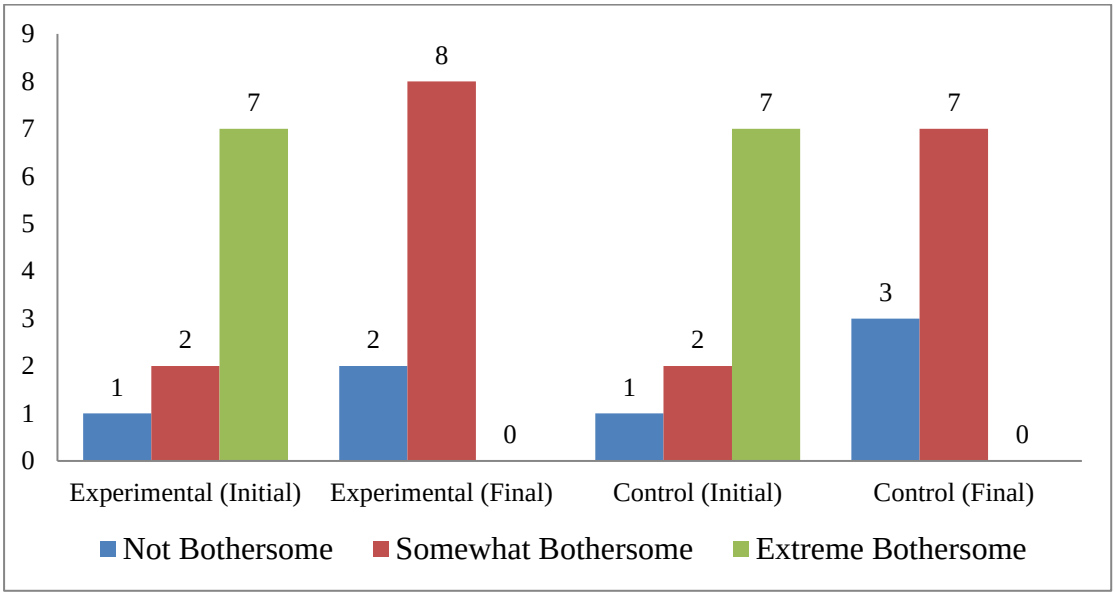


Figure 4.5.1: Comparing both-group leg pain (Initial-Final)

4.5.2 Numbness-Tingling sensation in leg

This study had found that in the 'Numbness-Tingling sensation' domain, observed t value was 5.622 (2.4±1.35) in the experimental group at two tailed paired t test while this same variable for control group observed value was 3.353 (1.9±1.792). 5% level of significant at 9 (nine) degree of freedom standard t value was 2.262 and observed t value in 'Numbness-Tingling sensation' domain in both group which were greater than standard t value that meant; null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of 'Numbness-Tingling sensation' domain were significant at 0.002% and 0.006% level. The significant level and mean difference of the experimental group was greater than the control group mean

and significant level that means McKenzie treatment approach for PLID patients was more effective for reducing numbness and tingling sensation in leg than basic physiotherapy treatment with pain killer. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom standard table value was 2.101 and observed t value was 0.142. The observed t value was less than the table value that meant null hypothesis was accepted and alternative hypothesis was rejected which meant; there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

Among the all the participants (n=20), 60% (n=12) participants were feeling extremely bothersome in 'numbness-Tingling sensation domain' (35% in experimental group and 25% in control group) at the initial day where only 5% (n=1) participant (in control group) was with extremely bothersome at final session.

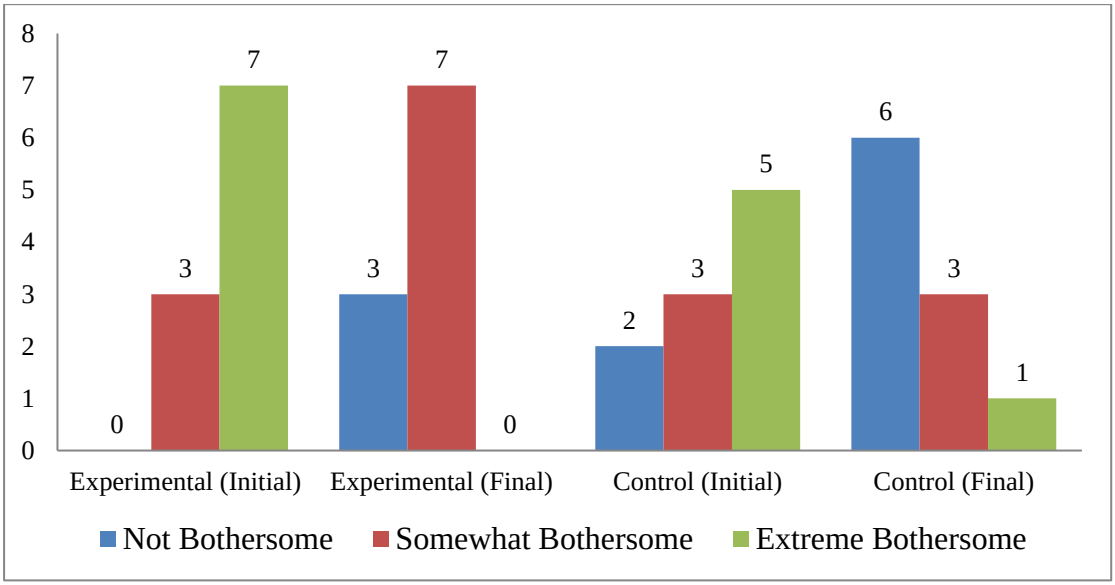


Figure 4.5.2: Comparing both-group 'numbness-tingling sensation' (Initial-Final)

4.5.3 Weakness in leg

This study found that in the 'Weakness in leg' domain, observed t value was 2.689 (1.4±1.647) in the experimental group at two tailed paired t test while this same variable for control group observed value was 1.769 (1.4±2.503) in within group. 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in the 'Weakness in leg' domain was 2.689 in experimental group and 1.769 in control group which were greater than standard t value in experimental group and less in the control group that meant; null hypothesis was rejected in experimental group and accepted in the control group and alternative hypothesis was accepted in experimental group and rejected in control group. Experimental group in aspect of 'Weakness in leg' domain was statistically significant at 0.025% level. The experimental group was significant, but control group was not statistically significant that means; McKenzie treatment for PLID patients was significantly reduce weakness in leg than basic physiotherapy treatment with pain killer. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom standard table value was 2.101 and observed t value was -0.332. The observed t value was less than the table value that meant; null hypothesis was accepted and alternative hypothesis was rejected that meant there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

In ‘weakness’ domain, 45% (n=9) participants were with extreme bothersome (15% in experimental group & 30% in the control group) at the initial day and no participants with feeling of extreme bothersome at the final day.

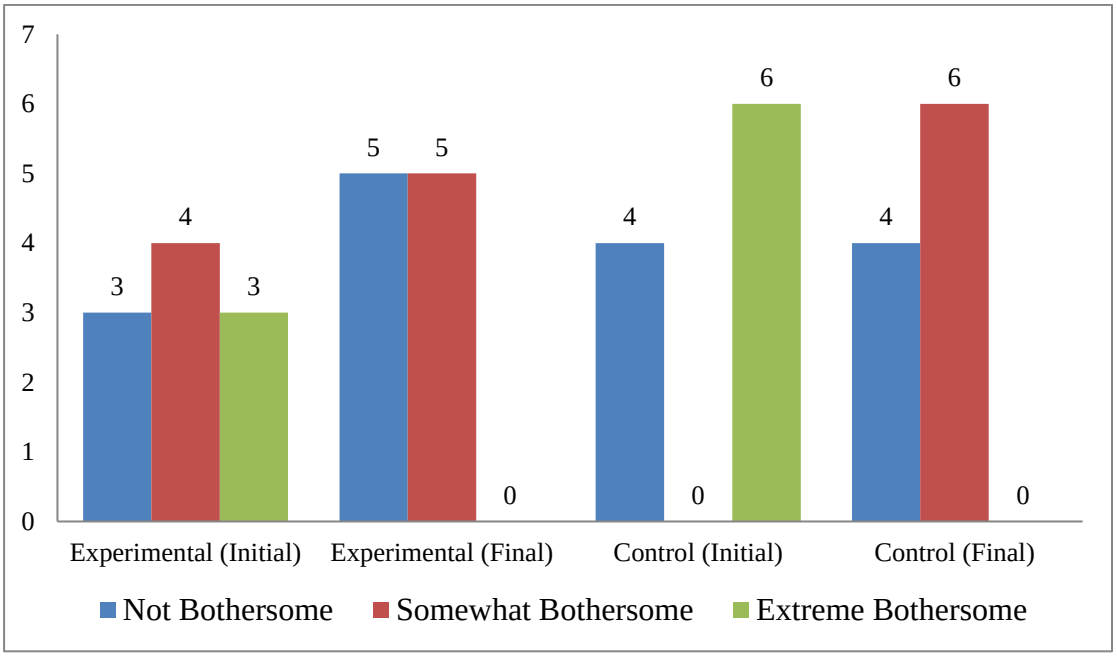


Figure 4.5.3: Comparing both-group weakness in leg (Initial-Final)

4.5.4 Back pain or leg pain in sitting

This study found that in the ‘Back pain or leg pain in sitting’ domain, observed t value was 3.308 (1.5±1.434) in the experimental group at two tailed paired t test while this same variable for control group observed value was 2.409 (1.4±1.838). 5% level of significant at 9 (nine) degrees of freedom standard t value was 2.262 and observed t value in back pain or leg pain in sitting in both group were greater than standard t value that meant; null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of ‘Back pain or leg pain in sitting’ domain were significant at .009 % and .039%. The significant level of the experimental group was higher than the control group significant level that meant; McKenzie treatment

approach for PLID patients was better reducing back pain or leg pain than basic physiotherapy treatment with painkiller. The Unrelated/independent t test in between group at 5% level of significant and 18 degrees of freedom standard table value was 2.101 and observed t value was 0.466. The observed t value was less than the table value that means; null hypothesis was accepted and alternative hypothesis was rejected which meant, there was no difference McKenzie treatment and basic physiotherapy treatment with medicine (pain killer) in between group.

There was no participants were with feeling of extreme bothersome in 'sitting leg pain' domain at final session where 20% (n=4) participants (5% in experimental group & 15% in control group) had feeling of extreme bothersome in the initial session.

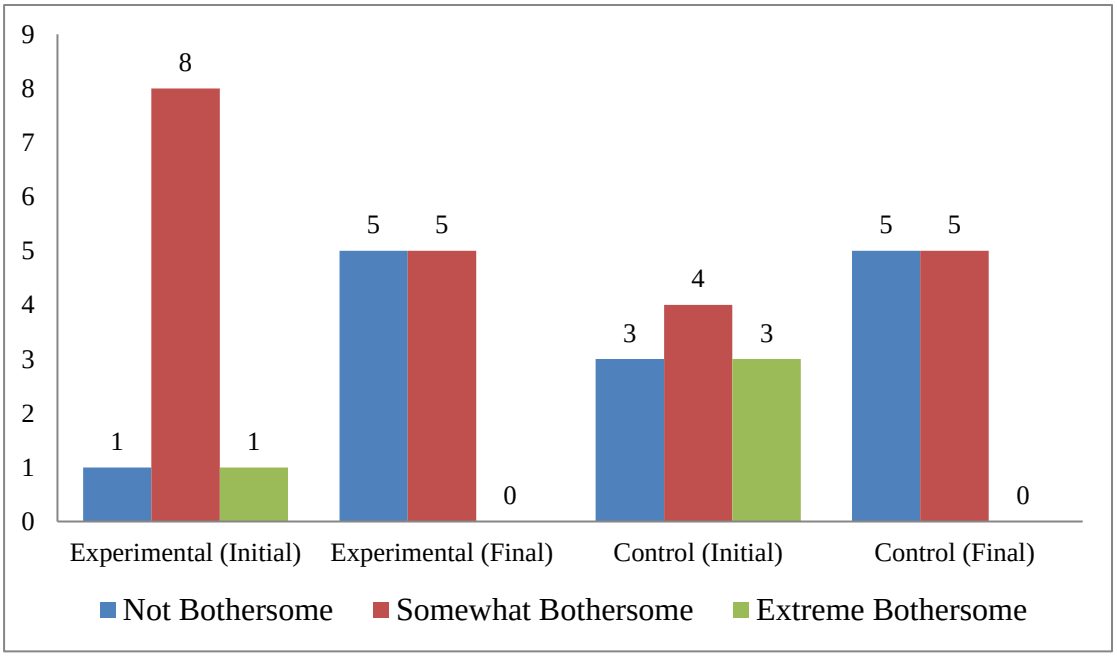


Figure 4.5.4: Comparing both-group back or leg pain in sitting (Initial-Final)

CHAPTER-V DISCUSSION

The researcher was devoted to find out the effectiveness of McKenzie physiotherapy treatment approach for PLID patients compared with basic physiotherapy treatment and medicine (painkiller). The different measurement tools were used to examine the hypothesis and test the hypothesis whether the null hypothesis were accepted or not based on the smaller or larger p. Self-oriented semi-structural questionnaire was used to find out the socio-demographical indicators. Significant improvements occurred in most of the measures that were recorded before and after treatment. The result found that the mean age of both group was 39.9 years (36.6 years in experimental group and 43.3 years in control group). The male was 60% and female was 40% in the both groups. 30% of the patients occupation were housewives (10% in experimental group and 20% in control group), 25% were service holder (15% in experimental group and 10% in control group), 20% were businessman (20% in experimental group and 20% in control group) and 25% (n=5) were the others. 75% of the subjects under study have small family size (40% in experimental group and 35% in control group) whereas 25% have large family size (n=5) (10% in experimental group and 15% in control group). 55% participants were living in rural area (25% in experimental group and 30% in control group) and 45% participants were living in urban area (25% in experimental group and 30% in control group). Out of the total participants 15% were illiterate (10% in experimental group and 5% in control group), 20% had completed their primary studies (5% in experimental group and 15% in control group), 15% completed their secondary school level (5% in experimental group and 10% in control group), 25% completed their higher secondary level education (10% in experimental group and 15% in control group) and 25% has completed their graduation or higher level education (20% in

experimental group and 5% in control group). Among all the participants the highest Body Mass Index (BMI) was 31.673 (26.728 in experimental group and 31.673 in control group) and the lowest was 19.296 (19.296 in experimental group and 21.866 in control group) with the mean BMI of 24.55 (with SD ± 2.79) (±2.29 in experimental group and ±3.29 in control group) where 10% people are with BMI of 22.701(5% in experimental group and 5% in control group). No participants are with underweight, 35% participants were overweight (20% in experimental group & 15% in control group), 5% with obesity (in control group) and rest of the others (60%; n=12) are with normal weight.

The Dallas pain scale was measured for measuring pain and discomfort in different working position like general pain intensity, night pain intensity, pain interference with lifestyles, pain at forward bending activity, back stiffness, interference with walking, hurts with walking, standing still, twisting activity, upright hard chair sitting, soft arm chair sitting, lying in bed, pain limit normal life, pain interfere in work and change of workplace. Among of these indicators, twisting pain keep for twisting, sitting in upright hard char and also sitting in soft arm chair did not found statistically significant at p value 0.05% where others indicators were significant in the experimental group in paired t test ($p<.05$ or more p value). Beside this five domains remain not significant in follow-up as night pain, pain keep from standing, sit in soft arm chair and change of work place in follow up. On the other hand, indicators of back stiffness interfere with work and change of work place did not found statistically significant ($p>.05$) where other indicators were significant in the control group in paired t test. But, all the domains remain not significant except interfere with lifestyle. In comparison between experimental to the control group, mean difference of the Dallas indicators had shown higher mostly in experimental group. In unrelated t test, all of the domains did not show

any significance statistically (p>.05). Among the outcome measurements of this study, the Dallas questionnaire had used in evaluation of every session where the progression outline were improved in most of the indicators within the experimental group rather than control.

In this study, Oswestry disability index was used to evaluate the level of disability impacted by the PLID to the subjects. According to the classification criteria determined by ODI, 20% participants were with bed-bounded disability in initial assessment within experimental group where there was no one had found in that group of disability in the final assessment and 10% participant was with crippled disability in final session but no one has been found in this level at follow-up session. On the other hand, there were no participants with bed-bounded disability within the control group. Beside this, 30% participants were with severe disability and 10% participant was with crippled disability in the initial assessment whilst no participants were with that group of disability at the final assessment. In Oswestry low back pain disability questionnaire, both groups were significant at experimental group where p=0.005% and in control group, p=0.01% that determine the better outcome for experimental group comparatively. The ODI had used in this study at every assessment after the treatment session also in the follow-up session to evaluate the outcome measurement progressively where the mean of the progression out line had shown a well differentiation within the both group and mean disability level of the experimental group has shown a better improvement in comparing to the control.

The fear-avoidance behavior among the participants had responded more in the subscale of fear avoidance about work within the control group where the experimental group shown less response in level of p<.05. In the physical activity subscale, the

experimental responded more rather than control in a comparison where the control was $p<.05$.

Sciatica bothersome index evaluate the outcome level from the subject's won perception to the impact of condition throughout the body by the four domains where the 5% subjects remain in the extreme level of bothersome in numbness-tingling sensation domain within the control group at the final assessment where comparatively nobody was found in the experimental group. Along with this, both the group had shown a better level of progression in comparison of initial to final assessment in the other three domains as leg pain, weakness in leg and back or leg pain in sitting.

The physiotherapy treatment was given upon McKenzie concept based on "Mechanical diagnosis and Treatment" where the directional preferences treatment procedures were used widely according to participants' condition along with sustained extension, extension in lying, extension in lying with participants and therapists over pressure, extension mobilization in lying, and extension-rotation mobilization in lying. The basic physiotherapy treatment like pelvic floor, back muscles strengthening and leg muscle strengthening, postural advice and also the home advice had given to the experimental group. On the other hand, the control group participants were given basic physiotherapy treatment and medicine (painkiller). They also received the treatment weekly four days in two weeks consecutively. McKenzie physiotherapy was provided by five well-trained physiotherapist to maintain the quality of the treatment and protocol of the research project. The participants and assessors were blinded and data was collected by two assessors.

The experimental group participants have received only McKenzie physiotherapy treatment weekly four days in two weeks consecutively. Machado, et al. (2010)

explored in the RCT where the number of treatment sessions was the maximum of six sessions over 3 weeks. Physical therapists were instructed to follow the treatment principles described in McKenzie's Textbooks and did not use other treatment modalities. After testing the participants' pain response to a comprehensive physical examination, therapists initially classified each patient into one of the three McKenzie syndromes (derangement, dysfunction, or postural) and provide an individualized treatment program to guide the treatment principle was to encourage directions of movement and postures that produced centralization of pain.

Mechanical diagnosis and therapy (MDT), widely known as the McKenzie method, is a popular approach for the assessment and treatment of low back pain (LBP) as well as PLID. The approach uses mostly the patient's response to repeated movements by reproducing the symptoms to find the direction of evaluation and treatment (Sheets, et al., 2012). Physiotherapy interventions often comprise some form of education and postural advice. This means of intervention especially the patient education and postural advice play a significant role in the management of LBP in McKenzie approach of treatment (Foster, et al., 1999). One-on-one education in the context of physiotherapy interventions covers issues such as an explanation of the person's condition, useful exercises, ergonomics and the importance of early return to normal activities (Moffet and McLean, 2006). In addition, group-based patient education interventions for people with LBP have been developed and tested, but with contradictory outcome results. Still, the expression "patient education" was found much more often in the literature than the expression "health education" (Linton, et al., 2001).

Numerous randomized controlled trials (RCTs) have investigated the efficacy of treatment for LBP, showing small treatment effects of questionable clinical meaningfulness (Surkitt, et al., 2012). Classification in the McKenzie method follows

a comprehensive clinical examination including examination of posture and range of movement, together with the assessment of patient's symptomatic response to different loading strategies applied to the spine (Machado, et al., 2010). One of the study had shown that the short-term treatment effects based on the McKenzie method had promoted the rapidly symptom improvement in patients with low back pain as well as PLID (Schenk, et al., 2003).

Several studies included in the review suggested that McKenzie therapy was more effective than most comparative treatments at short-term follow-up in comparison with the treatments included non-steroidal anti-inflammatory drugs, educational booklet, back massage with back care advice, strength training with therapist supervision, spinal mobilization, and general mobility exercises (Busanich and Verscheure, 2006). Only 1 of the 6 groups found the comparison treatment (massage/back care advice) to be more effective on both short-term and intermediate-term disability than McKenzie therapy. No other comparative treatment was more effective than McKenzie therapy at any identified point in time (Clare, et al., 2004). Among the 6 studies, 2 studies were excluded from the review because the philosophy of McKenzie therapy is focused on the current symptoms, regardless of the stage of inflammation (acute, sub-acute, and chronic) (Van, et al., 2003). To date, no authors have addressed the long-term efficacy of McKenzie therapy. This seems to be a rather large gap in the literature, considering the emphasis of McKenzie therapy on individualized programs and long-term prevention of recurrence. Most authors focus on short-term effects of McKenzie therapy or report outcomes within 3 months of treatment. The current study has found the nearly similar findings, although sample size was only 20. The treatment approach was applied nearly similar and taken medicine in control group.

The current review (Busanich and Verscheure, 2006) has explored that limited data make it difficult to determine whether the reduction in pain associated with McKenzie therapy is clinically meaningful, compared with other therapies (difference of 10 points on a 100-point scale). Studies that scored well on the PEDro scale (7–10) do not exist in great numbers. The most common flaw in those studies scoring less than 7 is lack of randomization and blinding. However, blinding patients and therapists may be impossible to achieve with McKenzie therapy because both the patient and the therapist know whether McKenzie therapy is being performed. Patient populations should also be better defined, as the review failed to identify the subjects' age, sex, activity level, and specific injury. These generalizations make it difficult to determine if McKenzie therapy is applicable to athletes and the demands of their sport. Clare et al1 indicated that the methodological quality of randomized controlled trials of McKenzie therapy needs improvement. Although it may be impossible to achieve a perfect score of 10 on the PEDro scale, scores higher than 6 should be attained. Studies rating lower than 7 on the PEDro scale are at risk for biased results (Maher, et al., 2003).

The core component of treatment in the McKenzie method is exercise, which consists of sustained postures or repeated movements. This method also includes other components such as education and postural training (Murtezani, et al., 2015) where extension and extension mobilization are the effective directional preferences (DP) for the lumbar spine in mechanical back pain. Directional preferences (DP) also decrease the pain intensity or improve the mobility of the restricted lumber spine along with centralization of pain (Long, et al., 2008). The current study was applied similar McKenzie treatment techniques for PLID patients.

A number of related systematic reviews on the efficacy of McKenzie treatment and treatment based on symptom response following session according to the patient

response method have been published. This review provides an updated systematic search of relevant literature the current review included only trials that recruited participants with LBP with DP and found a greater efficacy (Hancock, et al., 2007).

Chronic nonspecific low back pain (LBP) and its associated disability are a significant health and economic burden and exercise is often recommended as a first-choice treatment (Marshall, et al., 2013). Exercise prescription for LBP rehabilitation is typically based on the premise that biological deficits in strength, endurance, and recruitment patterns of the trunk muscles must be targeted to restore functional capacity (Airaksinen, et al., 2006). Exercise rehabilitation programs for LBP as well as PLID, there are no evidence that one type of exercise (e.g., specific trunk exercises, cardiorespiratory exercise) is superior to others (Middelkoop, et al., 2011). In addition to these, improved understanding of psychological factors associated with disability and pain, such as pain catastrophizing and fear-avoidance beliefs (FAB), has given rise to the belief that any form of moderate-to-vigorous physical activity may be sufficient for LBP and PLID rehabilitation (Leeuw, et al., 2007). It is unknown whether a specific trunk exercise program elicits greater or similar reductions in disability and pain compared with a single mode of exercise that does not specifically target the trunk (e.g., stationary cycling). Many studies suggest that catastrophizing and FAB are important factors in predicting pain and disability in patients with LBP and the reductions in pain and disability after exercise (Kovacs, et al., 2011).

In spite the widespread use of opioid medications as pain killers to treat chronic pain, there is least significant of evidence to support this practice. A recent study has reviewed the evidence regarding the use of opioids to treat chronic pain suggested that "There is no high- quality evidence on the efficacy of long-term opioid treatment of chronic nonmalignant pain" (Kissin, 2013) whilst a recent Cochrane review comparing

opioids to placebo in the treatment of low back pain came to a similar conclusion. Although there is some benefit over placebo when used for short term only and there is no evidence of benefit over non-opioid medications when used for shorter period of time (Chaparro, et al., 2014). A study in JAMA in 2008 found that "Despite rapidly increasing medical expenditures from 1997 to 2005, there was no improvement over this period in self-assessed health status, functional disability, work limitations, or social functioning among respondents with spine problems" (Trescot, et al., 2008).

A randomized controlled trial conducted by Murtezani, et al. (2015) with a 3-month follow-up period was between January 2009 and June 2012 where 271 patients with chronic LBP were randomized into two groups as the McKenzie therapy group (n = 134) and the other was electro physical agents group, (n = 137). The McKenzie treatment was planned individually consisted of self-mobilizing repeated movements or recurrent positions performed in specific motion directions, application of manual overpressure, and/or mobilization was assisted by therapist. They repeated exercises five times a day, 10–15 repetitions, depending of stage of disease and pain intensity. The subjects received a maximum of 7 treatments for a period of 4 weeks. Subjects assigned to the electro physical agents (EPAs) groups received: interferential current, ultrasound, and heat involving attendance 4 weeks (10 sessions) without any form of physical activity. Three measurement tools were used as pain intensity was measured by the Visual Analogue Scale (VAS), functional disability by the Oswestry Low Back Pain Disability Questionnaire (OSW), and a Fingertip-to-Floor Distance (FTF) with 4 weeks of treatment period, clinical outcomes (pain intensity, trunk flexion range of motion, and disability) were obtained at follow-up appointments at the end of the treatment period, 2 and 3 months. Significant improvement was achieved like increase in spinal motion, reduction of pain and disability was found within the both groups but

the results show the greater improvement in the McKenzie group ($p < 0.05$) and reduced pain & disability among the subjects with chronic LBP that revealed that the McKenzie therapy is more effective than EPAs group.

The present study design was also randomized control trial to explore the effectiveness of McKenzie treatment approach compared with basic physiotherapy and medicine. The sample size was 20 (10 in McKenzie group and 10 in basic physiotherapy group). McKenzie group was given the McKenzie Physiotherapy treatment along with basic exercise where the other group received basic exercise and medicine (pain killer). Researcher was used four measurement tools as Dallas pain questionnaire, functional disability by the Oswestry Low Back Pain Disability Questionnaire (OSW), Fear-avoidance belief questionnaire and Sciatica bothersome questionnaire with 2 weeks of treatment period where the clinical outcomes were obtained mostly at the end of the treatment period. In the outcome of the Dallas pain scale, Fear-avoidance belief questionnaire and sciatica bothersome questionnaire were significant at most of the indicators within McKenzie group and basic exercise group in paired t test, but while comparing the between group, there was no statistical significance. The mean difference of the McKenzie group was higher than the basic exercise group that revealed that the McKenzie group was more effective than the basic exercise group. In the Oswestry disability questionnaire, the outcomes turned to the better for most of the participants within the McKenzie group and basic exercise group where the better reduction of disability has seen within the McKenzie group. Both the study was randomized trial design to find out the efficacy of McKenzie physiotherapy. Two month after follow up also found McKenzie treatment is beneficial for PLID patients most of the indicators in Dallas pain questionnaire.

In this study, sample size was only 20, but the study conducted by Murtezani, et al. (2015) had taken the sample of 271. Both the study grouped the McKenzie physiotherapy receiving subjects to experimental group, but the control group of the both study had different treatment protocol.

Measurement tools were similar in the both study as the VAS scale and Oswestry disability questionnaire and the other questionnaire were fear avoidance belief questionnaire and sciatica bothersome questionnaire in this study and fingertip to floor distance test in the other study. The outcome was more significant in the study by Murtezani, et al. (2015) whilst less in this study.

Another multi-centre randomized controlled trial with a 3-month follow-up was conducted by Machado, et al. (2010) to evaluate the short-term effect of adding the McKenzie method to the first-line care of patients with acute low back pain. The sample size was 146 (McKenzie-first line care group 73 and 73 in only first line care group). Eligible participants were assigned to receive a treatment program based on the McKenzie method and first-line care (advice, reassurance and time-contingent acetaminophen) or first-line care alone for the period of 3 weeks.

The study had shown that McKenzie treatment group along with first line care produced statistical significant ($p=0.05$) but small reductions in pain when compared to first-line care alone. Patients receiving the McKenzie method did not show additional effects on global perceived effect, disability, function or on the risk of persistent symptoms. These patients sought less additional health care than those receiving only first-line care ($P = 0.002$). The first-line care was consisted of the provision of advice to remain active and to avoid bed rest, reassurance of the favorable prognosis of acute low back pain and instructions to take acetaminophen (paracetamol) on a time line basis. Roland Morris Disability Questionnaire was used for measuring disability. Also, patient's Specific

Functional scale was measured to different function and Global perceived effect. But, in this study where the researcher had used the pain killers along with basic exercise that results a less affectivity in comparison to the study by Machado, et al. (2010). Added to this, the McKenzie physiotherapy with different protocol like exercise or first-line care that was used in both the study were shown a similar result in the perspective of their study.

Albert and Mannicle, (2012) conducted a study to explore the efficacy within two groups randomized of either symptom guided exercise or sham exercise to find out treatment programs whether effective for severe sciatica patients or not where 181 severe sciatica patients had taken as subjects. Symptom-guided exercise consisted of back related exercises as directional end-range exercises and postural instructions guided by patient's individual directional preference (McKenzie concept), stabilizing exercises and back extensors. Home exercises programs were handed out to all patients. Sham exercises was consisted of optional exercises that were not back related but low dose exercises to simulate the increase in systemic blood circulation. In their study main outcome measures were Danish version of RMDQ (23 questions) to assess activity limitation, Low back pain rating scale used to measure current leg pain, Global improvement and number of neurological signs were measured by 5-point Liker Scale, Generic function (QUALY) was measured by Euro QOL (EQ-5D), Used Patients' self-reported follow up questionnaire for sick leave and Patients' satisfaction, Patients' expectations of outcome were measured by patients' self-report. In result both active treatment programs had improved but global improvement (most variables), activity limitations were significantly improved at end of treatment and after one year follow up. Root compression signs (Neurological sign) were statistically significant ($P < .001$) at one year after follow up. On the research protocol, permitted to take medicine (mild

analgesics and NSAIDs), not analyzed how many patients were taken this medicine in steps of the study in both groups. This study proved scientifically that conservative active physiotherapy treatment process is beneficial for severe sciatica patient. Physiotherapeutic treatment is beneficial in such type of patients. This randomized controlled trail has proved that the physiotherapy is very much effective in scientifically for the patient with disc herniation, although both groups are designed by different physiotherapy therapy techniques. On the contrary, this study had examined the efficacy of exercise along with McKenzie Physiotherapy to explore the effectiveness of them collectively with the outcome measures of Dallas low back pain questionnaire, Oswestry disability low back pain questionnaire, Fear-avoidance behavior questionnaire and sciatica bothersome questionnaire.

Engbert and Weber, (2011) also shown that the efficacy in comparison between therapeutic climbing exercise and standard exercise where it has been found that therapeutic climbing exercises increased muscular strength, perceived physical and mental well-being and abilities in activities of daily living (ADL) of chronic low back pain patients compared with the standard exercise therapy. Focusing on the psychological aspects of therapeutic exercise, climbing exercise compared with standard exercise therapy by a randomized controlled trial design, with single blind. Protocol were given to the climbing exercise training were standard warm up, coordination, stabilization, and trunk muscle exercises whilst the subjects allocated for standard exercise therapy group that consisted of warm up, strengthening, stretching, mobilization, coordination, and stabilization for the abdominal, back, pelvic, and lower limb muscles. Total 28 samples were included in this study where SF-36 questionnaire were used for measuring the physical and mental health status and Hannover Functional Ability Questionnaire (FEbH-R) questionnaire were used for measuring functional

disabilities. The therapeutic climbing exercise group had significantly improved in five subscales out of eight of SF-36 about physical health and mental health within the groups where the standard exercise group had significantly improved in four subscales out of eight of SF-36 about physical health and mental within the groups. Abilities of ADL measured by FFbH-R where there is no significant difference the therapeutic climbing exercise group and standard exercise group in comparison of within group and the between group as the sample size was small that's why it was difficult to generalize the result in the population. Small sample size (n=20) also used in this study as per the requirements of the objectives to explore the efficacy but it is also hard to generalize the statistics in population in all other perspectives and especially the ODI used to measure the disability rate in contrast to the study by grouping into McKenzie physiotherapy and basic exercise along with pain killer.

Senna and Machaly, (2011) shown in their study which aims to assess the effectiveness of spinal manipulation therapy (SMT) for the management of chronic nonspecific low back pain (LBP) to determine the effectiveness of maintenance SMT in long-term reduction of pain and disability levels associated with chronic low back conditions after an initial phase of treatments where the study design was single placebo randomized controlled trail with single blind and random allocation of sixty patients with chronic nonspecific LBP lasting at least 6 months, were to receive either (1) 12 treatments of sham SMT over a 1-month period, (2) 12 treatments, consisting of SMT over a 1-month period, but no treatments for the subsequent 9 months, or (3) 12 treatments over a 1-month period, along with "maintenance spinal manipulation" every 2 weeks for the following 9 months. The measured outcome was pain and disability scores, generic health status, and back-specific patient satisfaction at baseline and at 1-, 4-, 7-, and 10-month intervals. The results were shown that patients in second and third groups

experienced significantly lower pain and disability scores than first group at the end of 1-month period (P = 0.0027 and 0.0029, respectively). Only the third group that was given spinal manipulations (SM) during the follow-up period was shown more improvement in pain and disability scores at the 10-month evaluation. In this study, the duration was less in period of time as of two weeks consecutively in 8 sessions where the McKenzie therapy had proven significance along with exercise in treatment of PLID.

Petersen, et al. (2011) observed in their randomized control trial study to compare the effects of the McKenzie method performed by certified therapists with spinal manipulation performed by chiropractors when used adjunctive to information and advice. The sample size was 350, suffering from low back pain for more than 6 weeks with or without signs of nerve root involvement. The McKenzie treatment group was received the DP and educational booklet where in the spinal manipulation treatment group, all types of manual techniques including vertebral mobilization and high velocity thrust as well as myofascial trigger-point massage were used. In addition, all patients were provided with a Danish version of "The Back Book," which previously has been shown to have beneficial effect on patients' beliefs about back pain. A maximum of 15 treatments for a period of 12 weeks were given. All patients were educated in an individual program of self-administered mobilizing, stretching, stabilizing, and/or strengthening exercises chosen by their physical therapist or chiropractor depended on the treatment goals.

The main outcome measure was proportion of patients reporting success at 2 months follow-up. The 23-item modified Roland Morris Disability Questionnaire (RMDQ was used for measurement of disability, and other outcome measures were changes in pain, global perceived effect, quality of life, days with reduced activity, return-to-work,

satisfaction with treatment, and use of health care after the completion of treatment. Both treatment groups showed clinically meaningful improvements, at 2 months follow-up, the McKenzie treatment was superior to manipulation with respect to the number of patients who reported success after treatment (71% and 59%, respectively) ($P = 0.018$). The McKenzie group showed improvement in level of disability compared to the manipulation group reaching a statistical significance at 2 and 12 months follow up (mean difference 1.5, $P = 0.022$ and 1.5, $P = 0.030$, respectively). There was also a significant difference of 13% in number of patients reporting global perceived effect at end of treatment ($P = 0.016$). None of the other secondary outcomes showed statistically significant differences in both group.

Oswestry disability questionnaire was used in this study to measure the level of disability among the subjects between the McKenzie physiotherapy and Basic exercise group where DP and other sustained posture was maintained in the McKenzie group along with exercise in 8 treatment sessions with the duration of two weeks consecutively. The other questionnaires were Dallas pain rating questionnaire, Fear-avoidance belief questionnaire and sciatica bothersome questionnaire to guide the evaluation procedure and to measure the outcome.

Miller, et al. (2005) conducted a randomized controlled trial to compare the effectiveness of McKenzie approach to a specific Spine stabilization program for patients with chronic low back pain (CLBP). 30 subjects with CLBP were randomly assigned to either a McKenzie group or a specific spine stabilization group. To evaluate the outcome, functional status questionnaire, short-form McGill pain questionnaire (SF-MPQ), and passive straight leg raising (SLR) were administered at the initial examination and following a 6-week treatment program. The stabilization group manifested a statistically significant improvement in pain scores and in SLR range of

the involved lower extremity (p<0.05). The McKenzie group improved in the present pain index of the SF-MPQ only (p<0.05). They concluded that the specific spine stabilization exercises are more effective than McKenzie exercises for patients with CLBP.

Low back disorders are the most prevalent musculoskeletal health concerns in populations and may cause varying degrees of disability (Balagué, et al., 2012.). Obesity is another common public health problem that continues to increase (Kelly, et al., 2008). The increase has been especially pronounced in children and adolescents (Kautiainen, et al., 2009). Two recent meta-analyses showed that overweight and obesity increase the risk of both low back pain (LBP) and lumbar radicular pain (Shiri, et al., 2009). For LBP, the associations have been stronger in women compared with men. However, for lumbar radicular pain, no gender difference has been found (Nilsen, et al., 2011). Nearly all studies have looked at the effects of general obesity defined by body mass index (BMI). The use of BMI has been criticized for its inability to distinguish the difference between fat and lean mass, especially in men (Rothman, 2008.). Abdominal obesity defined by waist circumference has been associated with LBP in women, but not in men (Han, et al., 1997). Most previous studies on the influence of obesity on low back symptoms have been cross-sectional and the majority of prospective studies have had a relatively short follow-up time. Repeated measurements of weight-related factors have rarely been carried out, especially in young populations (Power, et al., 2001). The aim is to assess the association of overweight and obesity with LBP and clinically defined low back disorders as Prolapsed vertebral disc across the life course.

Oswestry disability index (ODI) questionnaire are used to evaluate the activities of daily living, which are badly influenced by LBP as well as PLID. All the sections are

used for experimental questionnaires that aimed to assess several aspects of daily living. The 10 sections of ODI domains are following pain intensity, personal care, lifting, walking, sitting, standing, sleeping, sex life, social life and travelling that give an outline of disability (in percentage; %) (Longo, et al., 2010). Where it had found that the mean disability for control group was in moderate level (38%) at the initial day which was also in moderate level (22.4%) at the final day. On the other hand, the mean disability for experimental group was in severe level (45%) at the initial day and in moderate level (27.20%) after 8 sessions of treatment where found two patient with bed bounded disability (82% & 90%) and one patient with crippled level of disability (72%) at the very first session within the experimental group whilst only one patient had found with crippled disability (78%) within the control group.

Petersen, et al. conducted a study in 2011, in which both the McKenzie and the manipulation group improved were in long term. Although between-group differences were not particularly large at all follow-ups, but the McKenzie method appeared as the more favorable method in comparing to others.

Among the participants in control group (n=7) at follow-up session, n=2 participants are eager to go through the surgery for their present condition.

CHAPTER-VI LIMITATION OF THE STUDY

- The sample size is really very small, so the result is difficult to generalize among whole population.
- Researcher has taken help from two assessors for data collection purpose, it may vary result.
- Data was collected two clinical setting CRP at Savar and CRP at Mirpur; it can be influencing the result.
- Sometimes treatment sessions were interrupted due to public holiday and recruit physiotherapists taken leave in the data collection that may interrupt the result.
- 15% participants were illiterate, it may give data error way.
- The control group that was basic physiotherapy treatment group with medicine mean age was higher than the McKenzie treatment group that may be influencing the result.
- Clinical Physiotherapists who were providing physiotherapy treatment, they were completed the McKenzie part- A and B, did not complete whole part of McKenzie approach.

CHAPTER-VII CONCLUSION AND RECOMMENDATION

The result of this study has shown that the effectiveness of McKenzie physiotherapy treatment is superior to the basic physiotherapy treatment with medicine after eight sessions of treatment for patients with PLID. After two months follow up, it has been found that the McKenzie treatment approach is much more effective than basic physiotherapy with medicine. Considering the final assessment and also follow up, the pain in different positions has been reduced in both the group while comparing to the initial assessment where McKenzie treatment group has found a greater benefit of the participants.

As the disability level and fear avoidance behavior regarding activity and work and also leg pain symptoms have been improved by McKenzie treatment for the PLID patients. The physiotherapists may apply McKenzie physiotherapy treatment approach for PLID patients in their practical area for treating PLID patients.

This study has found that medicine is not so much effective with basic physiotherapy treatment. Proper application of McKenzie approach seemed to be more beneficial for PLID patients to reduce financial burden and reduce fear avoidance about work and activity in their daily lives and also work place, and improves the self-confidence. Final impression about McKenzie treatment approach is helpful conservative treatment approach of physiotherapy treatment for PLID as well as mechanical low back pain problem patients.

Further study should be done in more specific treatment or placebo treatment in control group compared with McKenzie treatment approach with large sample size to find out the effectiveness of the McKenzie treatment approach for PLID patients.

BIBLIOGRAPHY

Aina, A., May, S. and Clare, H. (2004). The centralization phenomenon of spinal symptoms—a systematic review. *Manual therapy*, *9*(3), pp.134-143.

Airaksinen, O., Brox, J.I., Cedraschi, C.O., Hildebrandt, J., Klaber-Moffett, J., Kovacs, F., Mannion, A.F., Reis, S., Staal, J.B., Ursin, H. and Zanoli, G. (2006). Chapter-4: European guidelines for the management of chronic nonspecific low back pain. *European spine journal*, *15*, pp.s192-s300.

Albert, H.B. and Mannicle, C. (2012). The Efficacy of Systematic Active Conservation Treatment for Patients with Severe Sciatica. *Spine*, 37(7), pp. 531-542.

Alcántara-Bumbiedro, S., Flórez-García, M.T., Echávarri-Pérez, C. and García-Pérez, F. (2006). Oswestry low back pain disability questionnaire. *REHABILITACION-MADRID-*, *40*(3), p.150.

An, H.S., Eugene, T.J.M.A. and Masuda, K. (2003). Biological Repair of Intervertebral Disc. *Spine*, 28 (15), pp. 86–92.

Assendelft, W.J., Morton, S.C., Emily, I.Y., Suttorp, M.J. and Shekelle, P.G. (2003). Spinal manipulative therapy for low back pain: a meta-analysis of effectiveness relative to other therapies. *Annals of internal medicine*, *138*(11), pp.871-881.

Åstrand, P.O. (2003). *Textbook of work physiology: physiological bases of exercise*. Human Kinetics.

Atlas, S.J. (2010). Nonpharmacological treatment for low back pain. *Journal of Musculoskeletal Medicine,* 27(1), pp. 20–27.

Atlas, S.J., Keller, R.B., Chang, Y.C, Deyo, R.A. and Singer, D. E. (2001). Surgical and Nonsurgical Management of Sciatica Secondary to a Lumbar Disc Herniation. *Spine,* 26 (10), pp. 1179–1187.

Atlas, S.J., Keller, R.B., Wu, Y.A., Deyo, R.A. and Singer, D.E. (2005). Long-Term Outcomes of Surgical and Nonsurgical Management of Sciatica Secondary to a Lumbar Disc Herniation: 10 Year Results from the Maine Lumbar Spine Study. *Spine,* 30 (8), pp. 927–935.

Aure, O.F., Nilsen, J.H. and Vasseljen, O. (2003). Manual therapy and exercise therapy in patients with chronic low back pain. *Spine,* 28 (6), pp. 525-532.

Balagué, F., Mannion, A.F., Pellisé, F. and Cedraschi, C. (2012). Non-specific low back pain–Authors' reply. *The Lancet*, *379*(9829), pp.1874-1875.

Barak, O.F., Jakovljevic, D., Popadic, G.J., Ovcin, Z.B., Brodie, D. and Grujic, N. (2010). Heart rate variability before and after cycle exercise in relation to different body positions. *Journal of sports science & medicine*, *9*, pp.176-182.

Bartynski, W.S. and Petropoulou, K.A. (2007). The MR imaging features and clinical correlates in low back pain–related syndromes. *Magnetic resonance imaging clinics of North America*, *15*(2), pp.137-154.

Bindra, S., Sinha A.G.K. and Benjamin A.I. (2015). EPIDEMIOLOGY OF LOW BACK PAIN IN INDIAN POPULATION: A REVIEW. *International Journal of Basic and Applied Medical Sciences, 5 (1),* pp.166-179.

Bowling, A. (1997). Research Method in Health: Investigating and Health Services. *Open University Press*, Buckingham.

Brukner, P. (2012). *Brukner & Khan's clinical sports medicine* (4th ed). Sydney: McGraw-Hill.

Busanich, B.M. and Verscheure, S.D. (2006). Does McKenzie therapy improve outcomes for back pain?. *Journal of athletic training*, *41*(1), p.117.

Bybee, R.F., Hicks, C., Hons, B. and Byars, A. (2007). Cardiovascular and Metabolic Responses to Active and Passive Repetitive Lumbar Spine Exercises: 1535: Board# 25 May 30 3: 30 PM-5: 00 PM. *Medicine & Science in Sports & Exercise*, *39*(5), p.S235.

Celal, E. B., Karl-Ludwig, R., Ronald, S., Horst, M., Martin, N., Andreas, S., Martin, P., Wolf, O., Karl, U., Gerold, E. R. (2007). Physiotherapy-Based Rehabilitation Following Disc Herniation Operation: Results of a Randomized Clinical Trial. *Spine*, 32(19), pp. 2041-2049.

Chaparro, L.E., Furlan, A.D., Deshpande, A., Mailis-Gagnon, A., Atlas, S. and Turk, D.C. (2014). Opioids compared with placebo or other treatments for chronic low back pain: an update of the Cochrane Review. *Spine*, *39*(7), pp.556-563.

Childs, J.D., Cleland, J.A., Elliott, J.M., Teyhen, D.S., Wainner, R.S., Whitman, J.M., Sopky, B.J., Godges, J.J., Flynn, T.W., Delitto, A. and Dyriw, G.M. (2008). Neck pain: clinical practice guidelines linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association. *Journal of Orthopaedic & Sports Physical Therapy*, *38*(9), pp. A1-A34.

Clare, H., Adams, R., & Maher, C. (2005). Reliability of McKenzie Classification of Patients with Cervical or Lumbar pain. *Journal of Manipulative and Physiological therapeutics*, *28*(2), pp. 122-127.

Clare, H., Adams, R., & Maher, C. (2007). Construct validity of lumbar extension measures in McKenzie derangment syndrome. *Manual therapy, 12*(1), pp. 328-334.

Clare, H.A., Adams, R. and Maher, C.G. (2004). A systematic review of efficacy of McKenzie therapy for spinal pain. *Australian Journal of Physiotherapy*, *50*(4), pp. 209-216.

Dunsford, A., Kumar, S. and Clarke, S. (2011). Integrating evidence into practice: use of McKenzie-based treatment for mechanical low back pain. *Journal of multidisciplinary healthcare, 4*, pp. 393-402.

Engbert, K. and Weber, M. (2011).The Effects of Therapeutic Climbing in Patients with Chronic Low Back Pain. *Spine*, 36 (11), pp. 842 – 849.

Erdogmus, C.B., Resch, K.L., Sabitzer, R., Muller, H., Nuhr, M., Schoggl, A., Posch, M., Osterode, W., Ungersbock, K. and Ebenbichler,G.R. (2007). Physiotherapy-Based Rehabilitation Following Disc Herniation Operation. *Spine*, 32(19), pp. 2041–2049.

Fairbank, J.C. and Pynsent, P.B. (2000). The Oswestry disability index. *Spine, 25*(22), pp. 2940-2953.

Ferreira, M.L., Ferreira, P.H., Latimer, J., Herbert, R. and Maher, C.G. (2002). Does spinal manipulative therapy help people with chronic low back pain? *Australian Journal of Physiotherapy*, *48*(4), pp. 277-284.

Foster, N.E., Thompson, K.A., Baxter, G.D. and Allen, J.M. (1999). Management of Nonspecific low back pain by physiotherapists in Britain and Ireland: a descriptive questionnaire of current clinical practice. *Spine, 24*(13), p. 1332.

Freburger, J.K., Holmes, G.M., Agans, R.P., Jackman, A.M., Darter, J.D., Wallace, A.S., Castel, L.D., Kalsbeek, W.D. and Carey, T.S. (2009). The rising prevalence of chronic low back pain. *Archives of internal medicine, 169*(3), pp. 251-258.

Fritz, J.M. and George, S. (2002). Identifying Psychosocial Variables in Patients With Acute Work-Related Low Back Pain: The Importance of Fear-Avoidance Beliefs. *Physical Therapy,* 82(10), pp. 2940-2953.

Gracey, J.H., McDonough, S.M. and Baxter, G.D. (2002). Physiotherapy management of low back pain: a survey of current practice in Northern Ireland. *Spine, 27*(4), pp. 406-411.

Hahne, A. J., Ford, J. J. and McMeeken, J.M. (2010). Conservative Management of Lumbar Disc Herniation with Associated Radiculopathy. *Spine,* 35(11), pp. E488–E504.

Haladay, D.E., Miller, S.J., Challis, J. and Denegar, C.R. (2013). Quality of systematic reviews on specific spinal stabilization exercise for chronic low back pain. *journal of orthopaedic & sports physical therapy*, *43*(4), pp.242-250.

Han, T.S., Schouten, J.S.A.G., Lean, M.E.J. and Seidell, J.C. (1997). The prevalence of low back pain and associations with body fatness, fat distribution and height. *International journal of obesity*, *21*(7), pp. 600-607.

Hancock, M.J., Maher, C.G., Latimer, J., Spindler, M.F., McAuley, J.H., Laslett, M. and Bogduk, N. (2007). Systematic review of tests to identify the disc, SIJ or facet joint as the source of low back pain. *European Spine Journal*, *16*(10), pp. 1539-1550.

Hayden, J.A., Van Tulder, M.W. and Tomlinson, G. (2005). Systematic review: strategies for using exercise therapy to improve outcomes in chronic low back pain. *Annals of internal medicine*, *142*(9), pp. 776-785.

Hefford, C. (2006). Mckenzie classification of mechanical spinal pain: Profile of syndromes and directions of preference. *Manual therapy*, *13*(1), pp. 75-81.

Jackson, D.A. (2001). How is low back pain managed? Retrospective study of the first 200 patients with low back pain referred to a newly established community-based physiotherapy department. *Physiotherapy*, *87*(11), pp. 573-581.

Kautiainen, S., Koivisto, A.M., Koivusilta, L., Lintonen, T., Virtanen, S.M. and Rimpelä, A. (2009). Sociodemographic factors and a secular trend of adolescent overweight in Finland. *International Journal of Pediatric Obesity*, *4*(4), pp. 360-370.

Kelly, T., Yang, W., Chen, C.S., Reynolds, K. and He, J. (2008). Global burden of obesity in 2005 and projections to 2030. *International journal of obesity*, *32*(9), pp. 1431-1437.

Kissin, I. (2013). Long-term opioid treatment of chronic nonmalignant pain: unproven efficacy and neglected safety? *Journal of Pain Research*, 6, pp. 513–29.

Kovacs, F.M., Seco, J., Royuela, A., Peña, A., Muriel, A. and Spanish Back Pain Research Network (2011). The correlation between pain, catastrophizing, and disability in subacute and chronic low back pain: a study in the routine clinical practice of the Spanish National Health Service. *Spine*, *36*(4), pp. 339-345.

Lawrence, D.J., Meeker, W., Branson, R., Bronfort, G., Cates, J.R., Haas, M., Haneline, M., Micozzi, M., Updyke, W., Mootz, R. and Triano, J.J. (2008). Chiropractic management of low back pain and low back-related leg complaints: a literature synthesis. *Journal of manipulative and physiological therapeutics*, *31*(9), pp. 659-674.

Leeuw, M., Goossens, M.E., Linton, S.J., Crombez, G., Boersma, K. and Vlaeyen, J.W. (2007). The fear-avoidance model of musculoskeletal pain: current state of scientific evidence. *Journal of behavioral medicine*, *30*(1), pp. 77-94.

Linton, S.J. and van Tulder, M.W. (2001). Preventive interventions for back and neck pain problems: what is the evidence? *Spine*, *26*(7), pp. 778-787.

Long, A., Donelson, R. and Fung, T. (2004). Does it matter which exercise? A randomized control trial of exercise for low back pain. *Spine*, *29*(23), pp. 2593-2602.

Long, A., May, S. and Fung, T. (2008). Specific directional exercises for patients with low back pain: a case series. *Physiotherapy Canada*, *60*(4), pp. 307-317.

Longo, U.G., Loppini, M., Denaro, L., Maffulli, N. and Denaro, V. (2010). Rating scales for low back pain. *British medical bulletin*, *94*(1), pp. 81-144.

Luijsterburg, P.A.J., Lamers, L.M., Verhagen, A.P., Ostelo, R.W.J.G., ven den Hoogen, H.J. M. M., Peul, W., Avezaat, C.J.J. and. Koes, B.W. (2007). Cost-effectiveness of physical therapy and general practitioner care for sciatica. *Spine*, 32(18), pp. 1942–1948.

Machado, L., Maher, C., Herbert, R., Clare, H., & McAuley, J. (2010). The effectiveness of the McKenzie method in addition to first-line care for acute low back pain: A randomized controlled trial. *BioMed Central, 8*(10), pp. 1-10.

Machado, L.A., Maher, C.G., Herbert, R.D., Clare, H. and McAuley, J. (2005). The McKenzie Method for the management of acute non-specific low back pain: design of a randomised controlled trial [ACTRN012605000032651]. *BMC musculoskeletal disorders*, *6*(1), p. 50.

Machado, L.A.C., De Souza, M.V.S., Ferreira, P.H. and Ferreira, M.L. (2006). The McKenzie method for low back pain: a systematic review of the literature with a meta-analysis approach. *Spine*, *31*(9), pp. E254-E262.

Maher, C.G., Sherrington, C., Herbert, R.D., Moseley, A.M. and Elkins, M. (2003). Reliability of the PEDro scale for rating quality of randomized controlled trials. *Physical therapy*, *83*(8), pp. 713-721.

Malmivaara, A., Hakkinen, U., Aro, T., Heinrichs, M., Koskennimi, L., Kuosma, E., Lappi, S., Paloheimo, R., Servo, G., Vaarannen, V., and Sven, H. (1995).The Treatment of Acute of low back pain-bed rest, exercise or ordinary Activity? *The New England Journal of Medicine*, 332(6), pp. 351-355.

Maniadakis, N. and Gray, A. (2000). The economic burden of back pain in the UK. *Pain*, 84(1), pp. 95–103.

Marshall, P.W., Kennedy, S., Brooks, C. and Lonsdale, C. (2013). Pilates exercise or stationary cycling for chronic nonspecific low back pain: does it matter? a randomized controlled trial with 6-month follow-up. *Spine*, *38*(15), pp. E952-E959.

May, S. and Aina, A. (2012). Centralization and directional preference: a systematic review. *Manual therapy, 17*(6), pp. 497-506.

May, S., & Donelson, R. (2008). Evidence-informed management of chronic lower back pain with the McKenzie method. *The Spine Journal, 8*(1), pp. 134-141.

McKenize, R. (1981). *The Lumbar Spine: Mechanical diagnosis and therapy* (1 ed.): *Waikanae, New Zealand: Spinal Publications*.

McKenzie, R. (1990). *The cervical and thoracic spine: mechanical diagnosis and therapy*. Orthopedic Physical Therapy.

McKenzie, R. (1997). *Treat your own back*. Orthopedic Physical Therapy.

McKenzie, R.A. and May, S. (1981). The lumbar spine. *Mechanical diagnosis & therapy*, *1*, pp.374.

McKenzie, R.A. and May, S. (2003). Mechanical diagnosis and therapy: the lumbar spine. *Waikanae, New Zealand: Spinal Publications*.

McKenzie, R.A. and May, S. (2003). Mechanical diagnosis and therapy: the lumbar spine. *Waikanae, New Zealand: Spinal Publications*.

Menon, A., Korner-Bitensky, N., Kastner, M., McKibbon, K. and Straus, S. (2009). Strategies for rehabilitation professionals to move evidence-based knowledge into practice: a systematic review. *Journal of Rehabilitation Medicine*, 41(13), pp. 1024-1032.

Mielenz, T.J., Carey,T.S., Dyrek, D.A., Harris, B.A., Garrett, J.A.M. and Darter, J.D. (2013). Physical therapy utilization by patients with acute low back pain. *Physical Therapy,* 77, pp. 1040-1051.

Mikhail, C., Korner-Bitensky, N., Rossignol, M., Dumas, J.P. (2005). Physical therapists' use of interventions with high evidence of effectiveness in the management of a hypothetical typical patient with acute low back pain. *Physical Therapy*, 85(11), pp. 1151–1167.

Miller, E.R., Schenk, R.J., Karnes, J.L. and Rousselle, J.G. (2005). A comparison of the McKenzie approach to a specific spine stabilization program for chronic low back pain. *Journal of Manual & Manipulative Therapy*, *13*(2), pp. 103-112.

Moffett, J. and McLean, S. (2006). The role of physiotherapy in the management of non-specific back pain and neck pain. *Rheumatology*, *45*(4), pp. 371-378.

Murtezani, A., Govori, V., Meka, V.S., Ibraimi, Z., Rrecaj, S. and Gashi, S. (2015). A comparison of mckenzie therapy with electrophysical agents for the treatment of work related low back pain: A randomized controlled trial. *Journal of back and musculoskeletal rehabilitation*, *28*(2), pp. 247-253.

Nilsen, T.I.L., Holtermann, A. and Mork, P.J. (2011). Physical exercise, body mass index, and risk of chronic pain in the low back and neck/shoulders: longitudinal data from the Nord-Trøndelag Health Study. *American journal of epidemiology*, p.kwr087.

Njomo, D.W. (2011). *Factors Influencing Compliance with Mass Treatment in the National Programme for the Elimination of Lymphatic Filariasis in Kenya* (Doctoral dissertation, Jomo Kenyatta University of Agriculture and Technology).

O'Sullivan, P.B., Smith, A.J., Beales, D.J. and Straker, L.M. (2011). Association of biopsychosocial factors with degree of slump in sitting posture and self-report of back pain in adolescents: A Cross-Sectional Study. *Physical therapy*, 91(4), pp. 470-483.

Peng, B.G. (2013). Pathophysiology, diagnosis, and treatment of discogenic low back pain. *World Journal of Orthopedics*, 4(2), pp. 42-52.

Petersen, T., Larsen, K., Nordsteen, J., Olsen, S., Fournier, G. and Jacobsen, S. (2011). The McKenzie method compared with manipulation when used adjunctive to information and advice in low back pain patients presenting with centralization or peripheralization: a randomized controlled trial. *Spine*, *36*(24), pp. 1999-2010.

Petersen, T., Larsen, K., Nordsteen, J., Olsen, S., Fournier, G. and Jacobsen, S. (2011). The McKenzie method compared with manipulation when used adjunctive to information and advice in low back pain patients presenting with centralization or peripheralization: a randomized controlled trial. *Spine*, *36*(24), pp. 1999-2010.

Petersen, T., Laslett, M., Thorsen, H., Manniche, C., Ekdahl, C. and Jacobsen, S. (2003). Diagnostic classification of non-specific low back pain. A new system integrating patho-anatomic and clinical categories. *Physiotherapy Theory and Practice*, *19*(4), pp. 213-237.

Peul, W., van Houwelingen, H.C., van der Hout, W.B., Brand, Ronald., Eekhof, J.A.H., Tans, J.T., Ralph Thomeer, T.W.M. and Koes, B.W. (2005). Prolonged conservative treatment or 'early' surgery in sciatica caused by a lumbar disc herniation: rationale and design of a randomized trial [ISRCT 26872154]. *Bio Medical Central Musculoskeletal Disorders,* 6(8), pp. 1471-1474.

Power, C., Frank, J., Hertzman, C., Schierhout, G. and Li, L. (2001). Predictors of low back pain onset in a prospective British study. *American Journal of Public Health*, *91*(10), pp. 1671-1678.

Rothman, K.J. (2008). BMI-related errors in the measurement of obesity. *International journal of obesity, 32,* pp. S56-S59.

Rundell, S.D., Davenport, T.E., Wagner,T. (2009). Physical therapist management of acute and chronic low back pain using the World Health Organization's International Classification of Functioning, Disability and Health. *Physical Therapy,* 89 (1), pp. 82–90.

Schenk, R.J., Jozefczyk, C. and Kopf, A. (2003). A randomized trial comparing interventions in patients with lumbar posterior derangement. *Journal of Manual & Manipulative Therapy*, *11*(2), pp. 95-102.

Sedighi, M. and Haghnegahdar, A. (2014). Lumbar Disk Herniation Surgery: Outcome and Predictors. *Global Spine Journal*, 4, pp. 233–244.

Senna, M.K. and Machaly, S.A. (2011). Does Maintained Spinal Manipulation Therapy for Chronic Nonspecific Low Back Pain Result in Better Long-Term Outcome? *Spine,* 36 (18), pp. 1427–1437.

Sheets, C., Machado, L.A., Hancock, M. and Maher, C. (2012). Can we predict response to the McKenzie method in patients with acute low back pain? A secondary analysis of a randomized controlled trial. *European Spine Journal*, *21*(7), pp. 1250-1256.

Shiri, R., Karppinen, J., Leino-Arjas, P., Solovieva, S. and Viikari-Juntura, E. (2009). The association between obesity and low back pain: a meta-analysis. *American journal of epidemiology*, pp.kwp356.

Siddiq, M.A.B., Hasan, S.A., Das, G. and Khan, A.U.A. (2011). Interventional Pain Management in Rheumatological Diseases-A Three Years Physiatric Experience in a Tertiary Medical College Hospital in Bangladesh. *The Korean journal of pain*, *24*(4), pp. 205-215.

Stein, A. and Hughes, M. (2016). A Classical Physical Therapy Approach to the Overactive Pelvic Floor. *In The Overactive Pelvic Floor* (pp. 265-274). Springer International Publishing.

Surkitt, L.D., Ford, J.J., Hahne, A.J., Pizzari, T. and McMeeken, J.M. (2012). Efficacy of directional preference management for low back pain: a systematic review. *Physical therapy*, *92*(5), pp. 652-665.

Todd, N.V. (2010). For debate–guidelines for the management of suspected cauda equina syndrome. *British journal of neurosurgery*, *24*(4), pp. 387-390.

Trescot, A.M., Helm, S., Hansen, H., Benyamin, R., Glaser, S.E., Adlaka, R., Patel, S. and Manchikanti, L. (2008). Opioids in the management of chronic non-cancer pain: an update of American Society of the Interventional Pain Physicians'(ASIPP) Guidelines. *Pain physician*, *11*(2 Suppl), pp. S5-S62.

Turk, D.C. and Burwinkle, T.M. (2006). Cognitive-behavioral perspective on chronic pain patients. *Critical Reviews™ in Physical and Rehabilitation Medicine, 18*(1).

Van Middelkoop, M., Rubinstein, S.M., Kuijpers, T., Verhagen, A.P., Ostelo, R., Koes, B.W. and van Tulder, M.W. (2011). A systematic review on the effectiveness of physical and rehabilitation interventions for chronic non-specific low back pain. *European Spine Journal, 20*(1), pp. 19-39.

Van Tulder, M., Furlan, A., Bombardier, C., Bouter, L. and Editorial Board of the Cochrane Collaboration Back Review Group (2003). Updated method guidelines for systematic reviews in the Cochrane Collaboration Back Review Group. *Spine, 28*(12), pp. 1290-1299.

Waddell, C., Newton, M. and Henderson, I. (1993). A Fear-Avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain*, 52, pp. 157-168.

Weinstein, J.N., Lurie, J. D., Tosteson, T. D., Tosteson, A. N., Blood, E. A., Abdu, W. A., Herkowitz, H., Hilibrand, A., Albert, T. and Fischgrund, J. (2008). Surgical versus non-operative treatment for lumbar disc herniation. *Spine*, 33(25), pp. 2789–2800.

Werneke, M., Hart, D.L. and Cook, D. (1999). A descriptive study of the centralization phenomenon: a prospective analysis. *Spine*, *24*(7), pp. 676-683.

Werneke, M.W., Hart, D., Oliver, D., McGill, T., Grigsby, D., Ward, J., Weinberg, J., Oswald, W. and Cutrone, G. (2010). Prevalence of classification methods for patients with lumbar impairments using the McKenzie syndromes, pain pattern, manipulation, and stabilization clinical prediction rules. *Journal of Manual & Manipulative Therapy*, *18*(4), pp. 197-204.

Wetzel, F.T. and Donelson, R. (2003). The role of repeated end-range/pain response assessment in the management of symptomatic lumbar discs. *The Spine Journal*, *3*(2), pp. 146-154.

APPENDIXES

Permission Letter

Dated: February 02, 2016

To

The Head of programs,

Centre for the Rehabilitation of the Paralysed (CRP),

Savar, Dhaka-1343.

Through: The course co-coordinator, M. Sc. in Physiotherapy, BHPI, Savar, Dhaka-1343.

Sub: Prayer for permission to collect data from Musculoskeletal unit at CRP-Savar and CRP-Mirpur to conduct a research project.

Sir,

With due respect and humble submission to state that, I am a student of M.Sc. in Physiotherapy at Bangladesh Health Professional Institute (BHPI). As a part of our course curriculum, we have to conduct a research project for the partial fulfillment of the requirement for the degree of M.Sc. in Physiotherapy.My dissertation title is **"Effectiveness of Physiotherapy Treatment of Lumbar Disc Prolapse patients who are advised or planned surgery to musculoskeletal unit at CRP Savar and CRP-Mirpur".**The aim of the study is to identify the effectiveness of physiotherapy treatment for PLID patients who are advised or planed surgery at musculoskeletal unit at CRP-Savar and CRP-Mirpur. This study will be done by using quantitative method (Quasi Experimental design) which will be experimental study in the clinical setting at CRP-Savar and CRP-Mirpur. I have chosen musculoskeletal unit to collect data. So, I need to collect the data from the Patient with PLID who will come for receiving treatment in musculoskeletal unit under the Physiotherapy Department.

So, I therefore pray and hope that you would kind enough to give me the permission to collect data and complete the project successfully from your department.

Forwarded to the Head of programs 02.02.16

Yours faithfully

Mohammed Anwar Hossain
M.Sc. in Physiotherapy .Roll No -3
BHPI, CRP, Savar, Dhaka-1343

Approved

Md. Sohrab Hossain
Associate Professor Physiotherapy (BHPI)
Head of the Programs
CRP, Savar, Dhaka

বাংলাদেশ হেল্‌থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
Bangladesh Health Professions Institute (BHPI)
(The Academic Institute of CRP)

Ref. CRP-BHPI/IRB/02/16/030 Date: 27.02.2016

To,
Mohammad Anwar Hossain
Part – II, M.Sc. in Physiotherapy
Session: 2012-2013, DU Reg. No.: 081
BHPI, CRP, Savar, Dhaka-1343, Bangladesh.

Subject: Approval of the thesis proposal – **"Effectiveness of Physiotherapy treatment of lumbar disc prolapse patients who are advised or planed surgery to Musculoskeletal Unit at CRP-Savar and CRP-Mirpur"** by IRB of BHPI.

Dear Mohammad Anwar Hossain,
Congratulation!
The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application on January 21, 2016 to conduct the above mentioned thesis, with yourself, as the Principal investigator. The Following documents have been reviewed and approved:

SL#	Name of the Documents
1	Thesis Proposal
2	Questionnaire
3	Information sheet & consent form.

Since the study involves questionnaire have no likelihood of any harm to the participants and have possibility of benefit patients by measuring the Level of depression of spinal cord injury patients before and after participating sports at CRP, the members of the Ethics committee has approved the study to be conducted in the presented form at the meeting held at 08:30 AM on February 25, 2016 at BHPI.
The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring in the course of the study, any revision in the protocol and patient information to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,

S M Ferdous Alam
Assistant Professor
Member Secretary, Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh.

সিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ, ফোন ঃ ৭৭৪৫৪৬৪-৫, ৭৭৪১৪০৪ ফ্যাক্স ঃ ৭৭৪৫০৬৯
CRP-Chapain, Savar, Dhaka-1343, Tel : 7745464-5, 7741404, Fax : 7745069, E-mail : contact@crp-bangladesh.org, www.crp-bangladesh.org

CRP
Centre for the Rehabilitation of the Paralysed

পক্ষাঘাতগ্রস্তদের পুনর্বাসন কেন্দ্র (সিআরপি)
Centre for the Rehabilitation of the Paralysed (CRP)
a project of the Trust for the Rehabilitaton of the Paralysed
Head Office: CRP- Savar, CRP- Chapain, Savar Dhaka-1343, Bangladesh
Tel: +880 02 7745464-5, Fax: 7745069, E-mail: contact@crp-bangladesh.org. www. crp-bangladesh.org

Ref: *Date:*

CRP-R&E-0401-180 14.03.2016

To
Mohammad Anwar Hossain
Centre for the Rehabilitation of the Paralysed

Ref: *Study Title* "Effectiveness of Physiotherapy treatment of lumbar disc prolapse patients who are advised or planed surgery to Musculoskeletal Unit at CRP-Savar and CRP-Mirpur."

Sub: Approval of documents for *Study Title* "Effectiveness of Physiotherapy treatment of lumbar disc prolapse patients who are advised or planed surgery to Musculoskeletal Unit at CRP-Savar and CRP-Mirpur"

Dear Mohammad Anwar Hossain,

The CRP Ethics Committee reviewed and discussed your application to conduct the research entitled "Effectiveness of Physiotherapy treatment of lumbar disc prolapse patients who are advised or planed surgery to Musculoskeletal Unit at CRP-Savar and CRP-Mirpur" on 14th March 2016.

The following documents were reviewed:

SL No	Documents	Version	*Dated*	*Copy*
1	Protocol	-	11.03.16	1

The following members of the ethics committee reviewed the protocol on 14th March 2016.

S. No.	Name	Role in EC	Affiliation with Institute(Yes/No) If yes, Specify.....
1	Prof. Dr. Mohammad Alamgir Kabir	Chair of CRPEC	No
2	Muhammed Shahriar Zaman	Member Secretary	Yes, Research Officer
3	Sohrab Hossain	Executive Member	Yes, Head of Programs

CRP
Centre for the Rehabilitation of the Paralysed
পক্ষাঘাতগ্রস্তদের পুনর্বাসন কেন্দ্র (সিআরপি)
Centre for the Rehabilitation of the Paralysed (CRP)
a project of the Trust for the Rehabilitaton of the Paralysed
Head Office: CRP- Savar, CRP- Chapain, Savar Dhaka-1343, Bangladesh
Tel: +880 02 7745464-5, Fax: 7745069, E-mail: contact@crp-bangladesh.org, www. crp-bangladesh.org

Ref: *Date:*

4	Julker Nayan	Executive Member	Yes, Head of Occupational Therapy Dpt.
5	Sharmin Hasnat	Executive Member	Yes, Sr. SLT & Acting Head and Lecturer, Speech and Language Therapy Department.
6	Md Obaidur Rahman	Executive Member	No
7	Nayma Nazneen	Executive Member	Yes, customers care officer, Inclusive Job Centre.

We confirm that neither you nor your study team members participated in the deliberations of the Ethics Committee & did not vote on the proposal for this study.

We approve the research to be conducted in its presented form at Centre for Rehabilitation of the Paralysed Ethics Committee (CRPEC)

The CRP Ethics Committee expects to be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information / informed consent and asks to be provided a copy of the final report.

Please submit to the EC the status report of the study as per EC SOP's

The EC is organized & operates according to the requirements of Declaration of Helsinki and ICH-GCP, local regulatory requirements and guidelines

Yours sincerely,

Chair of CRPEC

Informed Consent

Health Care Centre: Centre for the Rehabilitation of the paralysed (CRP)

Assalamualikum/Namasker, my name is Mohammad Anwar Hossain; I am doing M. Sc in Physiotherapy from the Bangladesh Health profession Institute. With the help of my supervisor, I am conducting a research project which is a part of my course curriculum. That is entitled as **"Effectiveness of Physiotherapy Treatment of Lumbar Disc Prolapse patients who are advised or planned surgery to musculoskeletal unit at CRP Savar and CRP-Mirpur".**

The aim of the study is to identify the effectiveness of physiotherapy treatment for PLID patients who are advised or planed surgery at musculoskeletal unit at CRP-Savar and CRP-Mirpur

The design of this study is true experimental and data will be collected by structured questionnaire. If you agree to participate, then I will ask you some question that would take maximum 15-20 minutes one time and need two times. If you feel any discomfort or uncomfortable or want to skip a question, and then just tell me I will go on. You will be not paid for the participation of my study.

The participants have the right to withdrawal consent and discontinue participation at any time. Information of this s study will be collected and never be shared with others without participant's permission. Information will be kept safely and confidentiality will be maintained. The participants do not get direct benefit from the study but we hope we will identify the effectiveness of physiotherapy treatment for PLID patients. The results of the study could give rise to some adaptations to the rehab program.

If you have any question about the research, please ask me.

I agree to participate in the research project without any force

Signature of the patient: ---------- Date: ----------

Signature of the Interviewer: ---------- Date: ----------

Signature of the Witness: ---------- Date: ----------

মৌখিক সম্মতিপত্র

আস্‌সালামামু আলাইকুম / নমস্কার, আমি মুহাম্মদ আনোয়ার হোসেন, বাংলাদেশ হেল্‌থ প্রফেশন্‌স ইন্সটিটিউট এর এম.এম.সি ইন ফিজিওথেরাপি বিভাগের দ্বিতীয় পর্বের একজন ছাত্র।আমি আমার সুপারভাইজারের সহায়তায় একটি গবেষণা প্রকল্প করছি যা আমার কোর্স কারিকুলাম এর অংশ বিশেষ। আমার গবেষণার বিষয় হল " **সিআরপি সাভার এবং সিআরপি মিরপুরের মাসকুস্কেলেটাল শাখায় কোমড়ের ডিস্ক প্রলাস্প রোগীদের অস্ত্রপ্রচারের উপদেশ অথবা পরিকল্পনা করা হয়েছে তাদের ফিজিওথেরাপি চিকিৎসার উপকারিতা** "।

এই গবেষণার উদ্দেশ্য হল **সিআরপি সাভার এবং সিআরপি মিরপুরের মাসকুস্কেলেটাল শাখায় কোমড়ের ডিস্ক প্রলাস্প রোগীদের অস্ত্রপ্রচারের উপদেশ অথবা পরিকল্পনা করা হয়েছে তাদের ফিজিওথেরাপি চিকিৎসার উপকারিতা বের করা**।

এই গবেষণাটি একটি পরীক্ষামূলক গবেষণা এবং রোগীদের তথ্য উপাত্ত সংগৃহিত হবে কাঠামোগত প্রশ্নের মাধ্যমে এবং যারা গবেষণার জন্য উপযোগি তাদের নির্বাচন করা হবে। যদি আপনি অংশগ্রহনে আগ্রহী হন, তাহলে আমি আপনাকে কিছু প্রশ্ন করব যা ১৫-২০ মিনিট সময় নিবে একবারের জন্য যেটা আমি দুইবার পূরণ করব।

অংশগ্রহনকারীরা প্রশ্ন চলাকালীন যেকোনো সময়ই এই প্রশ্নোওর পর্ব ত্যাগ করতে পারবেন। এই গবেষণার জন্য কিছু তথ্য উপাত্ত সংগ্রহ করা হবে এবং এই তথ্য উপাত্ত রোগির অনুমতি ব্যাতিত অন্য কাউকে প্রদান করা হবে না। তথ্যগুলো নিরাপদে রাখা হবে ও গোপনীয়তা নিশ্চিত করা হবে।

অংশগ্রহণকারীরা সরাসরি কোন উপকারিতা পাবে না কিন্তু আমরা আশা করছি যে,এই গবেষণার মাধ্যমে আমরা কোমড়ব্যাথা রোগীদের ফিজিওথেরাপি চিকিৎসার গুরুত্ব বের করতে পারব।

আপনার যদি এই গবেষণা সর্ম্পকে কিছু জানার থাকে তাহলে আপনি ফোনে আমার নিকট থেকে জেনে নিতে পারেন।

আমি স্বেচ্ছায় এ গবেষণা প্রকল্পে অংশগ্রহন করতে রাজি আছি।

অংশগ্রহণকারীর স্বাক্ষর ঃ _____

গবেষকের স্বাক্ষর ঃ _____

স্বাক্ষীর স্বাক্ষর ঃ _____

সিআরপি সাভার এবং সিআরপি মিরপুরের মাসকুস্কেলেটাল শাখায় কোমড়ের ডিস্ক প্রলাস্প রোগীদের অস্ত্রপ্রচারের উপদেশ অথবা পরিকল্পনা করা হয়েছে তাদের ফিজিওথেরাপি চিকিৎসার উপকারিতা ।

রোগীর কোড নং :

অধ্যায় : ১-পরিচিতি

১.১ অংশগ্রহণকারীর নাম :

১.২ বয়স :

১.৩ লিঙ্গ: ১. পুরুষ ২. মহিলা

১.৪ উচ্চতা :

১.৫ ওজন:

১.৬ ঠিকানা:

১.৭ নির্দেশকৃত চিকিৎসকের নাম :

অধ্যায় : ২- আর্থ-সামাজিক ও জনসংখ্যাতাত্ত্বিক তথ্য

২.১ পেশা :

১. কৃষক ২.দিনমজুর ৩.চাকুরীজীবি

৪. গার্মেন্টস্ কর্মী ৫. গাড়ী চালক ৬. রিক্সা চালক

৭. ব্যবসায়ী ৮. বেকার ৯. গৃহিনী

১০. শিক্ষক ১১. ছাত্র ১২.অন্যান্য

২.২ বৈবাহিক অবস্থা

১. বিবাহিত ২. অবিবাহিত ৩. আলাদা ৪. তালাকপ্রাপ্ত

২.৩ পরিবারের আকার

১. ছোট পরিবার ২. যৌথ পরিবার

২.৪ ছেলেমেয়ের সংখ্যা:

২.৫ আবাসিক এলাকা

১. গ্রাম ২. শহর

২.৬ শিক্ষাগত যোগ্যতা

১. কখনো স্কুলে যাইনি ২. প্রাথমিক শিক্ষা ৩. মাধ্যমিক শিক্ষা

৪. উচ্চ মাধ্যমিক শিক্ষা ৫. স্নাতক/ স্নাকোত্তর

২.৭ ধর্ম

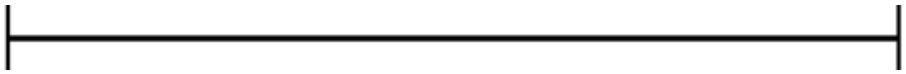
১. ইসলাম ২. হিন্দু ৩. খ্রিষ্টান ৪. বৌদ্ধ

২.৮ ধূমপান

১. হ্যা ২. না

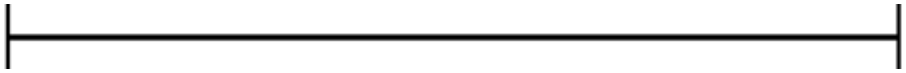
অধ্যায়ঃ ৩- ডালাস ব্যথাজনিত প্রশ্নাবলী

৩.১ আপনার ব্যথা কতটুকু ?



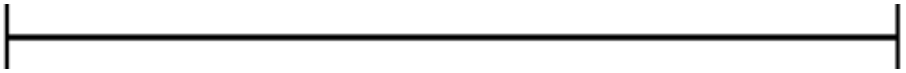
কোন ব্যথা নাই অনেক ব্যথা

৩.২ রাতের বেলায় আপনার ব্যথা কতটুকু ?



কোন ব্যথা নাই অনেক ব্যথা

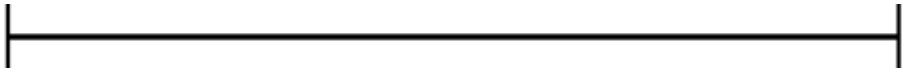
৩.৩ আপনার ব্যথা কি আপনার জীবন যাত্রাকে বাধাগ্রস্ত করে?



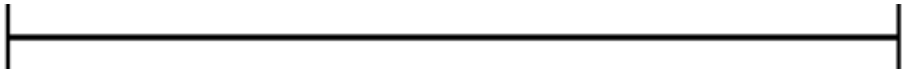
কোন বাধাগ্রস্ত করে না অনেক বাধাগ্রস্ত করে

৩.৪ ব্যথার ঔষধ খেলে কি আপনার ব্যথা কমে?

সম্পূর্ন কমে কমে না

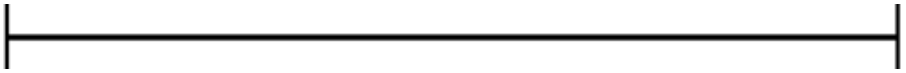


৩.৫ আপনার কোমড় কতটুকু শক্ত মনে হয়?



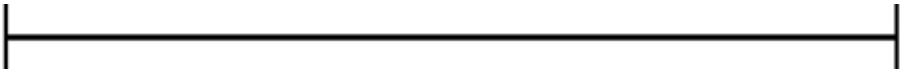
শক্ত মনে হয় না শক্ত মনে হয়

৩.৬ হাটলে কি আপনার ব্যথা বাড়ে?



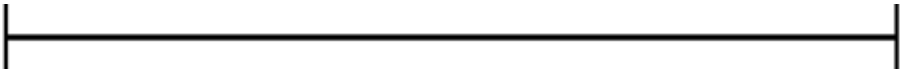
কোন ব্যথা নাই অনেক ব্যথা

৩.৭ আপনার ব্যথার জন্য কি আপনি সোজা হয়ে দাঁড়াতে পারেন?



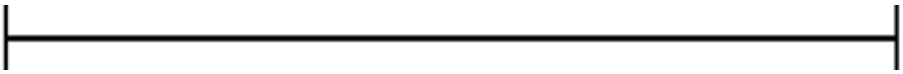
সোজা হয়ে দাঁড়াতে পারি　　সোজা হয়ে দাঁড়াতে পারি না

৩.৮ হাঁটার সময় কি আপনি ব্যথা অনুভব করেন?



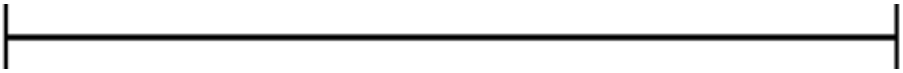
কোন ব্যথা নাই　　অনেক ব্যথা

৩.৯ আপনার ব্যথার জন্য কি আপনি সামনে দিকে ঝুঁকতে পারেন?



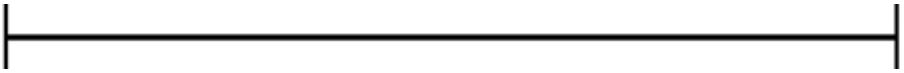
ঝুঁকতে পারি　　ঝুঁকতে পারি না

৩.১০ আপনার ব্যথার জন্য কি শক্ত চেয়ারে সোজা হয়ে বসতে পারেন?



বসতে পারি　　বসতে পারি না

৩.১১ আপনার ব্যথার জন্য কি নরম চেয়ারে সোজা হয়ে বসতে পারেন?

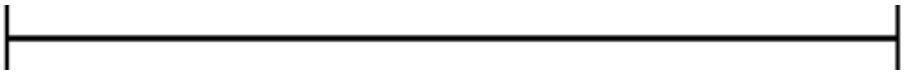


বসতে পারি　　বসতে পারি না

৩.১২ আপনি কি শোয়ার সময় ব্যথা অনুভব করেন?

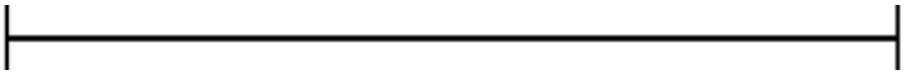
কোন ব্যথা নাই　　অনেক ব্যথা

৩.১৩ আপনার ব্যথা আপনার স্বাভাবিক জীবন যাত্রাকে কতটুকু বাধাগ্রস্ত করেছে?



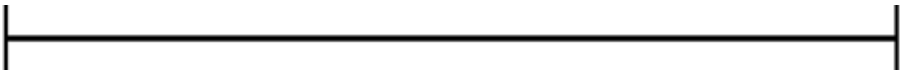
কোন বাধাগ্রস্ত করে নাই বাধাগ্রস্ত করেছে

৩.১৪ আপনার ব্যথা আপনার স্বাভাবিক কাজকর্মকে কতটুকু বাধাগ্রস্ত করেছে?



কোন বাধাগ্রস্ত করে নাই বেশী বাধাগ্রস্ত করেছে

৩.১৫ আপনার কোমড় ব্যথার জন্য আপনার কর্মস্থলে কতটুকু পরিবর্তন করেছেন?



কোন পরিবর্তন করি নাই সম্পূর্ন পরিবর্তন করেছি

অধ্যায় :৪- অস-ওয়সট্রি কোমর ব্যথার অক্ষমতা সংক্রান্ত প্রশ্নাবলী

৪.১ ব্যথার তীব্রতা

- ☐ আমার এই মুহূর্তে কোন ব্যথা নেই
- ☐ এই মুহূর্তে ব্যথা খুবই হালকা
- ☐ এই মুহূর্তে ব্যথা মধ্যপন্থী
- ☐ এই মুহূর্তে ব্যথা মোটামুটি তীব্র
- ☐ এই মুহূর্তে ব্যথা খুব গুরুতর
- ☐ এই মুহূর্তে ব্যথা অচিন্তনীয়

৪.২ ব্যক্তিগত যত্ন (ওয়াশিং,ড্রেসিং ইত্যাদি)

- ☐ আমি সাধারণত নিজেকে দেখাশুনা করতে পারি, ব্যথা ছাড়া
- ☐ আমি সাধারণত নিজেকে দেখাশুনা করতে পারি, কিন্তু এটা কিছুটা ব্যথাদায়ক
- ☐ নিজেকে দেখাশুনা করা ব্যথাদায়ক, কিন্তু আমি কিছুটা সতর্কতা অবলম্বন করি
- ☐ আমার কিছু সাহায্য প্রয়োজন হয়, কিন্ত অধিকাংশ কাজ আমি নিজে করতে পারি
- ☐ আমার নিজের কাজকর্মের জন্য সারাদিন ব্যাপি অন্যের সাহায্যের প্রয়োজন হয়
- ☐ আমি কষ্ট করেও কাপড় পরিস্কার করতে পারি না এবং বিশ্রামে থাকি

৪.৩ উত্তোলন

- ☐ আমি অতিরিক্ত ব্যথা ছাড়া ভারী ওজন উত্তোলন করতে পারি
- ☐ আমি ভারী ওজন উত্তোল করতে পারি, কিন্তু এটা কিছুটা ব্যথা তৈরী করে
- ☐ আমি ব্যথার জন্য ভারী ওজন উত্তোলন করতে পারি না, কিন্তু আমি সুবিধামত স্থানথেকে ওজন উত্তোলন করতে পারি, যেমন: টেবিল হতে
- ☐ আমি ব্যথার জন্য ভারী ওজন উত্তোলন করতে পারি না, কিন্তু আমি সুবিধামত স্থানথেকে অল্প অথবা মোটামুটি ওজন উত্তোলন করতে পারি
- ☐ আমি খুবই অল্প ওজন উত্তোলন করতে পারি
- ☐ আমি কোন ওজনই উত্তোলন অথবা বহন করতে পারি না

৪.৪ হাঁটা

- ☐ ব্যথা আমাকে যে কোন দুরত্বে হাঁটার ক্ষেত্রে বাঁধার সৃষ্টি করে না
- ☐ ব্যথা আমাকে এক মাইলের বেশি হাটতে বাঁধার সৃষ্টি করে
- ☐ ব্যথা আমাকে আধা মাইলের বেশি হাটতে বাঁধার সৃষ্টি করে
- ☐ ব্যথা আমাকে ১০০ গজের বেশি হাটতে বাঁধার সৃষ্টি করে
- ☐ আমি শুধু লাঠি অথবা ক্রাচ ব্যবহার করে হাঁটতে পারি

- ☐ আমি বেশীরভাগে সময়ই বিছানায় থাকি এবং হামাগুড়ি দিয়ে টয়লেটে যাই

৪.৫ বসা

- ☐ আমি যেকোন চেয়ারে আমার নিজের ইচ্ছামত বসতে পারি
- ☐ আমি শুধুমাত্র আমার পছন্দের চেয়ারে নিজের ইচ্ছামত বসতে পারি
- ☐ আমি ব্যথার জন্য একঘন্টার বেশী বসতে পারি না
- ☐ আমি ব্যথার জন্য আধা ঘন্টার বেশী বসতে পারি না
- ☐ আমি ব্যথার জন্য ১০ মিনিটের বেশী বসতে পারি না
- ☐ আমি ব্যথার জন্য সব সময় বসতে পারি না

৪.৬ দাঁড়ানো

- ☐ আমি ব্যথা ছাড়া আমার ইচ্ছামত দাড়িয়ে থাকতে পারি
- ☐ আমি আমার ইচ্ছামত অনেকক্ষণ দাড়িয়ে থাকতে পারি, কিন্তু এটা কিছুটা ব্যথার সৃষ্টি করে
- ☐ আমি ব্যথার জন্য একঘন্টার বেশী দাড়িয়ে থাকতে পারি না
- ☐ আমি ব্যথার জন্য আধা ঘন্টার বেশী দাড়িয়ে থাকতে পারি না
- ☐ আমি ব্যথার জন্য ১০ মিনিটের বেশী দাড়িয়ে থাকতে পারি না
- ☐ আমি ব্যথার জন্য সব সময় দাড়িয়ে থাকতে পারি না

৪.৭ ঘুমানো

- ☐ ব্যথা আমার ঘুমের কোন সমস্যা তৈরী করে না
- ☐ আমি একমাত্র বিছানায় ভালভাবে ঘুমাতে পারি
- ☐ আমি বিছানায় ছয় ঘন্টার কম ঘুমাতে পারি
- ☐ আমি বিছানায় চার ঘন্টার কম ঘুমাতে পারি
- ☐ আমি বিছানায় দুই ঘন্টার কম ঘুমাতে পারি
- ☐ আমি ব্যথার জন্য সবসময় ঘুমাতে পারি না

৪.৮ যৌন জীবন

- ☐ আমার যৌন জীবন স্বাভাবিক এবং কোন ব্যথা তৈরী করে না
- ☐ আমার যৌন জীবন স্বাভাবিক এবং কিছুটা ব্যথা তৈরী করে
- ☐ আমার স্বাভাবিক এবং অনেক ব্যথা তৈরী করে
- ☐ আমার যৌন জীবন ব্যথার জন্য গুরুতরভাবে সীমাবদ্ধ
- ☐ আমার যৌন জীবন ব্যথার জন্য অনেকটাই গুরুতরভাবে সীমাবদ্ধ
- ☐ আমার যৌন জীবন ব্যথার জন্য পুরোটাই গুরুতরভাবে সীমাবদ্ধ

৪.৯ সামাজিক জীবন

- ☐ আমার সামাজিক জীবন স্বাভাবিক এবং এটা কোন ব্যথা তৈরী করে না
- ☐ আমার সামাজিক জীবন স্বাভাবিক কিন্তু এটা কিছুটা ব্যথা তৈরী করে
- ☐ ব্যথা আমার সামাজিক জীবনের উপর কোন প্রভাব ফেলে না কিন্তু উদ্দিপনামূলক কাজকর্ম হতে বিরত রাখে
- ☐ ব্যথা আমার সামাজিক জীবনকে বাধাগ্রস্ত করে এবং বাহিরে যেতে পারি না
- ☐ ব্যথা আমার জীবনকে চার দেয়ালের মধ্যে সীমাবদ্ধ করেছে
- ☐ ব্যথার জন্য আমার কোন সামাজিক জীবন নেই

৪.১০ ভ্রমন

- ☐ আমি ব্যথা ছাড়াই যে কোন জায়গায় ভ্রমন করতে পারি
- ☐ আমি যে কোন জায়গায় ভ্রমন করতে পারি, কিন্তু এটা কিছুটা ব্যথার সৃষ্টি করে
- ☐ আমি অতিরিক্ত ব্যথা নিয়ে দুই ঘন্টার বেশি ভ্রমন করতে পারি
- ☐ আমি অতিরিক্ত ব্যথা নিয়ে এক ঘন্টার বেশি ভ্রমন করতে পারি
- ☐ ব্যথার জন্য আমি ত্রিশ মিনিটের বেশি ভ্রমন করতে পারি না
- ☐ ব্যথার জন্য আমি চিকিৎসার প্রয়োজন ব্যতীত ভ্রমন করি না

অধ্যায় :৫- কোমড় ব্যথা রোগিদের জন্য ভয়-পরিহার বিশ্বাস প্রশ্নাবলী

	সম্পূর্ণ অসম্মতি		অনিশ্চিত			সম্পূর্ণ একমত
৫.১ শারীরিক কর্মকান্ডের জন্য আমার ব্যথা তৈরী হয়েছে	০	১ ২	৩	৪	৫	৬
৫.২শারীরিক কর্মকান্ডে আমার ব্যথাকে খারাপের দিকে নিয়ে যায়	০	১ ২	৩	৪	৫	৬
৫.৩ শারীরিক কর্মকান্ড আমার কোমড়ের জন্য ক্ষতিকর	০	১ ২	৩	৪	৫	৬
৫.৪ আমার শারীরিক কর্মকান্ড করা উচিত নয় যেটা আমার ব্যথাকে আরো বাড়িয়ে দেয়	০	১ ২	৩	৪	৫	৬
৫.৫ আমি কোন শারীরিক কর্মকান্ড করতে পারি না যেটা আমার ব্যথাকে আরো বাড়িয়ে	০	১ ২	৩	৪	৫	৬
৫.৬ আমার ব্যথা আমার কাজকর্ম দ্বারা অথবা আমার কর্মস্থলে দূর্ঘটনার জন্য তৈরী হয়েছে	০	১ ২	৩	৪	৫	৬
৫.৭ আমার কাজকর্ম আমার ব্যথা বাড়িয়ে দেয়	০	১ ২	৩	৪	৫	৬
৫.৮ ব্যথার ক্ষতিপূরণ সংক্রান্ত আমার একটি দাবি আছে	০	১ ২	৩	৪	৫	৬
৫.৯ আমার কাজকর্ম আমার জন্য অনেক ভারী	০	১ ২	৩	৪	৫	৬
৫.১০ কাজ আমার ব্যথাকে সৃষ্টি করে অথবা খারাপের দিকে নিয়ে	০	১ ২	৩	৪	৫	৬
৫.১১ আমার কাজকর্ম আমার কোমড়ের জন্য ক্ষকিকর	০	১ ২	৩	৪	৫	৬
৫.১২ আমার বর্তমান ব্যথা নিয়ে আমার স্বাভাবিক কাজকর্ম করা	০	১ ২	৩	৪	৫	৬
৫.১৩ আমি আমার বর্তমান ব্যথা নিয়ে স্বাভাবিক কাজকর্ম করতে	০	১ ২	৩	৪	৫	৬
৫.১৪ আমার ব্যথার চিকিৎসা না করা পর্যন্ত আমার স্বাভাবিক কাজকর্ম করতে পরি না	০	১ ২	৩	৪	৫	৬
৫.১৫ আমি তিনমাসের মধ্যে আমার স্বাভাবিক কাজকর্ম করার কথা চিন্তা করতে পরি না	০	১ ২	৩	৪	৫	৬

৫.১৬ আমি আর কাজে ফিরে যেতে সক্ষম হব বলে মনে করতে	০ ১ ২	৩ ৪ ৫	৬

অধ্যায় :৬- বোদারসম স্কেল

	বিরক্তর নয়	কিছুটা বিরক্তর	সম্পূর্ণ বিরক্তর
৬.১ আপনি কি পায়ে ব্যথা অনুভব করেন ?	০ ১ ২	৩ ৪ ৫	৬
৬.২ আপনি পায়ে অবশ অবশ অথবা ঝি ঝি অনুভব করেন ?	০ ১ ২	৩ ৪ ৫	৬
৬.৩ আপনি কি পায়ে দূর্বলতা অনুভব করেন ?	০ ১ ২	৩ ৪ ৫	৬
৬.৪ আপনি কি বসা অবস্থায় কোমড় ব্যথা অথবা পায়ে ব্যথা	০ ১ ২	৩ ৪ ৫	৬

Code No:

"Effectiveness of Physiotherapy treatment of lumber disc prolapse patients who are advised or planned surgery to musculoskeletal unit at CRP-Savar and CRP- Mirpur"

Please complete this form before your first appointment with the Lakewood Group. Your careful answers will help us to understand your pain problem and design the best treatment program for you. You may feel concerned about what happens to the information you provide, as much of it is personal. Our records are strictly confidential. No outsider is permitted to see your case record without your written permission.

Part: 1- Personal details:

1.1 Patients name:

1.2 Age:

1.3 Sex:	1. Male	2. Female
1.4 Height:		
1.5 Weight:		
1.6 Address:	Village:	Post office:
	Thana:	District:

1.7 Referring physician name:

Code No:

Part: 2-Socio-demographic information

2.1 Occupation:

1. Farmer 2. Day labor 3.Service holder 4. Garments worker
5. Driver 6. Rikshawola 7.Businessman 8. Unemployment
9. Housewife 10.Teacher 11.Student 12.Others

2.2 Marital status:

1. Married 2. Unmarried 3.Window 4. Divorce

2.3 Family size:

1. Small family 2. Large family

2.4 Number of Children:

2.5 Living place:

1. Urban 2. Rural

2.6 Educational status:

1. Illiterate 2.Primary 3.Secondary
4. HSC passed 5. Graduate & Masters

2.7 Religion:

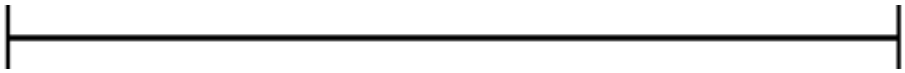
1. Islam 2. Hindu 3. Christen 4.Boddho

2.8 Smoking

1. Yes 2. No

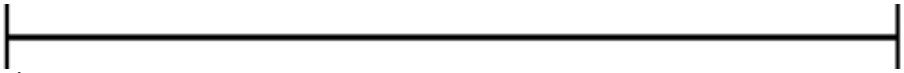
Part: 3- Dallas Pain questionnaire

3.1 How bad is your pain?



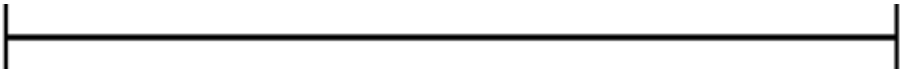
No pain Severe pain

3.2 How bad is the pain at night?



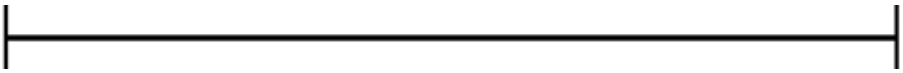
No pain severe pain

3.3Does the pain interfere with your lifestyle?



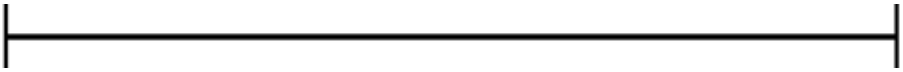
No problem Total change in lifestyle

3.4. How severe pain you feel during forward bending activity?



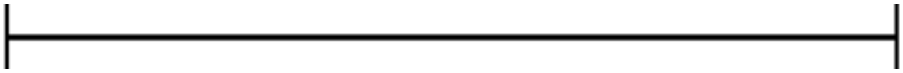
No pain Severe pain

3.5. How stiff is your back?



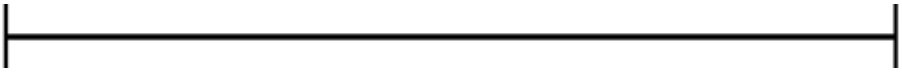
No stiffness Worse possible stiffness

3.6. Does your pain interfere with walking?



No problem Cannot walk

3.7. Do you hurt when walking?

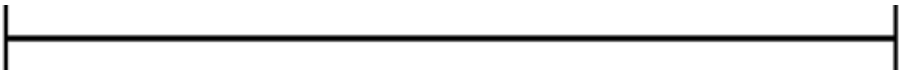


No problem Worse possible pain

3.8. Does your pain keep you from standing still?

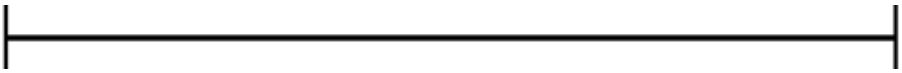
Can stand as long as I want Cannot stand at all

3.9. Does your pain keep you from twisting?



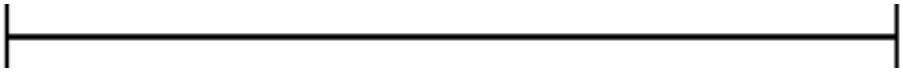
No problem Cannot twist

3.10. Does your pain allow you to sit in an upright hard chair?



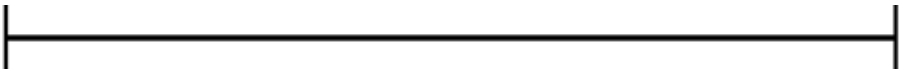
Sit as long as I like Cannot use a hard chair at all

3.11. Does your pain allow you to sit in a soft arm chair?



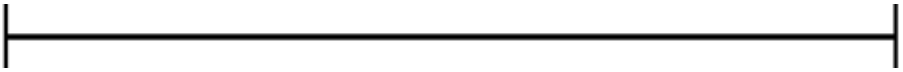
Sit as long as I like Cannot use a soft chair at all

3.12. Do you have back pain when lying in a bed?



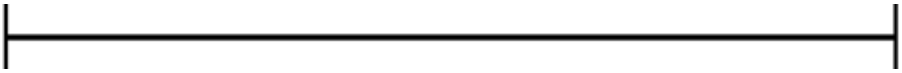
No Pain Worse Pain

3.13. How much does your pain limit your normal lifestyle?



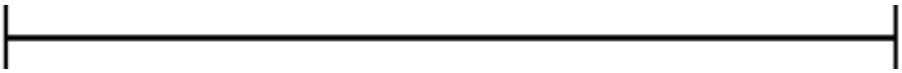
No pain No relief at all

3.14. Does your pain interfere with your work?



No problem Totally cannot walk

3.15. How much have you had to change your work place because of back pain?



No change So much that I cannot keep my job

Part: 4-Oswestry Low Back Pain Disability Questionnaire

4. 1: Pain Intensity

□ I can tolerate the pain I have without having to use pain killers.

□ The pain is bad but I manage without taking pain killers.

□ Medicine give complete relief from pain.

□ Medicine give moderate relief from pain.

□ Medicine give very little relief from pain.

□ Medicine have no effect on the pain and I do not use them.

4.2: Personal Care

□ I can look after myself normally without causing extra pain.

□ I can look after myself normally but it causes extra pain.

□ It is painful to look after myself and I am slow and careful.

□ I need some help but manage most of my personal care.

□ I need help every day in most aspects of self care.

□ I do not get dressed wash with difficulty and stay in bed.

4. 3: Lifting

□ I can lift heavy weights without extra pain.

□ I can lift heavy weights but it gives extra pain.

□ Pain prevents me from lifting heavy weights off the floor but I can manage if they are conveniently positioned for example on a table.

□ Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned.

□ I can lift only very light weights.

□ I cannot lift or carry anything at all.

4.4: Walking

□ Pain does not prevent me walking any distance

□ Pain prevents me walking more than 1 mile

□ Pain prevents me walking more than 0.5 miles

□ Pain prevents me walking more than 0.25 miles

□ I can only walk using a stick or crutches

□ I am in bed most of the time and have to crawl to the toilet.

4. 5: Sitting

□ I can sit in any chair as long as I like

□ I can only sit in my favorite chair as long as I like

□ Pain prevents me sitting more than 1 hour

□ Pain prevents me from sitting more than 0.5 hours

□ Pain prevents me from sitting more than 10 minutes

□ Pain prevents me from sitting at all

4.6: Standing

□ I can stand as long as I want without extra pain.

□ I can stand as long as I want but it gives me extra pain.

□ Pain prevents me from standing for more than 1 hour

□ Pain prevents me from standing for more than 30 minutes

□ Pain prevents me from standing for more than 10 minutes

□ Pain prevents me from standing at all

4.7: Sleeping

□ Pain does not prevent me from sleeping well.

□ I can sleep well only by using tablets.

□ Even when I take tablets I have less than 6 hours sleep.

□ Even when I take tablets I have less than 4 hours sleep.

□ Even when I take tablets I have less than 2 hours of sleep.

□ Pain prevents me from sleeping at all.

4.8: Sex Life

□ My sex life is normal and causes no extra pain.

□ My sex life is normal but causes some extra pain.

□ My sex life is nearly normal but is very painful.

□ My sex life is severely restricted by pain.

□ My sex life is nearly absent because of pain.

□ Pain prevents any sex life at all.

4.9: Social Life

□ My social life is normal and gives me no extra pain.

□ My social life is normal but increases the degree of pain.

□ Pain has no significant effect on my social life apart from limiting energetic interests such as dancing.

□ Pain has restricted my social life and I do not go out as often.

□ Pain has restricted my social life to my home.

□ I have no social life because of pain.

4.10: Traveling

□ I can travel anywhere without extra pain.

□ I can travel anywhere but it gives me extra pain.

□ Pain is bad but I manage journeys over 2 hours.

□ Pain restricts me to journeys of less than 1 hour.

□ Pain restricts me to short necessary journeys under 30 minutes.

□ Pain prevents me from traveling except to the doctor or hospital.

Part: 5- Fear-Avoidance Beliefs Questionnaire

	Completely disagree	Unsure	Completely agree
5.1My pain is caused by physical activity	0 1 2	3 4 5	6
5.2 Physical activity makes my pain worse	0 1 2	3 4 5	6
5.3 Physical activity might harm my back	0 1 2	3 4 5	6
5.4 I should not do physical activities which might Make my pain worse	0 1 2	3 4 5	6
5.5 I cannot do physical activities which (might) make my pain worse	0 1 2	3 4 5	6
5.6 My pain was caused by my work or by an accident	0 1 2	3 4 5	6
5.7 My work aggravated my pain	0 1 2	3 4 5	6
5.8 I have a claim for compensation for my pain	0 1 2	3 4 5	6
5.9 My work is too heavy for me	0 1 2	3 4 5	6

5.10 My work makes or would make my pain worse	0 1 2		3 4 5	6
5.11 My work might harm my back.	0 1 2		3 4 5	6
5.12 I should not do my normal work with my present pain	0 1 2		3 4 5	6
5.13 I cannot do my normal work with my present pain	0 1 2		3 4 5	6
5.14 I cannot do my normal work till my pain is treated	0 1 2		3 4 5	6
5.15 I do not think that I will be back to my normal work within 3 months	0 1 2		3 4 5	6
5.16 I do not think that I will ever be able to go back	0 1 2		3 4 5	6

Part: 6- Bothersome Index

	Not bothersome	somewhat bothersome	extremely bothersome
6.1 Do you feel leg pain	0 1 2	3 4 5	6
6.2 Do you feel numbness-Tingling sensation in leg	0 1 2	3 4 5	6
6.3 Do you feel weakness in leg	0 1 2	3 4 5	6
6.4 Do you feel back pain or leg pain in sitting	0 1 2	3 4 5	6

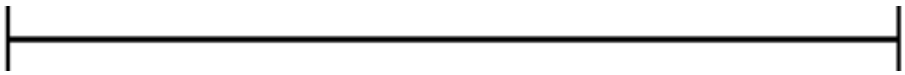
Follow up questionnaire after 2-months

Code No:

"Effectiveness of McKenzie Physiotherapy treatment for Prolapsed Lumber Intervertebral Disc (PLID) patients to musculoskeletal unit at CRP: A Randomized Controlled Trail"

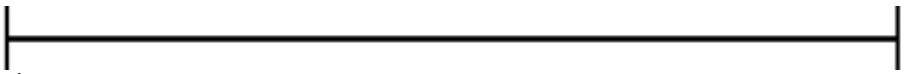
Part: 1- Dallas Pain questionnaire

1.1 How bad is your pain?



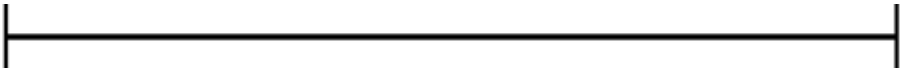
No pain Severe pain

1.2 How bad is the pain at night?



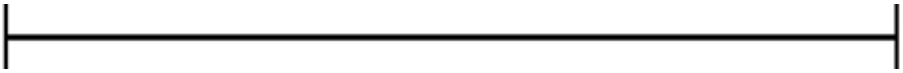
No pain severe pain

1.3Does the pain interfere with your lifestyle?



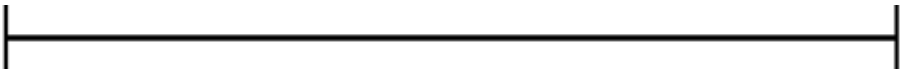
No problem Total change in lifestyle

1.4. How severe pain you feel during forward bending activity?



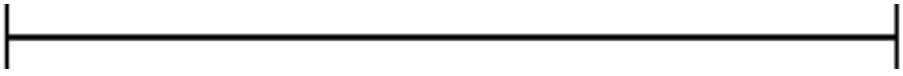
No pain Severe pain

1.5. How stiff is your back?



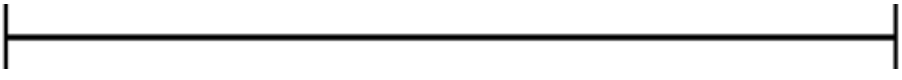
No stiffness Worse possible stiffness

1.6. Does your pain interfere with walking?



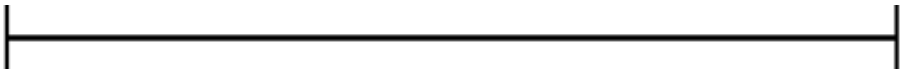
No problem Cannot walk

1.7. Do you hurt when walking?



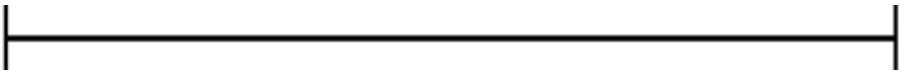
No problem Worse possible pain

1.8. Does your pain keep you from standing still?



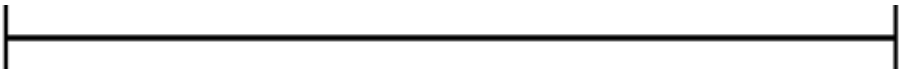
Can stand as long as I want Cannot stand at all

1.9. Does your pain keep you from twisting?



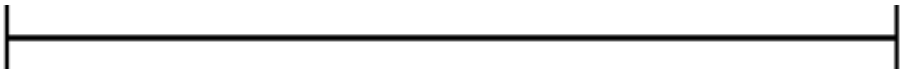
No problem Cannot twist

1.10. Does your pain allow you to sit in an upright hard chair?



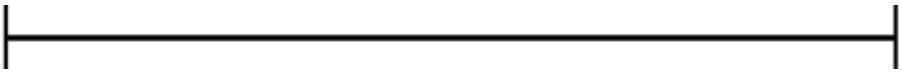
Sit as long as I like Cannot use a hard chair at all

1.11. Does your pain allow you to sit in a soft arm chair?



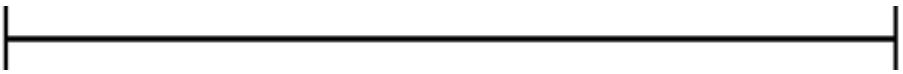
Sit as long as I like Cannot use a soft chair at all

1.12. Do you have back pain when lying in a bed?



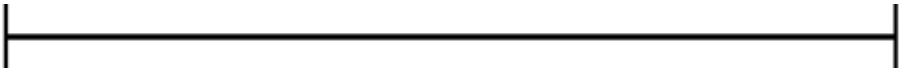
No Pain Worse Pain

1.13. How much does your pain limit your normal lifestyle?



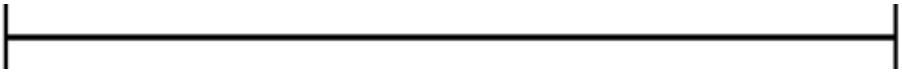
No pain No relief at all

1.14. Does your pain interfere with your work?



No problem Totally cannot walk

1.15. How much have you had to change your work place because of back pain?



No change So much that I cannot keep my job

Part: 2-Oswestry Low Back Pain Disability Questionnaire

2. 1: Pain Intensity

□ I can tolerate the pain I have without having to use pain killers.

□ The pain is bad but I manage without taking pain killers.

□ Medicine give complete relief from pain.

□ Medicine give moderate relief from pain.

□ Medicine give very little relief from pain.

□ Medicine have no effect on the pain and I do not use them.

2.2: Personal Care

□ I can look after myself normally without causing extra pain.

□ I can look after myself normally but it causes extra pain.

□ It is painful to look after myself and I am slow and careful.

□ I need some help but manage most of my personal care.

□ I need help every day in most aspects of self care.

□ I do not get dressed wash with difficulty and stay in bed.

2. 3: Lifting

□ I can lift heavy weights without extra pain.

□ I can lift heavy weights but it gives extra pain.

□ Pain prevents me from lifting heavy weights off the floor but I can manage if they are conveniently positioned for example on a table.

□ Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned.

□ I can lift only very light weights.

□ I cannot lift or carry anything at all.

2.4: Walking

□ Pain does not prevent me walking any distance

□ Pain prevents me walking more than 1 mile

□ Pain prevents me walking more than 0.5 miles

□ Pain prevents me walking more than 0.25 miles

□ I can only walk using a stick or crutches

□ I am in bed most of the time and have to crawl to the toilet.

2. 5: Sitting

□ I can sit in any chair as long as I like

□ I can only sit in my favorite chair as long as I like

□ Pain prevents me sitting more than 1 hour

□ Pain prevents me from sitting more than 0.5 hours

□ Pain prevents me from sitting more than 10 minutes

□ Pain prevents me from sitting at all

2.6: Standing

□ I can stand as long as I want without extra pain.

□ I can stand as long as I want but it gives me extra pain.

□ Pain prevents me from standing for more than 1 hour

□ Pain prevents me from standing for more than 30 minutes

□ Pain prevents me from standing for more than 10 minutes

□ Pain prevents me from standing at all

2.7: Sleeping

□ Pain does not prevent me from sleeping well.

□ I can sleep well only by using tablets.

□ Even when I take tablets I have less than 6 hours sleep.

□ Even when I take tablets I have less than 4 hours sleep.

□ Even when I take tablets I have less than 2 hours of sleep.

□ Pain prevents me from sleeping at all.

2.8: Sex Life

□ My sex life is normal and causes no extra pain.

□ My sex life is normal but causes some extra pain.

□ My sex life is nearly normal but is very painful.

□ My sex life is severely restricted by pain.

□ My sex life is nearly absent because of pain.

□ Pain prevents any sex life at all.

2.9: Social Life

□ My social life is normal and gives me no extra pain.

□ My social life is normal but increases the degree of pain.

□ Pain has no significant effect on my social life apart from limiting energetic interests such as dancing.

□ Pain has restricted my social life and I do not go out as often.

□ Pain has restricted my social life to my home.

□ I have no social life because of pain.

2.10: Traveling

□ I can travel anywhere without extra pain.

□ I can travel anywhere but it gives me extra pain.

□ Pain is bad but I manage journeys over 2 hours.

□ Pain restricts me to journeys of less than 1 hour.

□ Pain restricts me to short necessary journeys under 30 minutes.

□ Pain prevents me from traveling except to the doctor or hospital.