

**EFFECTIVENESS OF NEURODYNAMICS ALONG WITH
CONVENTIONAL PHYSIOTHERAPY FOR PATIENTS WITH PROLAPSED
LUMBER INTERVERTEBRAL DISC (PLID)**

Kaniz Fatima Camy

Bachelor of Science in Physiotherapy (B.Sc. PT)

Roll:925

Reg.no.:1729

Session: 2010-2011

BHPI, CRP, Savar, Dhaka-1343



Bangladesh Health Professions Institute (BHPI)

Department of Physiotherapy

CRP, Savar, Dhaka-1343

Bangladesh

August' 2016

We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled

**EFFECTIVENESS OF NEURODYNAMICS ALONG WITH
CONVENTIONAL PHYSIOTHERAPY FOR PATIENTS WITH PROLAPSED
LUMBER INTERVERTEBRAL DISC(PLID)**

Submitted by **Kaniz Fatima Camy** for partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B. Sc. PT).

.....
Md. ObaidulHaque
AssociateProfessor& Head
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka
Supervisor

.....
Mohammad Anwar Hossain
AssociateProfessor& Head
Department of Physiotherapy
CRP, Savar, Dhaka

.....
Mohammad HabiburRahman
Assistant Professor
Department of Physiotherapy
CRP, Savar, Dhaka

.....
Md. Shofiqul Islam
Assistant Professor
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka

.....
Md. ObaidulHaque
Associate Professor & Head
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka

DECLARATION

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that for any publication, presentation or dissemination of information of the study, I would be bound to take written consent from the Physiotherapy Department of Bangladesh Health Professions Institute, BHPI.

Signature:

Date:

Kaniz Fatima Camy

Bachelor of Science in Physiotherapy (B. Sc. PT)

Roll-925

Reg. no.:1729

Session: 2011-2012

BHPI, CRP, Savar, Dhaka-1343

CONTENTS

	Page No.
Acknowledgement	I
Acronyms	II
List of Figure	III
List of Table	IV
Abstract	V
CHAPTER- I: INTRODUCTION1-10	
1.1 Background	1-4
1.2 Rationale	5-6
1.3 Hypothesis	7
1.4 Null Hypothesis	7
1.5 Aim of the Study	8
1.6 Objectives of the study	8
1.7 Conceptual Framework	9
1.8 Operational Definition	10
CHAPTER- II: LITERATURE REVIEW 11-26	
CHAPTER-III:METHODOLOGY27-32	
3.1 Study Design	27
3.2 Study Area	27
3.3 Study Population And Sampling	27
3.4 Sample Size	28
3.5 Selection Criteria	29
3.6 Data Processing	29
3.6.1 Data Collection Tools	29
3.6.2 Measurement Tools	29

3.6.3 Data Collection Procedure	30
3.7.1 Data Analysis	30
3.7.1 Significant level	30
3.8 Treatment Protocol	31-32
3.9 Ethical Considerence	32
CHAPTER-IV: RESULTS	33-55
CHAPTER-V: DISCUSSION	56-60
CHAPTER-VI: CONCLUSION & RECOMMENDATION	61-62
6.1 Conclusion	61
6.2 Recommendation	61-62
REFERENCES	63-72
APPENDIX	73-97

Acknowledgement

At first I want to pay my thankfulness to Almighty Allah who gave me the ability to complete the study.

I am very much grateful to my honorable teacher and supervisor **Md. Obaidul Haque**, Associate Professor & Head of the physiotherapy department, BHPI, CRP, Savar, Dhaka, for giving me his valuable time, his thoughtful supervision and excellent guidance without which I could not able to complete this research project.

I would like to express my gratitude to **Fabiha Alam Disha**, Lecturer, Department of Physiotherapy, BHPI, CRP, Savar for recommend me to begin the study procedure and to **Mohammad Anwar Hossain**, Associate Professor & Head, Department of Physiotherapy, CRP, for giving me the courageous to conduct the study and permit me to collect data from the clinical setting of Musculoskeletal Unit, Physiotherapy Department, CRP, Savar.

Thanks to **Mohammad Habibur Rahman**, Assitant Professor, Department of Physiotherapy and **Ehsanur Rahman**, Assistant Professor, Department of Physiotherapy, CRP, Savar for helping me to choose the topic and for encouraging me to do the study and helping me in all aspects of my study

I am glad to acknowledge **Md. Shofiqul Islam**, Assistant Professor, Department of Physiotherapy, BHPI, CRP, who dedicatedly taught us Research Methodology subject and supervised us to accomplish the Research Project from the very beginning..

I would like to acknowledge the name of **S.M. Mustofa Kamal, Jakia Tajtufa, Sultan Salauddin**, Clinical Physiotherapist, Musculoskeletal Unit, CRP, Savar for helping me to collect valuable data of this study.

I would like to thank the librarian of BHPI for their kind support to find out related books, journals and also access to HINARI.

I would like to thank to all participants of the study for their enormous co-operation.

My special thanks to my friends for their continuous suggestions and supports to take challenges and that have inspired me throughout the project.

Acronyms

ADL	Activity of Daily Living
BHPI	Bangladesh Health Professions Institute.
BMRC	Bangladesh Medical Research Council
CRP	Centre for the Rehabilitation of the Paralysed.
DP	Directional Preference
IRB	Institutional Review Board
MS	Musculo Skeletal
NSAID's	Non-Steroidal Anti-inflammatory Drugs
ODI	Oswestry Disability Index
PLID	Prolapsed Lumbar Intervertebral Disc
PT	Physiotherapy
RCT	Randomized Control Trail
ROM	Range of Movement
SR	Systematic Review
USA	United States of America
WHO	World Health Organization

List of Figure

Figure No.	Title	Page No.
Figure – 1:	Gender Distribution	33
Figure -2:	Education level	34
Figure -3:	Occupation of the participants	35
Figure- 4:	Living area of the participants.	36
Figure- 5:	Causes of pain	37
Figure- 6:	Duration of pain among PLID patients.	38
Figure – 7:	Pain Reduction of PLID patients in Case Group.	39
Figure- 8:	Mean Pain Reduction of PLID patients in Case Group on.	40
Figure – 9:	Pain Reduction of PLID patients in Control Group.	41
Figure-10 :	Mean Pain Reduction of PLID patients in Control Group.	42
Figure-11:	Mean Difference of Pain Reduction in Both Groups	43
Figure-12:	ODI Score in Control Group	44
Figure-13:	Mean ODI Score of Control Group	45
Figure-14 :	ODI Score in Case Group	46
Figure-15:	Mean ODI Score of Case Group	47
Figure-16 :	Mean Difference of ODI Score in Both Groups	48

List of Table

Table No.	Title	Page No.
Table -I:	Experimental Group Treatment Protocol	31
Table-II:	Neurodynamic of lower limb	31
Table – III:	Control Group Treatment Protocol	32
Table-IV:	Patient disability on Mann-Whitney test in between groups	49
Table-V:	Disability comparison using Wilcoxon Signed Rank test within the control group	50
Table-VI:	Disability comparison using Wilcoxon Signed Rank test within the trail group	51
Table-VII:	Patient pain on Mann-Whitney test in between groups	52
Table-VIII:	Pain comparison using Wilcoxon Signed Rank test within the trail group	53
Table-IX:	Pain comparison using Wilcoxon Signed Rank test within the control group	54

Abstract

Purpose: The purpose of the study was to explore the efficacy of Neurodynamic with conventional physiotherapy compare to only conventional physiotherapy for the treatment of Prolapsed Lumbar Intervertebral Disc. *Objectives:* To determine the socio-demography of Prolapsed Lumbar Intervertebral Disc patient and to analyze the efficacy of Neurodynamic in reducing pain and improving function by reducing disability. *Methodology:* This study is an experimental design. Twenty patients with Prolapsed Lumbar Intervertebral Disc were conveniently selected from musculo-skeletal outpatient unit, CRP and then ten patients were randomly assigned to Neurodynamic with conventional physiotherapy group and ten patients to the only conventional physiotherapy group. Oswestry Disability Index (ODI) was used to measure disability. Statistical analysis was done by using Mann- Whitney *U* test and Wilcoxon test. *Results:* Mean difference of pain between pre-test and post-test of experimental group and control group were 5.3 and 0.9 and mean difference of ODI score between pre-test and post-test of experimental group and control group were 16.5 and 9.1. Following application of treatment the study found that the experimental group showed a significant improvement ($p < .05$) in case of Prolapsed Lumbar Intervertebral Disc. *Conclusion:* This experimental study shows that Neurodynamic with conventional physiotherapy is more effective than conventional physiotherapy alone for patients with Prolapsed Lumbar Intervertebral Disc.

Keywords: Neurodynamic, Conventional Physiotherapy, Prolapsed Lumbar Intervertebral Disc.

1.1 Background

Prolapsed lumbar disc is a displacement of disc material (nucleus pulposus or annulus fibrosis) beyond the intervertebral disc space. The highest prevalence is among people aged 30-50 years, with a male to female ratio of 2:1. There is little evidence to suggest that drug treatments are effective in treating herniated disc (Jordonet al., 2009). According to West et al., 2010 Prolapsed Lumbar Intervertebral Disc Disease was found 78.2%. 56% of adults have disc bulging (Orthofracs, 2013).

Prolapsed lumbar intervertebral disc (PLID) is one of the most common musculoskeletal disorders in the population (Khruakhornet al., 2010). Musculoskeletal disorders constitute a major health problem to our society. Lifetime prevalence rates of Prolapsed Lumbar Intervertebral Disc is up to 85-90% (Taechasubamornet al., 2011).

Prolapsed lumbar intervertebral disc is a common musculoskeletal disorder which causes pain in the lumbosacral area. It could be acute, sub-acute and chronic in its clinical presentation. It affects 80% people at some point in their live (Srivastava, 2013).

In Bangladesh, the number of people with prolapsed lumbar intervertebral disc is increasing and is a matter of concern. The process of disc degeneration is an aberrant, cell-mediated response to progressive structural failure. A degenerate disc is one with structural failure combined with accelerated or advanced signs of aging (Michael & Peter, 2006)

Bangladesh is one of the highly populated developing countries in the world (Sarkar & Rahman, 2007). According to World Health Organization statistics, 10% of population in Bangladesh is disabled (Hossain, 2011). PLID as well as Prolapsed Lumbar Intervertebral Disc is one of the most common causes of disability and the burden for the individual, society and as well as the National Health Service in the world (McKenzie, 1995). PLID or Prolapsed Lumbar Intervertebral Disc is the most common condition in the developed Western countries (Doherty, 2012). Approximately 80% of all human beings experience Prolapsed Lumbar Intervertebral Disc in their lives (Hills, 2006). PLID causes activity limitation, besides it is the

second most common cause of receiving treatment and the third most common cause of surgical procedure (Apfel et al., 2010).

PLID is the most common cause of lumbosacral radiculopathy (Hahne et al., 2010). Lumber radicular syndrome is based on a lumber disc prolapsed (Erdogmus, 2007). PLID may be radiated to the lower limb. The prevalence of leg pain, as a referred symptom associated with back pain or prolapsed lumbar intervertebral disc has been shown to be approximately 35%, while true prevalence of sciatica is 2-5% (Nachemson et al., 2009).

PLID is of significant socioeconomic relevance because it causes temporary productivity loss, high medical and indirect costs, or even permanent disability (Apfel et al., 2010). PLID is the global cause of personal, community and financial burden as it is one of the most common health problems (Hoy et al., 2012). PLID is one of the commonest causes of disability in the working population. Self-rated disability at work was strongly associated with the presence of musculoskeletal disorders or other musculoskeletal diseases (Miranda et al., 2010). Employees who are unable to work due to back pain spend a significant amount of time on sick leave, which impacts on productivity in the work place (Johanning, 2008).

Pain in the low back area is a common phenomenon. Mechanical problems are the most common cause (around 90%) and a majority (70% to 85%) does not have a specific cause identified. Any injury to one of the intervertebral discs (disc tear, disc herniation), ligament and joint also causes pain (Manusov, 2012). The cause of LBP depends on different factors. Hills (2006) mention that the mechanical Prolapsed Lumber Intervertebral Disc is the most common cause of work related occupational disability. Prolapsed Lumber Intervertebral Disc also aggravated by poor sitting posture in both sedentary and manual workers (McKenzie, 1995). Traumatic or degenerative conditions of the spine are the most common cause of Prolapsed Lumber Intervertebral Disc although disk protrusion and herniation have been popularized as cause of LBP (Wheeler, 2007).

Prolapsed Lumber Intervertebral Disc is the global cause of personal, community and financial burden as it is one of the most common health problems (Hoy et al., 2012). LBP is of significant socioeconomic relevance because it may lead to a temporary

loss of productivity, enormous medical and indirect costs, or even permanent disability (Apfel et al., 2010).

The worldwide most common musculoskeletal problem is Prolapsed Lumber Intervertebral Disc; around 80% people are affected by Prolapsed Lumber Intervertebral Disc in their life time. Prolapsed Lumber Intervertebral Disc (LBP) is known globally as prime contributor to Years Lived with Disability (YLDs). It is the absolute cause of disability in developed countries and also for developing countries. It also creates a substantial personal, community, and financial burden globally stated that day by day the effects of LBP on the economic, social and public health increasing enormously. Back pain and related disability are major problems and the prevalence of back pain in general population in one year ranging from 4.8% to 79.5%, On the other hand, back pain that restricts daily functional activities is not also rare (17% to 70%) (Takasaki & May, 2014). Lumber radiculopathy has a reported annual incidence of 83.2 per 100000 and an increased prevalence in the fifth decade of life among the general population (Polston, 2007).

Lumber spine disorders are very familiar and often result in a disabling condition (Murphy, 2004).It is also considered the second leading cause of office visits to primary care physicians in USA. Louw et al., (2007) showed that the life time prevalence of LBP in developed countries is reported to be up to 85%; it is maximum prevalent in musculoskeletal condition and creating disability in the developed nations, such as the United States of America (USA) and Australia. Alkherayf (2010) stated that at some point during Saskatchewan adults' lifetime 84.1% had experienced LBP.A report showed that the prevalence of LBP is much lower in the less industrialised countries than more industrialised countries. A global review of the prevalence of Prolapsed Lumber Intervertebral Disc in the adult general population showed point prevalence of 12–33% and 1-year prevalence of 22–65%.It is estimated that 75% to 80% of the adult population experienced LBP at least once in their lifetime with approximately 10% going on to develop chronic persistent or recurrent pain. In the case of acute LBP, reports suggest that 75–90% of cases recover within 6 weeks regardless of medical intervention, but up to 25% are at risk of developing chronic pain and disability. Mobilization permits early treatment by gentle oscillatory movements, which have the effects of decreasing muscle spasm and pain and thus gradually improving mobility (Saunders et al., 2005).Neurodynamics are

mechanically used to stimulate and move neural tissues, in order to gain insight into their mobility and sensitivity to movement where in the presence of an abnormality, skilled manual therapy treatment using these tests is designed to improve the mobility of the neural structures and consequently to reduce sensitivity to movement and tension.(Hamouda, 2013).

Neurodynamics techniques are used in the instances of altered neurodynamic or altered neural tension. It aims to restore the relative mobility of the neural tissue and surrounding mechanical interfaces, reducing intrinsic pressures and regaining optimum physiological function (Malik,et al., 2012).Neurodynamics is a gentle movement technique used by the physiotherapists to move the nerves (Coppieters et al., 2009). It contributes to restoring the stretching and tensile ability of neural tissue and stimulates the restoration of normal physiological function of nerve cells (Nee & Butler, 2006).Nee & Butler, (2006) proposed that neurodynamic mobilization techniques iseffective in addressing peripheral neuropathic pain where involved nerve roots.Considering the facts of chronic Prolapsed Lumber Intervertebral Disc it is evident that the treatment methods should target the reduction of pain which is due to neural compression and Neurodynamics plays important roles in decreasing pain and improving the range of motion of the Prolapsed Lumber Intervertebral Disc patients (Murphy & Hurwitz, 2007).

1.2 Rationale

PLID or Prolapsed Lumbar Intervertebral Disc is not only a disabling condition but also has significant impact on the sufferer. So, various systems of medicine are trying their best to give maximum functional recovery within short time. Bangladesh is a developing country with massive population though there is very limited resources and opportunities to get proper medical care due to insufficient skilled professionals and expensive services. Within this perspective mainly a PLID patient get medication and sometimes operated by surgeon but physiotherapy intervention has a great role to prevent PLID and restore the functions maximizing the ability to perform ADL's. So, evidence based physiotherapy intervention is the important to build up the liability to the patients also professionals.

The various treatments used for non-radicular pain are little different from the radicular type of pain. The non-radicular pains are treated with conservative medical management procedure such as Short Wave Diathermy (SWD), Microwave Diathermy (MWD), Ultrasound Therapy (UST), Interferential Therapy (IFT), Transcutaneous Electrical Nerve Stimulation (TENS), manual therapy, ergonomics, postural education, neurodynamic etc. The principles of treating a radicular pain includes rest, anti-inflammatory medication such as NSAIDs, lumbar traction, superficial and deep heating modalities, manual therapy, neurodynamic principles, orthotics, ergonomics etc.

Very Few studies have done to regarding the Effectiveness of Neural Tissue Mobilization and Conventional Physiotherapy for Mechanical Radiating Prolapsed Lumbar Intervertebral Disc. The design of this study will make the comparison in order to discover the most effective physiotherapy intervention to alleviate early symptoms of the condition and develop an evidence based treatment strategy for the professional.

In this area of neurodynamics there are few researches published in Bangladesh, no research has been published yet to find out the efficacy of neurodynamics along with conventional physiotherapy comparing with only conventional physiotherapy in any well reputed journal.

The study is designed to investigate the efficacy of Neurodynamics for the treatment of PLID and The study will help other physiotherapist to know the actual effectiveness of this treatment approach.

Lastly, to determine whether a clinical benefit for neurodynamic could be concluded (Maaher at al., 2003) A positive effect was concluded if the intervention was statistically significantly more beneficial compared to the control or a negative effect if the intervention was less effective than the control, and a neutral effect was concluded where the intervention and control did not statistically differ significantly (Piner at al., 2005).

1.3 Hypothesis

Neurodynamics along with conventional physiotherapy is more effective than only conventional physiotherapy for the management of patient with prolapsed lumbar intervertebral disc (PLID).

1.4 Null Hypothesis

Neurodynamics along with conventional physiotherapy is no more effective than only conventional physiotherapy for the management of patient with prolapsed lumbar intervertebral disc (PLID).

1.5 Aim of the study

The aim of the study is to find out the effectiveness of neurodynamics along with conventional physiotherapy for the management of patient with prolapsed lumbar intervertebral disc (PLID).

1.6 Objectives of the study

General Objective

To find out the therapeutic effectiveness of neurodynamics for the patient with prolapsed lumbar intervertebral disc (PLID).

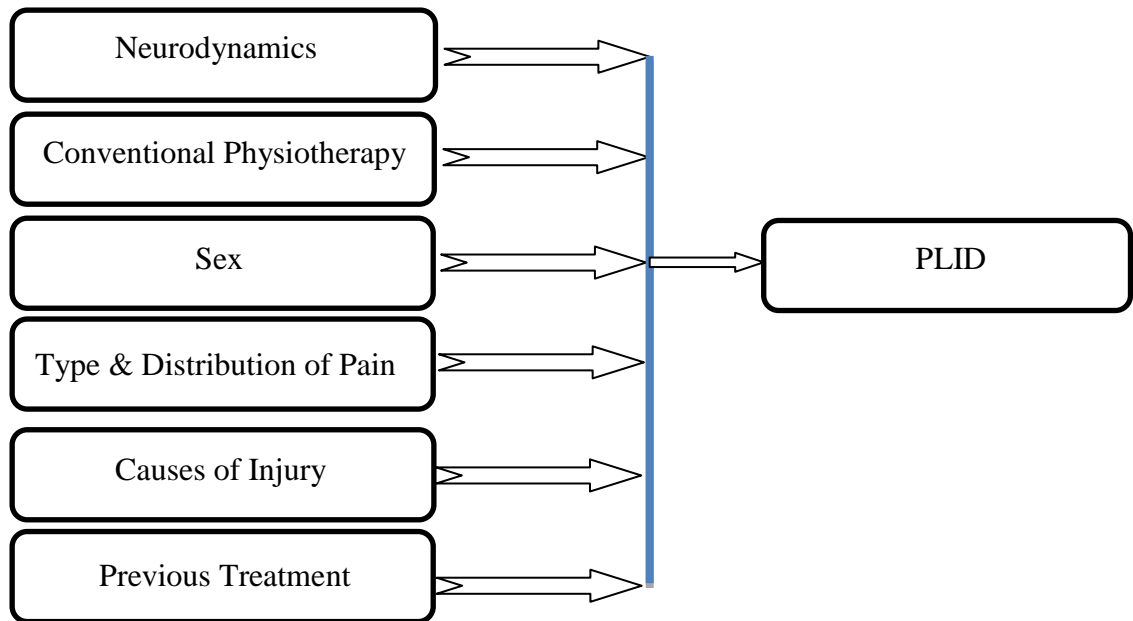
Specific Objectives

1. To figure out the socio-demography of prolapsed lumbar intervertebral disc (PLID);
2. To explore the efficacy of Neurodynamics in reducing pain of the patients with prolapsed lumbar intervertebral disc (PLID);
3. To determine the effectiveness of Neurodynamics in reducing disability and improving functional ability of the patient with prolapsed lumbar intervertebral disc (PLID);
4. To formulate a recommendation on treatment guideline for prolapsed lumbar intervertebral disc (PLID) patients evaluating the result of the study;

1.7 Conceptual Framework

Independent variables

Dependent variable



1.8 Operational Definition

Neurodynamic

Medical Definition of neurodynamic is of, relating to, or involving communication between different parts of the nervous system.

Conventional physiotherapy

Physiotherapy interventions that are widely accepted and practiced by the mainstream medical community are called Conventional Physiotherapy.

Pain is a normal protection mechanism and physiological reaction of the body to an abnormal stimulus and the main presenting symptom of patients with low back trouble. Although the symptoms of pins and needles, numbness, weakness, stiffness and instability are common, the most important symptom is pain. Pain has been defined by the International Association for the Study of Pain (IASP) as ‘an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage’ (Merskey&Bogduk, 2008)

According to Manusov (2012), Prolapsed Lumber Intervertebral Disc can be classified in two categories based on signs and symptoms: Nonspecific – the most common type of diffuse pain that does not change in response to particular movements, is localized & non-radiating & Radicular – pain which radiates down the leg below the knee may be unilateral or bilateral and changes in intensity in response to particular positions or maneuvers. The most common radicular pain is due to sciatica.

PLID or Prolapsed Lumber Intervertebral Disc may or may not refer to the lower limb and into the groin or perineum. Radiating pain means that the pain experienced in a part of the body by the patient may be situated far away from the diseased or injured area. Pain in the lower limb associated with PLID is either somatic referred pain or radicular pain. Pain extending across a relatively wide region and felt deeply, in a relatively constant or fixed location is somatic referred pain. Pain that travels along the length of the lower limb, along a narrow band is radicular pain. Pain in the buttock or proximal thigh extending below the knee is not necessarily radicular pain. Deep aching pain indicates somatic referred pain and Lancinating or shooting pain refers to radiating pain (Bruehl et al., 2012).

PLID is one of the commonest causes of disability in the working population. Disability due to PLID has been defined as restricted functioning, involving limitation of activity and restriction of participation in life situations. Disability often accompanies PLID, varies in extent and may be temporary or even permanent (Waddell, 2013). In the International classification of functioning, disability and health (ICF), the emphasis was changed to activity and activity limitation meaning

difficulty in the performance, accomplishment or completion of an activity. Difficulties in performing activities occur when there is a qualitative or quantitative alteration in the way in which activities are carried out. Difficulty includes all the ways in which the doing of the activity may be affected.

The duration of PLID may be described as acute pain lasts up to 7 days, sub-acute pain more than 7 days but less than 7 weeks and chronic pain lasts more than 7 weeks. As the key feature of adult back pain have typical life time patterns of fluctuating symptoms of varying severity, a patient who suffers recurrent episodes of pain, each of which is separated by a pain-free period of at least 3 months, each new episode satisfies the definition of acute LBP (Bogduk&McGuirk, 2012).

The lumbar vertebral column is made of five vertebrae and in between two vertebrae there are intervertebral discs. The intervertebral discs play a vital role in the functioning of the spine. The motions permit between vertebral bodies are (1) Translational motion in the long axis of the spine (2) Rotary motion about a vertical axis (3) Antero-posterior bending and (4) Lateral bending. The orientation of zygapophyseal facets from L1 to L4 limits lateral flexion and rotation (Srivastava et al., 2013). When the lumbar spine is flexed, the Range Of Motion in rotation is less than when the lumbar spine is in the neutral position. The orientation of the lumbar zygapophyseal facets favors forward flexion and backward extension. The amount of flexion varies at each inter-space of the lumbar vertebrae, but most of the flexion takes place at the lumbo-sacral joint. The average range of flexion is 80 degree at L1/L2, 90 at L2/L3 and 120 at L3/L4 and L5/ S1 (Srivastava et al., 2013).

The pathophysiology of PLID is usually indeterminate. In fact one of the defining features of this disorder is non-specific etiology. Pain arises from a number of sites, including the vertebral column, surrounding muscles, tendons, ligaments and fascia. Stretching, tearing or contusion of these may result in Prolapsed Lumbar Intervertebral Disc (Freeman et al., 2007).

Any of the structures of the lumbar spine that receives innervation could be a source of PLID. Thus pain could arise from the ligaments, muscles, tendons, fasciae, joints, vertebral bodies, nerves, dura or discs of the lumbar spine. (Bogduk&McGuirk,, 2012).

Radicular pain may occur by inflammation of nerve root, by compression of the dorsal root ganglion or its blood supply or by microscopic damage to the nerve root (Karppinen, 2007).

McKenzie(1995) mentioned that mechanical pain occurs when the joint between two bones placed in opposition. When surrounding ligaments and other soft tissues are over stretched the patient will initially feel major discomfort but as the time passes pain will eventually develop. Mechanical Prolapsed Lumber Intervertebral Disc classified as in three relatively simple categories that are postural syndrome, dysfunction symptom and derangement syndrome.

Freeman et al., (2007) proposed that there are several possible non-mechanical causes of Prolapsed Lumber Intervertebral Disc such as small fracture to the spine from osteoporosis, Prolapsed Lumber Intervertebral Disc from pelvic and low abdominal organs which include bladder infection, kidney stone, endometriosis, ovarian cancer or cyst and testicular torsion. McKenzie (1995) reported that rheumatoid arthritis, ankylosing spondylitis and other bacterial infections may lead to non-mechanical Prolapsed Lumber Intervertebral Disc. In some cases psychological factors can lead to Prolapsed Lumber Intervertebral Disc.

There are numerous risk factors assumed to be related to PLID. Epidemiological studies have generally divided these factors into three dimensions: individual and life style factors, physical or biomechanical factors and psychosocial factors (Ferguson & Marras, 2010). Individual factors such as age, gender, anthropometric measures and muscle strength and flexibility have been considered as possible risk factor for PLID. Factors related to lifestyle such as smoking and obesity have been shown to be risk factors for PLID (Shiri et al., 2010). Physical and biomechanical factors including postural stress (high spinal load or bad posture), whole body vibration, heavy work, frequent lifting and prolonged or repeated bending, driving, sitting and twisting have been considered to be associated with back pain and disc prolapse (Vingard et al., 2008). In addition people dissatisfied with their work, low social support, low job control and low supervisor support in workplace are more likely to report PLID (Kaila-Kangas et al., 2007).

Although there is technological advances have been made in recent years, specialists are still unable to identify the specific origin of acute back pain in the majority of

patients. It has been argued that less than 15% of back pain sufferers can be given a clinically relevant specific diagnosis based on PLID history, clinical examination, neurophysiological and radiological studies (Nachemson, 2013).

The treatment most commonly prescribed for back pain is medication; particularly non-steroidal anti-inflammatory drugs (NSAIDs), muscle relaxants, and narcotic analgesics. In one longitudinal study of primary care patients with Prolapsed Lumbar Intervertebral Disc, 69% were prescribed non-steroidal anti-inflammatory drugs, 35% muscle relaxants, 12% narcotics, and 4% acetaminophen; 20% received no medications. For Pain relief from acute PLID, the guidelines recommended paracetamol as a first choice and NSAIDs as a second choice. If paracetamol or NSAIDs fail to reduce pain a short course of muscle relaxants alone or in addition to NSAIDs can be considered (Tulder et al., 2011).

Lumbar supports (braces or orthoses) are used to prevent back injuries and also as a treatment for people with Prolapsed Lumbar Intervertebral Disc. Several potential mechanisms of action of lumbar supports are reported in the literature that may support their use in the treatment of Prolapsed Lumbar Intervertebral Disc. They are supposed to: (1) correct deformity; (2) limit spinal motion; (3) stabilize the lumbar spine; (4) reduce mechanical loading; and (5) provide miscellaneous effects such as massage, heat or placebo (Calmels, 2009)

Exercise therapy was defined as any program in which, during the therapy sessions, the participants were required to carry out repeated voluntary dynamic movements or static muscular contractions (in each case, either “whole-body” or “region-specific”; and either with or without external loading), where such exercises were intended as a treatment for Prolapsed Lumbar Intervertebral Disc. The exercise was to have been supervised or “prescribed” (Koes et al.,2010). A recent study examined systematic reviews provided strong evidence that exercise programs reduce pain and disability in people with non-specific Prolapsed Lumbar Intervertebral Disc (Swinkels et al., 2009).

Various interventions have been proposed for prolapsed lumbar intervertebral disc and have been further scrutinized in systematic reviews (Clarke et al., 2010; Hahne et al., 2010; Boyles et al., 2011).

Spinal manipulation is defined as a high velocity thrust to a joint beyond its restricted range of movement. The European guidelines proposed considering referral for spinal manipulation (a small amplitude high velocity single thrust passive movement up to the end of the available range of motion) for patients who fail to return to normal activities as non-surgical management of acute and chronic PLID (Tulder et al., 2007), Spinal mobilization involves low-velocity, passive movements within or at the limit of joint range (Brox et al., 2012). Most studies do not make a clear distinction between these two, because in clinical practice these two techniques are part of a “spinal manipulation package” that is often referred to as manual therapy (Bekkering et al., 2003).

Lumbar traction is applied by putting a harness around the lower rib cage and a second one around the iliac crest, and applying a force aiming at separating both harnesses. The applied force must be at least 25% of the body weight (weaker forces are considered as placebo). The duration and level of exerted traction can be varied in a continuous or intermittent mode (Heijden et al., 2009).

Massage can be defined as soft tissue manipulation using the hands or a mechanical device. Different techniques can be used, such as: effleurage, petrissage, friction, kneading, or hacking. Either a classical approach is used, or an approach in which the rules of massage from physical medicine are combined with those of acupuncture from neural therapy (treats one unique point with a special vibrating instrument that stimulates the acupuncture point superficially but not with needle insertion). In clinical practice, massage is often applied in combination with other therapies such as exercises and other interventions but sometimes also as a sole treatment (Furlan et al., 2012).

The cognitive behavioral therapy approach to pain has been conceptualized as a way of enhancing treatment by addressing relevant negative (emotions and thoughts) and behavioral (altered activity and medication-taking) aspects. It offers an educational concept whereby positive coping strategies are taught to enhance recovery (Linton & Ryberg, 2011). The approach seemed to be an effective treatment for patients with chronic PLID, but it is unknown what type of patients benefit from what type of behavioral treatment (Tulder et al., 2012).

In McKenzie method the therapy of PLID patients consist of an educational component, supported with advice from the book “Treat Your Own Back” and an active therapy component along with instructions in postural control and directional specific exercise repeated several times a day according to the principle of the syndrome (McKenzie & May, 2003).

Neurodynamic is a gentle movement technique used by the physiotherapists to move the nerves. The concept of neurodynamics was originally introduced by Shacklock in 1995. It refers to both the mechanical and physiological components of the nervous system as a whole, and the interconnections between them. Up to 40 percent of people experience sciatic pain, which occurs, when sciatic nerve is trapped or inflamed. There is need to stretch & mobilize the nerve & suggested treatment involved stretching & mobilize of the nerve for 5 minutes (Shacklock, 1995).

Neurodynamic of the nervous system, was described by Maitland in 1985, Elvey in 1986 and refined by Butler in 1991, is an addition to assessment and treatment of neural pain syndromes including lumbar spinal syndromes (Butler, 2010).

Nee & Butler (2010) proved that the neurodynamic technique can be effective in addressing musculoskeletal presentation of neuropathic pain. The study included that the peripheral neuropathic pain is because of injury to root or peripheral nerve trunk by mechanical or chemical stimuli. Clinical manifestation includes positive and negative symptoms. Positive symptoms reflect an abnormal level of exhibitions in the nervous system and include pain, paraesthesia, and dyesthesia. Negative symptoms indicate reduced impulse conduction in the neural tissue and hypoesthesia or anaesthesia and weakness (Nee & Butler, 2010).

Prolapsed Lumbar Intervertebral Disc as refers to pain in the lumbo-sacral area of spine encompassing the distance from 1st lumbar vertebra to the 1st sacral vertebra, this is the area of the spine where the lordotic curve forms (Phansopkar & Kage, 2014). It's known one of the most common symptoms experienced by people throughout the world. Rhon & Fritz, (2015) stated that LBP is one of the top 10 global burden diseases on the society (Rhon & Fritz, 2015). Chronic back pain is a complex problem affecting about 20% of the population in Bangladesh in each year between the age group 30-60 years which has a great harmful effect on individual health, employment and daily activities of living. Back pain is the cause that mostly makes people disables

and make them unable to go their daily work in United Kingdom (UK). 60% to 80% of the world's population has experienced at least one episode of Prolapsed Lumber Intervertebral Disc in their lifetime all over. About 45% to 55% of adult persons experience Prolapsed Lumber Intervertebral Disc within one year. In addition, About 62% of previously experienced LBP patient would experience pain after 12 months. This condition may cause a decrease in the quality of life of individuals, as well as deterioration in physical activity and it is the one of four major conditions that causes disability. Functional disability caused by LBP is a major problem. It's affects people of all ages, from children to the elderly, and is a very frequent reason for medical consultations (Mazroa& Mohammad, 2012).

Usually both male and female are equally affected by Prolapsed Lumber Intervertebral Disc but probability to have LBP is associated with female especially in developing country due to their working posture, prolong and abnormal stress on back muscles can lead LBP and elastic fiber strain can be a cause that leads to LBP. Several risk factors that are the trigger to be happened LBP including occupational sitting, awkward posture, standing and walking, manual handling or assisting patients, pushing or pulling, bending and twisting, lifting or carrying (Balague, 2012) and other including depressive moods, obesity, body height and age (Mazroa& Mohammad, 2012).

For working people prolong sustain bending posture makes the lordotic curvature of lumbar spine became straight that creates increased inter-discal pressure leads to Prolapsed Lumber Intervertebral Disc and most of the activity of daily life in flexion position including sports, flexion stresses are considered as a key role in lumbar disc failure that causes LBP. Many disc herniations are physiologically resolved after several months of duration but severe pain and unpleasant sensorimotor disturbances makes people suffer a lot. Albert, (2012) mentioned life time prevalence of lumber disc herniation is 5% among men and for women it is about 4%. Maximum mechanical back pain patients are related to inter vertebral disk problem and abnormally displaced disc within the vertebrae is usually the mechanism of pain but it may cause by trauma, pathological, degeneration or mechanical abnormality. It thought that faulty posture can be a cause of LBP and the postural retraining was tradition physiotherapeutic intervention in the treatment of Prolapsed Lumber Intervertebral Disc (LBP) but the relation between posture and LBP is largely unknown. The ideal spinal posture is a common component of the clinical

management of non-specific LBP patients the direct relationship between spinal posture and LBP still remains unclear. It may also be classified as specific or nonspecific. Most of the LBP patients are non-specific because maximum LBP patients was not perfectly diagnosed based on anatomical or physiological abnormalities (Ebadi, 2012).

According to duration, LBP classified as acute, sub-acute and chronic. There is some controversy about the exact time duration of acute or chronic LBP, it's mentioned that less than three months is considered as acute and more than three months is considered as chronic. About 10% of acute LBP usually goes to chronic LBP. LBP is categorized by the duration of symptoms as: Acute LBP (0–6 weeks); Sub acute LBP (7–12 weeks); Chronic LBP (>12 weeks). The acute Prolapsed Lumbar Intervertebral Disc is the result of injury such as sprain or strain, while the cause of chronic Prolapsed Lumbar Intervertebral Disc is multi-factorial (William, et al., 2007).

According to McKenzie (2003), mechanical LBP is classified as postural, derangement and dysfunction; in respect to site and area of pain, it may unilateral or bilateral including symmetrical or asymmetrical in which he also stated lumbosacral radicular leg pain is the most common symptom; and usually pain worsens with coughing, sneezing and or patients may report sensory symptoms, limited forward flexion of the lumbar spine, difficulty in extend lumbar spine, gait deformity like limbic gait if pain is unilateral or antalgic gait and the characteristics of LBP where asymmetrical muscle spasm of the paraspinal muscles of lumbar spine with other signs and symptoms like pain, paraesthesia, numbness, reduction of muscle power and decrease functional ability, for People with chronic Prolapsed Lumbar Intervertebral Disc are more likely to seek care and they use more health care service and for these reason there are increased medication prescription and visit to physician, physiotherapist and chiropractors (Freburger, et al., 2009). Physical therapist, chiropractors, orthopedic surgeon, general physician and other specialists are the main health service providers for the LBP patients in the UK. From the literature review the researcher has found two treatment options for LBP; the conservative and surgical managements where physiotherapy undergoes to conservative method. "Physiotherapy which is a primary care, autonomous, client-focused health profession dedicated to improving quality of life by promoting physical activity, optimal mobility and overall health and wellness, preventing disease, injury, and disability, managing acute and chronic conditions, activity limitations, and participation restrictions, improving and

maintaining optimal functional independence and physical performance, rehabilitating injury and the effects of disease or disability with therapeutic exercise programs and other interventions and educating and planning maintenance and support programs to prevent re-occurrence, re-injury or functional decline” (Desveaux, et al. 2012).

There are several evidences about conservative and surgical management for Prolapsed Lumbar Intervertebral Disc patients and among them lumbar discectomy found to be done mostly by the orthopedic surgeon; but recurrent disc herniation or progressive disc space reduction after discectomy leads to increase pain and disability that creates necessity of repeat surgery, revision surgery does not improve symptoms. Most of the physicians agree that almost all the patients of LBP should take conservative management like physical therapy. There is no any clear evidence of primary spinal fusion surgery is more effective than any other rehabilitation intervention. Besides this, there is no difference of outcome between primary care practitioners like physiotherapist and orthopaedic surgeon. Chou (2009) said for back pain which is caused by prolapsed disc with radiculopathy, placebo injection is inferior to surgery but there is fair evidence of epidural steroid injection is moderately reduces pain symptoms but for short term not for long term time duration. For long term benefit conservative management is superior to surgery. LBP with spondylolisthes is treated by surgery has similar effect as conservatives management (Kovacs, 2011). Compared to laminectomy and discectomy instrumented fusion has the equal chance of recurrence after surgery and reverse spinal fusion surgery in patients with LBP has no benefit; and he also did a study about four year follow up, showed that the improvement rate in LBP patients after four years is inferior in patients who underwent to surgery compared with non-surgical management like physical exercise. Spinal surgery for LBP with herniated lumbar disc associated with radiculopathy and symptomatic spinal canal stenosis is better for short-term benefits compared to conservative therapy, though benefits diminish with long-term follow-up in some trials; on the other hand for non-radicular back pain with common degenerative changes, fusion is no more effective than intensive rehabilitation, but associated with small to moderate benefits compared to standard nonsurgical therapy. Spinal surgery for LBP has effectiveness in short term but in long term there is no significantly difference of physiotherapy management and spinal surgery. Conservative management includes analgesics, rest, exercise, traction, manipulation, mobilization and epidural injection (Albert, 2012). Pinto, et al. (2012) concluded that

epidural steroid injection has no evidence in treatment of sciatica. Physiotherapy exercise is widely used in all over the world as a primary intervention for Prolapsed Lumber Intervertebral Disc. Physiotherapy is a tailored intervention focused on physical factors including the combined individual exercise programs and advice. It is now a common part of the management of Prolapsed Lumber Intervertebral Disc patients. A current study by Middlekoop, (2011) presents an up-to-date overview on the current literature on physical and rehabilitation medicine in patients with chronic LBP; and he stated the physical and rehabilitation medicine interventions include exercise therapy, back schools, transcutaneous electrical nerve stimulation (TENS), superficial heat or cold, low level laser therapy (LLLT), individual patient education, massage, behavioral treatment, lumbar supports, traction, and multidisciplinary rehabilitation. This systematic review has provided an overview on these physical and rehabilitation medicine interventions applied on patients with chronic Prolapsed Lumber Intervertebral Disc and its effectiveness (Middlekoop, 2011).

In clinical practice a number of physiotherapy treatment strategies are currently utilized by a range of practitioners with varying degrees of effectiveness, i.e. joint mobilization and manipulation, exercise therapy, soft tissue massage techniques, electrotherapy, and traction. Core stability exercises extensively researched and clinically popular. A moderate beneficial treatment by exercise therapy for Prolapsed Lumber Intervertebral Disc patients which is applied in a sequential manner depending on individual patients; sometimes it may be extension or sometimes may be flexion or it may be lateral rotation. This treatment effect is independent of changes to the musculoskeletal system, which implies that there is a benefit of exercise for pain not related to an increase in strength; and has a significant effect on work disability in patients with chronic nonspecific Prolapsed Lumber Intervertebral Disc, regardless of the exercise type. Mobilizations use low-grade velocity, small or large amplitude passive movement techniques within the patient's range of motion and control (Rubinstein, et al., 2013). Some possibilities of arguments regarding the same treatment effect of both spinal mobilization and analgesics based on few evidences; on the other hand exercise therapy concentrate on strengthening and stabilizing the muscle groups of the abdomen and back producing improvements in pain and functioning in patients with chronic LBP. Vargas, et al. (2012) described moderate exercise is more effective than passive treatment in reducing pain or

disability. Motor control exercise improves neuromuscular control of trunk segments; if spinal manipulation and trunk control exercise are used combined, the treatment become effective. Moderate evidences described the effectiveness of combined treatment with mobilization and standard medical practice is more than medical treatment alone; and there is no difference in effects produced by manipulation & therapeutic exercise for Prolapsed Lumber Intervertebral Disc (Vargas, et al., 2012). Spinal manipulation therapy (SMT) appears to be as effective as other common therapies prescribed for chronic Prolapsed Lumber Intervertebral Disc, such as exercise therapy, standard medical care, or physiotherapy (Rubinstein, et al., 2012). SMT has statistically significant short term effect on pain relief and functional status when SMT is added to another intervention. Electro physical modalities especially hot packs, short wave diathermy (SWD), ultrasound therapy (UST); TENS were reported to be the most commonly used treatments. Low-level laser therapy, lumbar supports, short wave diathermy, traction, transcutaneous electrical nerve stimulation, and ultrasound have conflicting evidence of effectiveness for CLBP. Ebadi, (2012) showed continuous mood UST along with conversional physiotherapy was more effective significantly in improving function, lumber range of motion and endurance time; in another study she showed deep heat, using therapeutic ultrasound, was found to be effective in one study for chronic Prolapsed Lumber Intervertebral Disc compared with placebo ultrasound. There is a dearth of evidence that suggested clinically UST is effective in case of LBP patients. Transcutaneous electrical nerve stimulation (TENS) and interferential currents (IFC) both are more effective than placebo for the treatment of nonspecific chronic Prolapsed Lumber Intervertebral Disc. It is not suggested for acute back pain, sub-acute back pain, or acute radicular pain syndromes. TENS is suggested for selected use in chronic back pain or chronic radicular pain syndrome as an adjunct for more efficacious treatments. Nerve compression or pinching might occur as a result of either narrowing of the inter-vertebral space in diseases like spinal stenosis or in case of herniated or protruding disc bulge which can put pressure on the nerve and the most effective approach to treat a pinched nerve is to reduce the compression of the vertebrae through traction and realignment of vertebral bones thus it further helps in loosening of muscles resulting in decrease in pain and inflammation. Patients with Prolapsed Lumber Intervertebral Disc and radiation most frequently complain of paraesthesia and radicular pain, also sensory symptoms typically present along a dermatome, often myotome, upper limb weakness

(15%), decreased sensation (33%) and often muscle atrophy (2%). The intervertebral disc has been found to be causative in only 22% of cases, while 68% of cases appear to arise from a combination of discogenic and spondylotic causes (Rodine, 2012). May & Aina, (2012) in a systematic review, found three studies where patients with a directional preference responded significantly better to treatment when compared to other treatments.

Cleland, et al. (2007) found in his study that, 23 patients received neural dynamic techniques or Neurodynamics, of which 13 patients (56.5%) had a successful outcome. Techniques that are reported to mobilize components of nervous system may be used to diminish the patient's symptoms (Kostopoulos, 2004). Certain clinical provocation tests and techniques e.g. LLTT have been employed as a means of identifying neural tissue involvement in lumbar pain syndrome (Cowell & Philips, 2002).

In the sub-acute and chronic patients, Neurodynamics is often helpful (Syková, et al., 2006). This involves gentle repetitive movements of the nerve root/ peripheral nerve complex into the direction of restriction and pain (Murphy, 2004). There are various manoeuvres that can be used, including the lateral glide mobilization, which may allow one to target the nerve root, and distal brachial plexus mobilization, which theoretically affects the brachial plexus more globally (Murphy, 2004). Ellis & Hing, (2008) concluded that Neurodynamics can be used for treatment of neurodynamic dysfunction and has positive therapeutic benefit.

The study of single-blind randomized controlled trial of thirty subjects (male 10, Female 20) by Allison, et al. (2002) clearly demonstrated significant improvements in pain and disability in both trial and control group. The Neurodynamics group had significantly lower pain levels by compared to the articular mobilization treatment group. However, in another research Fabrizi, et al. (2011) found Neurodynamics that reduces pressure on nerve roots by widening the intervertebral foramina and realign the spine in its optimal position may relieve symptoms.

In a comparison between Neurodynamics and lumbar traction with lumbar radicular pain patients, researchers found there was significant improvement in both groups but more clinically meaningful changes were seen in the nerve mobilization group (Sambyal & Kumar, 2013). On the other hand Kumar, (2010) concluded his study

stating that Neurodynamics shows significant improvement may be because of provocation to the nerve roots compared with Conventional Physiotherapy and McKenzie manipulation. But, Patients treated with Conventional Physiotherapy were resulted in minimum relief of the symptoms and pain reduction.

Nee & Butler, (2006) proved that the neurodynamic technique can be effective in addressing musculoskeletal presentation of neuropathic pain and the study included that the peripheral neuropathic pain is because of injury to root or peripheral nerve trunk by mechanical or chemical stimuli which manifestation includes positive and negative symptoms where positive symptoms reflect an abnormal level of exhibitions in the nervous system and include pain, paraesthesia, and dysesthesia and negative symptoms indicate reduced impulse conduction in the neural tissue and hypoesthesia or anaesthesia and weakness.

Hunt, (2002) found that Neurodynamics is a therapeutic technique that has received favourable acceptance as management approach to neurogenic pain syndrome where anatomical and bio- mechanical review of peripheral nerves includes nerve mobility and stress and strain characteristics in both upper and lower extremities and mechanisms and consequences of trauma on nerve microcirculation as well as influence on axoplasmic and lymphatic flow with in peripheral nerve.

Mobilization of the nervous system is an approach to physical treatment of pain in which the method influences pain physiology via mechanical treatment of neural tissues and the non-neural structures surrounding the nervous system where the musculoskeletal system exerts non uniform stresses and movement in neural tissue depending on the local anatomical and mechanical characteristics and pattern of body movement, but this response includes neural sliding, pressurization, elongation and changes in intra-neural microcirculation, axonal transport and impulse traffic where many events occur in body including tension; neural tension can better be explained by including mechanical and physiological mechanism. Neural tension test may be better described as Neurodynamic test (Schafer et al., 2009).

It was proved that neurodynamic techniques and mobilization have a role in treatment of chronic Prolapsed Lumbar Intervertebral Disc and radiculopathy from PLID. This comes in agreement with Burns and Hangee(2008), who investigated the use of thrust, non-thrust mobilization/manipulation coupled with neurodynamic mobilization (neurodynamic) exercises for an individual with recurrent lower back pain. The

patients experienced a rapid improvement in pain and functions after non-thrust and thrust manipulation to the lumbar spine and supine lower extremity neurodynamic mobilization (neurodynamic) techniques. A combination of thrust and non-thrust mobilization/manipulation and lower extremity neurodynamic mobilization techniques (neurodynamic) may be helpful in patients with chronic recurrent, Prolapsed Lumbar Intervertebral Disc with radicular symptoms (Burns and Hangee, 2008).

A Neurodynamic technique has a great role in management of radiculopathy and Prolapsed Lumbar Intervertebral Disc. It is supported by McCracken (2008), who tested the long-term effects of a neurodynamic treatment technique for a patient with non-specific Prolapsed Lumbar Intervertebral Disc (LBP) and lower extremity (LE) pain. The study suggested that neurodynamic treatment (neurodynamic) techniques may be useful in treating patients with low back and lower extremity pain who present with neural tension dysfunction. However, symptoms did not resolve substantially until introduction of a neurodynamic treatment technique. Also, slump stretching, was shown to be effective in the management of patients with non-radicular LBP when combined with lumbar mobilization and exercise. The effect of neurodynamic techniques in exploration of sciatic nerve root from compression of disc herniation explained by McGill (2007), who stated that if the nerve root is impinged and cannot slide, instead of moving, the pain was elicited along the nerve trunk. The concept of nerve gliding plays a major role in formulating a treatment plan for nerve mobilization. Blood circulation and axonal transport, which are necessary for the functional and structural integrity of a neuron, will recover after the removal of the pressure by neurodynamic techniques was performed for reducing pressure caused by intraneural and extraneural fibrosis, increasing vascular and axoplasmic flow, and restoring tissue mobility (Oskay et al., 2009).

Neurodynamic is a part of manual therapy that has been reported to be an effective intervention for certain conditions including Prolapsed Lumbar Intervertebral Disc, sciatica and piriformis syndrome (Kutty et al., 2014).

Neurodynamic technique is often used clinically to restore nerve mobility and decrease pain (Kumar, 2013)

Shacklock (2011) stated that the neuraxis, meninges and spinal canal form a mechanical triad. The nervous system as a whole is a mechanically and

physiologically continuous structure from the brain to the distal end of the peripheral nerves therefore, movement at one end affects the whole system and concluded that movement at the ankle joint helped in mobilizing the sciatic nerve proximally at lumbosacral level.

Butler (2008) stated that the neural system is a dynamic organ spanning the entire body. The mobility of this system is such that it can act dependently or independently of the structures it spans. When changes imparted in one area of the neural system it may affect the whole system.

Butler (2010) stated that clinicians use neurodynamic for the treatment of nerve root and peripheral nerve related symptoms in the low back and the lower extremity pain.

Neurodynamic has a great role in management of Prolapsed Lumbar Intervertebral Disc with radiculopathy and has long term effects for patient with non-specific Prolapsed Lumbar Intervertebral Disc (McCracking, 2008).

Traditional exercise therapy program for lumbar pain focuses on pain relief but neurodynamic viewed as another form of manual therapy that restore the mechanical function of impaired neural tissue. (Kutty et al., 2014).

Sahar (2011) found that neurodynamic in treatment of low back dysfunctions is effective in improving pain, reducing short term disability and promoting centralization of symptoms rather than lumbar mobilization treatment with exercise therapy.

Patients treated with neurodynamic and lumbar stabilization showed better VAS scores and Straight Leg Test scores compared to patients treated with active range of motion exercises and lumbar stabilization. (Colakoviæ&Avdiae, 2013)

Butler (2007) stated that distal mobilization of the sciatic nerve affects the nerve roots at lower lumbo-sacral level.

Xavier and Farrel (2012) studied the effects of neurodynamic of sciatic nerve in 21 subjects, and concluded that treatment of the distal portion of nerve by neurodynamic relieved distal pain and score of Visual analog scale (VAS) was decreased to 70%.

The study of single-blind randomized controlled trial of thirty subjects (male 10, Female 20) by Allison et al., (2012) clearly demonstrated significant improvements in pain and disability in both trial and control group. The Neurodynamic group had significantly lower pain levels by compared to the articular mobilization treatment group.

Neurodynamic along with conventional treatment was found to be more effective for sciatica in relieving pain as well as improving the range of SLR than conventional treatment alone. (Sarkari, 2007).

This research was antrial design to evaluate the effectiveness of physiotherapy techniques combining neurodynamicsalong with other physiotherapy treatment and also to compare their effectiveness with other physiotherapy alone for the management of pain and disability of the patients with prolapsed lumber intervertebral disc. To identify the effectiveness of this treatment regime, Oswestry Disability Index (ODI) is used as measurement tools for measuring the pain intensity, disability and how the pain affect different functional abilities to manage in everyday life.

3.1 Study Design

Trial study design has been used (Randomized Control Trial- RCT).

According to DeyPoy&Gitlin (2013) the deign could be shown by

Trial Group: R O1 X O2

Control Group: R O1 O2

The study was antrial between two subject designs. Neurodynamics and other Physiotherapy treatment were applied to the trial group and only other Physiotherapy treatment was applied to the control group.

A pre-test (before intervention) and post-test (after intervention) was administered with each subject of both groups to compare the pain and functional ability of the subject before and after the treatment.

3.2 Study Area

Musculo-skeletal Unit of Physiotherapy Department at CRP, Savar, Dhaka.

3.3 Study Population & Sampling

The study population was the patients diagnosed with prolapsed lumber intervertebral disc attended in the Musculo-skeletal Unit of Physiotherapy Department at CRP, Savar, Dhaka.Simple random sampling procedure was used.

3.4 Sample Size

The equation of the sample size calculation are given below-

$$n = z^2 \times pq / e^2$$

Here,

$p = 0.56$ (Here p = prevalence and $p = 56\%$) (Orthofracs, 2013)

$q = 1 - p = 1 - 0.56 = 0.44$

Margin of error $e = 0.05$

z (For 95% = 1.96)

Therefore, $n = 378.6$

According to this equation the sample should be 379 people but due to lack of opportunity the study was conducted with 20 patients attended at CRP.

3.5 Selection Criteria

3.5.1 Inclusion criteria

- Clearly diagnosed patient having prolapsed lumbar intervertebral disc.
- Both male and female was included.
- Age:18-60 year (McKenzie, 1990)
- Willingness.

3.5.2 Exclusion Criteria

- Subjects who were not interested.
- Mentally retard patients.
- Undiagnosed case.
- Pathological problems in spinal origin.

3.6 Data processing

3.6.1 Data collection tools

- Record or Data collection form
- Consent Form
- Socio demographic questions.
- Oswestry Disability Index (ODI)
- Pen, Papers

3.6.2 Measurement tools

Oswestry Disability Index (ODI): This is a set of questionnaire that has been designed to provide information regarding how the patient's back pain affects his/her ability to manage in everyday life.

3.6.3 Data Collection Procedure

The study procedure was conducted through assessing the patient, initial recording, treatment and final recording. After screening the patient at department, the patients were assessed by a qualified physiotherapist. 5 sessions of treatment were provided for every subject. 20 subjects were chosen for data collection according to the inclusion criteria. The researcher divide all participants into two groups and was code C1, C2, C3, C4, C5, C6, C7, C8, C9, C10 for control group and T1, T2, T3, T4, T5, T6, T7, T8, T9, T10 for trial group.

Data was gathered through a pre-test, intervention and post-test and the data was collected by using a written questionnaire form which it formatted by the researcher. Pre-test was performed before beginning the treatment and the intensity of pain was noted and functional ability was noted with ODI questionnaire form. The same procedure was performed to take post-test at the end of 5 sessions of treatment. The researcher collected the data both in trial and control group in front of the qualified physiotherapist in order to reduce the biasness.

3.7.1 Data Analysis

Data was analyzed by use of SPSS 20 software, Microsoft Office Excel and scientific calculator.

3.7.2 Significant level

In order to find out the significance of the study, the researcher calculated the “p” value. The p values refer the probability of the results for trial study. The word probability refers to the accuracy of the findings. A p value is called level of significance for an experiment and a p value of <0.05 was accepted as significant result for health service research. If the p value is equal or smaller than the significant level, the results are said to be significant.

3.8 Treatment Protocol

Neurodynamic was applied by a graduate qualified physiotherapist who is expertized in neurodynamic technique to the patients of trial group.

Table -I: Trial Group Treatment Protocol

Treatment option	Duration/Repetition
McKenzie Approach (Directional Preference)	10 repetition in each session
Lumber Mobilization (Maitland mobilization)	5 minutes in each session
IRR	10 minutes in each session
Soft tissue technique	3 minutes
Neurodynamic	5 repetition in each session
Neural Stretching	5 repetition in each session

Table-II: Neurodynamic of lower limb:

Joints	SLR (Basic)	SLR2	SLR3	SLR4	PKB (Prone Knee Bend)
Hip	Flexion and Adduction	Flexion	Flexion	Flexion and medial rotation	Neutral
Knee	Extension	Extension	Extension	Extension	Flexion
Ankle	Dorsiflexion	Dorsiflexion	Dorsiflexion	Planter Flexion	Planter flexion
Foot	-	Eversion	Inversion	Inversion	
Toes	-	Extension	-	-	-
Nerve Bias	Sciatic nerve and tibial nerve	Tibial nerve	Sural nerve	Common peroneal nerve	Femoral nerve

Table – III: Control Group Treatment Protocol

Treatment option	Duration/Repetition
McKenzie Approach (Directional Preference)	10 repetition in each session
Lumber Mobilization (Maitland mobilization)	5 minutes in each session
IRR	10 minutes in each session
Soft tissue technique	3 minutes

3.9 Ethical Consideration

The proposal was submitted to the Institutional Review Board (IRB) of Bangladesh Health Profession Institute (BHPI) and after defense the research proposal approval was taken from the IRB. A written/verbal consent was taken from participate before collecting of data. The World Health Organization (WHO) guideline was always followed to conduct the study. During the course of the study, the samples who were interested in the study had given consent forms and the purpose of the research and the consent form were explained to them verbally. The study did not interfere with their jobs. They were informed that their participation was fully voluntary and they had the right to withdraw or discontinue from the research at any time. They were also informed that confidentiality was maintained regarding their information. It should be assured the participant that his or her name or address would not be used. The participant will also be informed or given notice that the research result would not be harmful for them.

For this study 20 patients with PLID were taken as sample from Musculo-skeletal outpatient unit of Center for Rehabilitation of Paralyzed (CRP), Savar to explore the effectiveness of Neurodynamic for the treatment of patient with PLID.

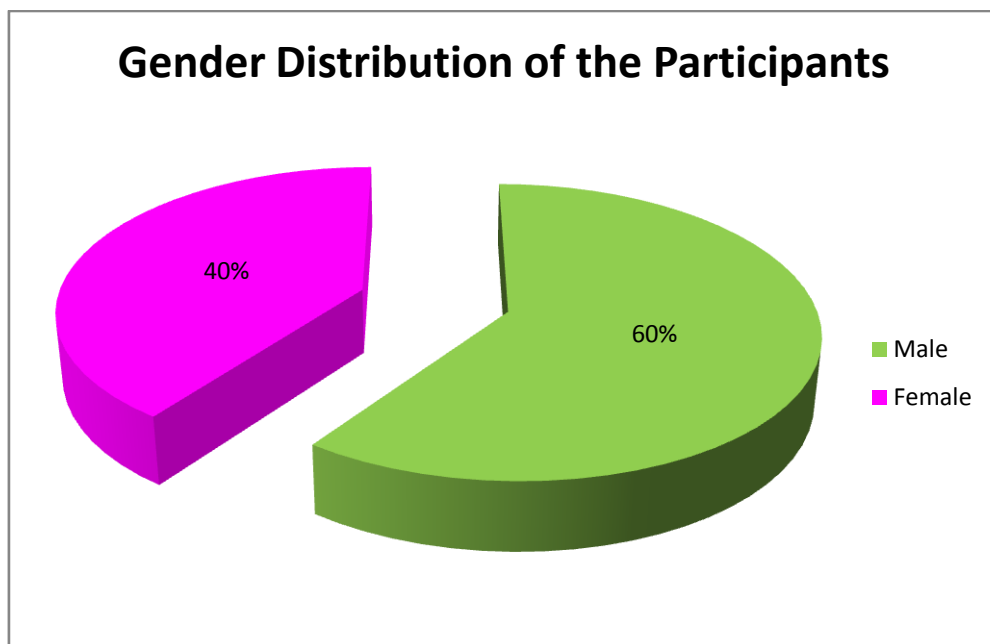
In this study the results which were found have been shown in different bar diagrams, pie charts and tables.

0.1 Socio demographic Information

Gender Distribution of the Participants

In this study 20 Patients with PLID were included as sample, among them 40% (n=8) were Female and 60% (n=12) were Male.

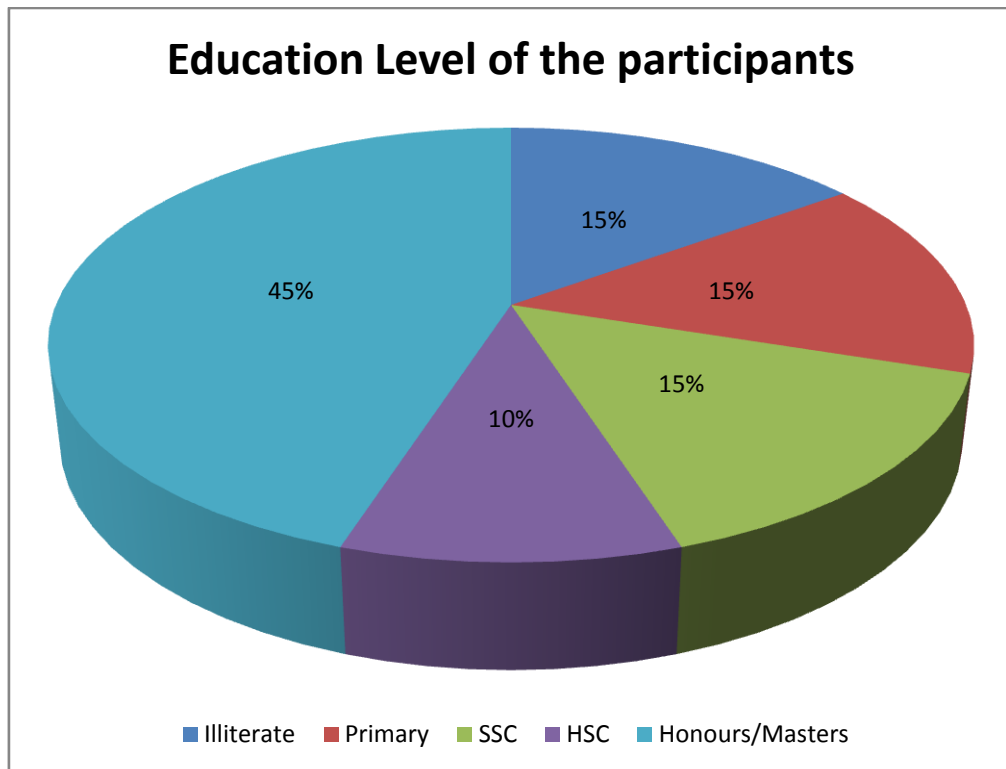
Figure – 1: Gender Distribution



Education Level of the participants

Among the 20 participants 45% (n=9) was honors/masters degree, 10% (n= 2) was HSC passed, 15% (n=3) was SSC passed, 15% (n=3) was primarily educated and 15% (n=3) was illiterate.

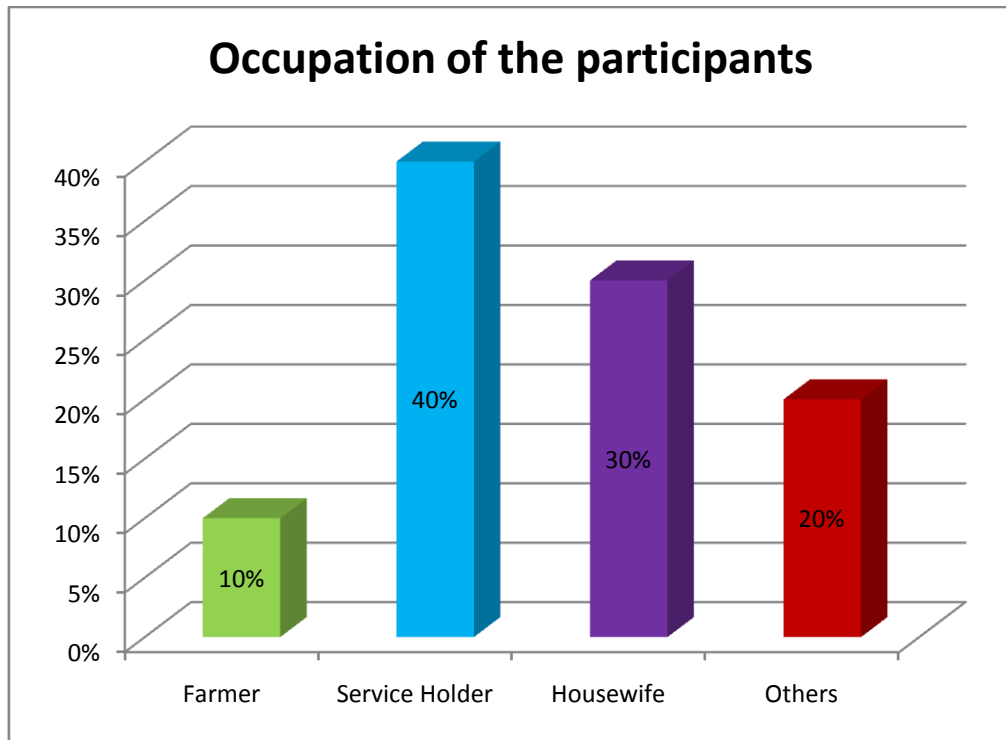
Figure -2: Education level



Occupation of the Participants

Among the total 20 sample 40% (n=8) were service holder, 30% (n=6) were housewife, 10% (n=2) were Farmer and 20% (n=4) were others.

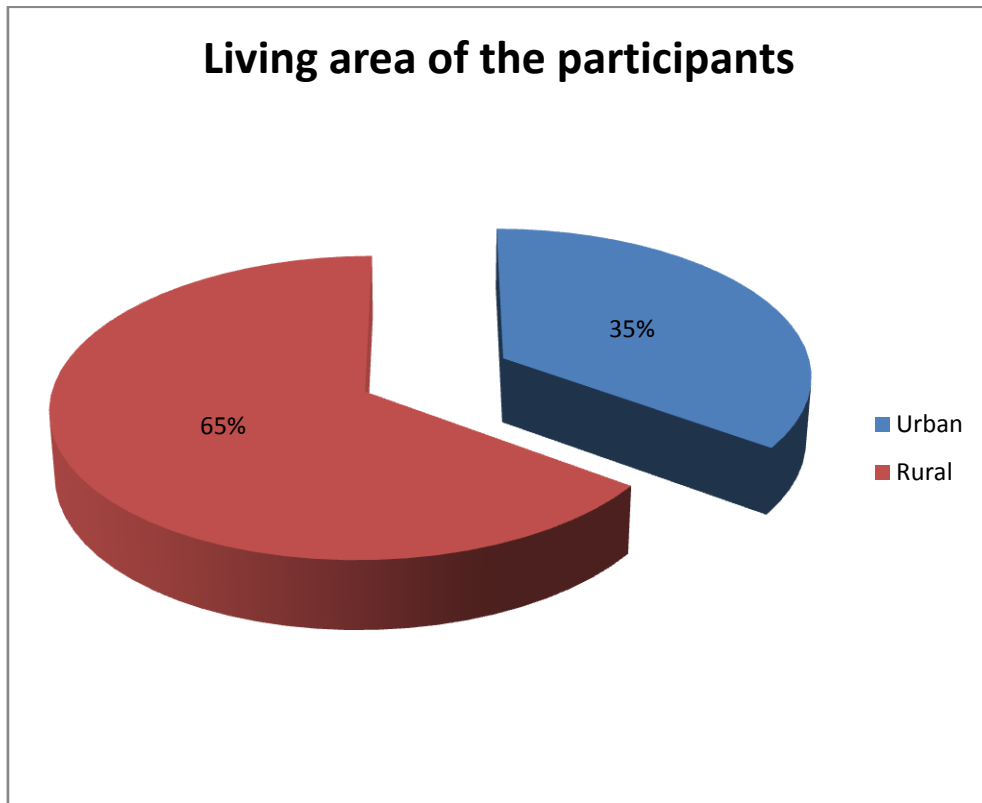
Figure -3: Occupation of the participants



Living area of the participants

This study done with 20 patients among them 65% (n=13) came from rural living area and 35% (n=7) came from urban living area.

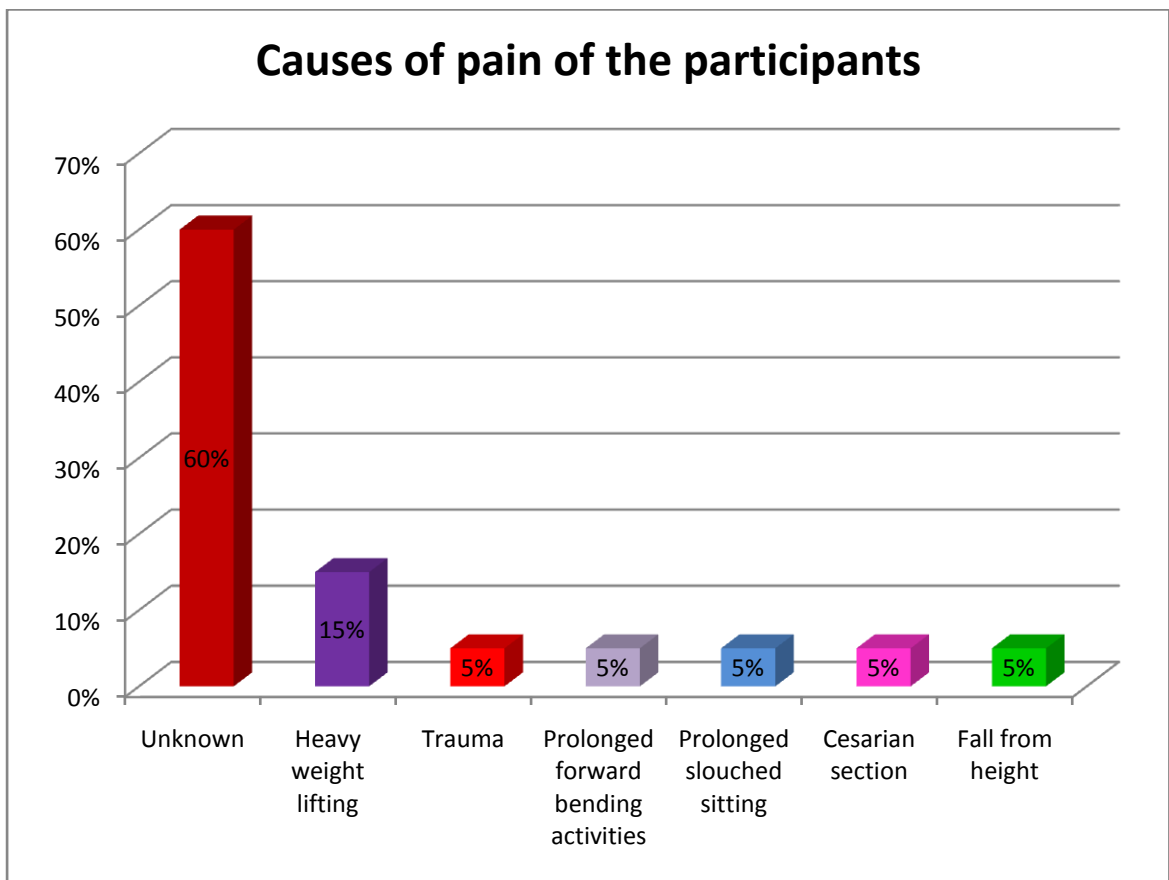
Figure-4: Living area of the participants.



Causes of pain of the participants

Causes of pain among the 20 participants who had PLID diagnosis are different. There are 60% (n=12) were unknown cause, 15% (n=3) were heavy weight lifting, 5% (n=1) were history of trauma, 5% (n=1) were history of prolonged forward bending activities, 5% (n=1) were cause of prolonged slouched sitting activities, 5% (n=1) had cesarean section and 5% (n=1) were history of fall from height.

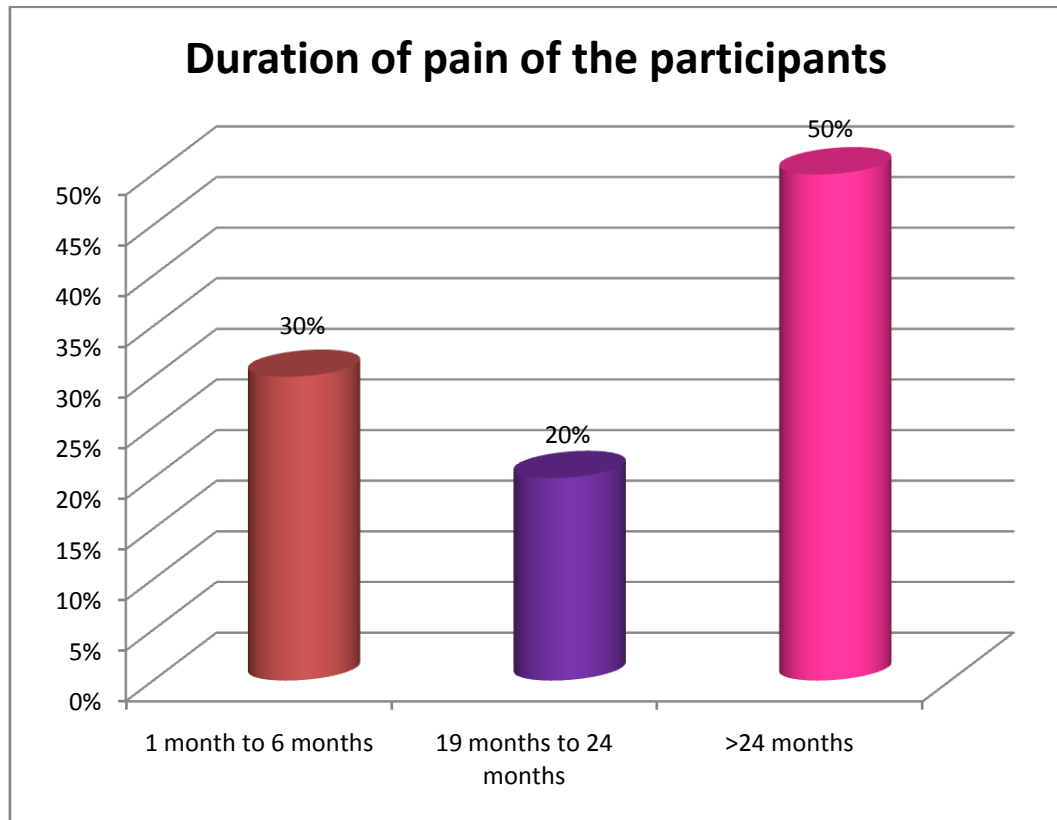
Figure-5: Causes of pain



Duration of pain due to PLID of the participants

Clearly diagnosed PLID patient pain duration 50 % (n=10) were >24 months, 30% (n=6) were 1 to 6 months and 20% (n=4) were 19 to 24 months.

Figure-6: Duration of pain among PLID patients.

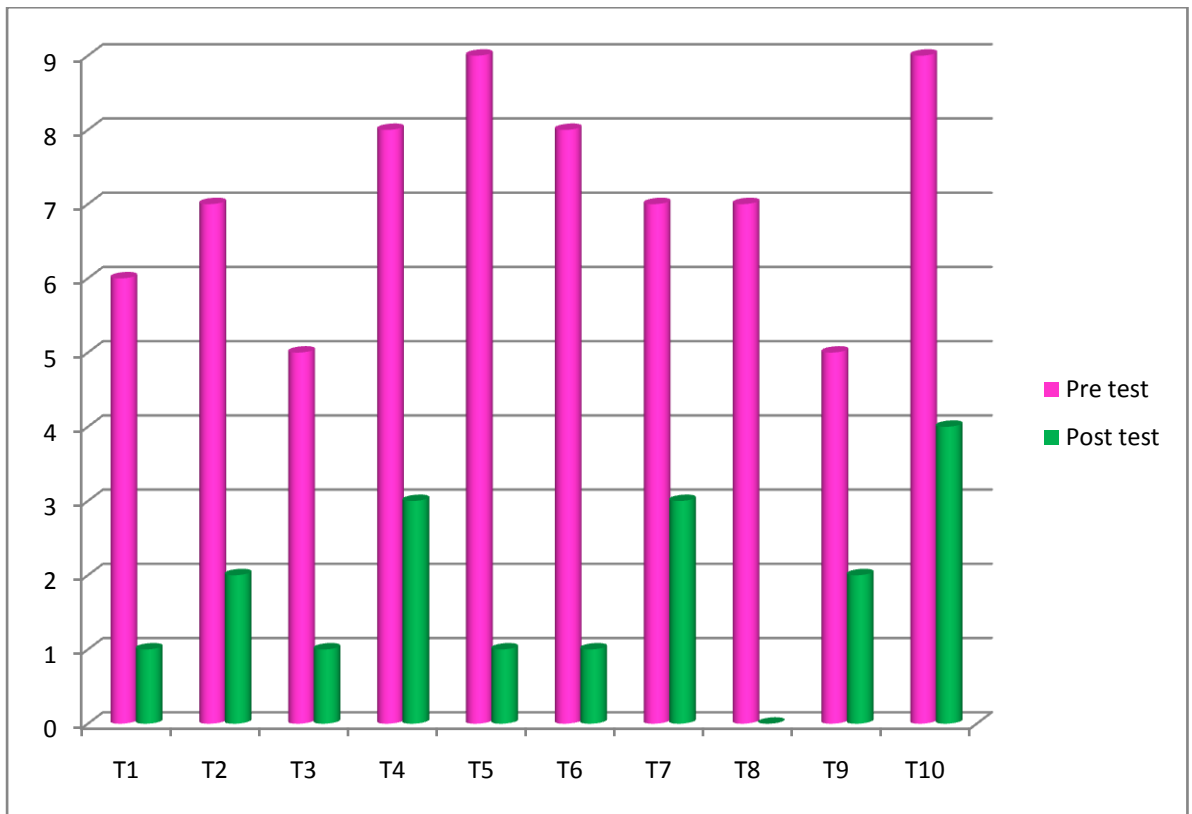


0.2 Pain measurement

Pain reduction of PLID patients in Case group

Reduction of pain is shown in the chart.

Figure – 7: Pain Reduction of PLID patients in Case Group.

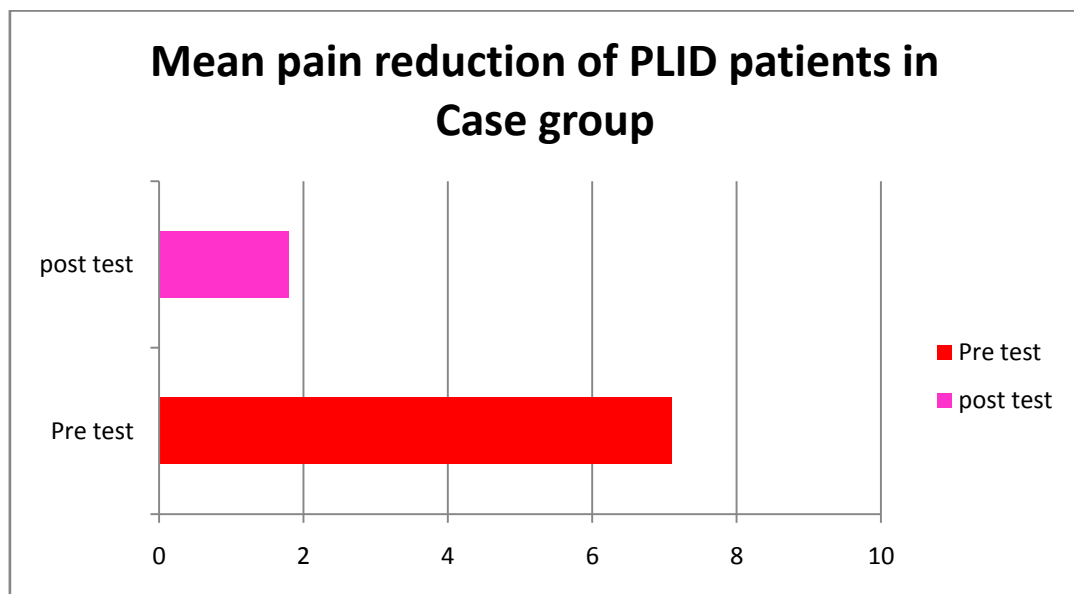


Mean Pain Reduction of PLID patients in Case Group

The mean of pain reduction in PLID patients between pre-test and post-test of case group are 7.1 and 1.8.

Mean pain reduction of PLID patients in Case group	
Pre test	7.1
post test	1.8

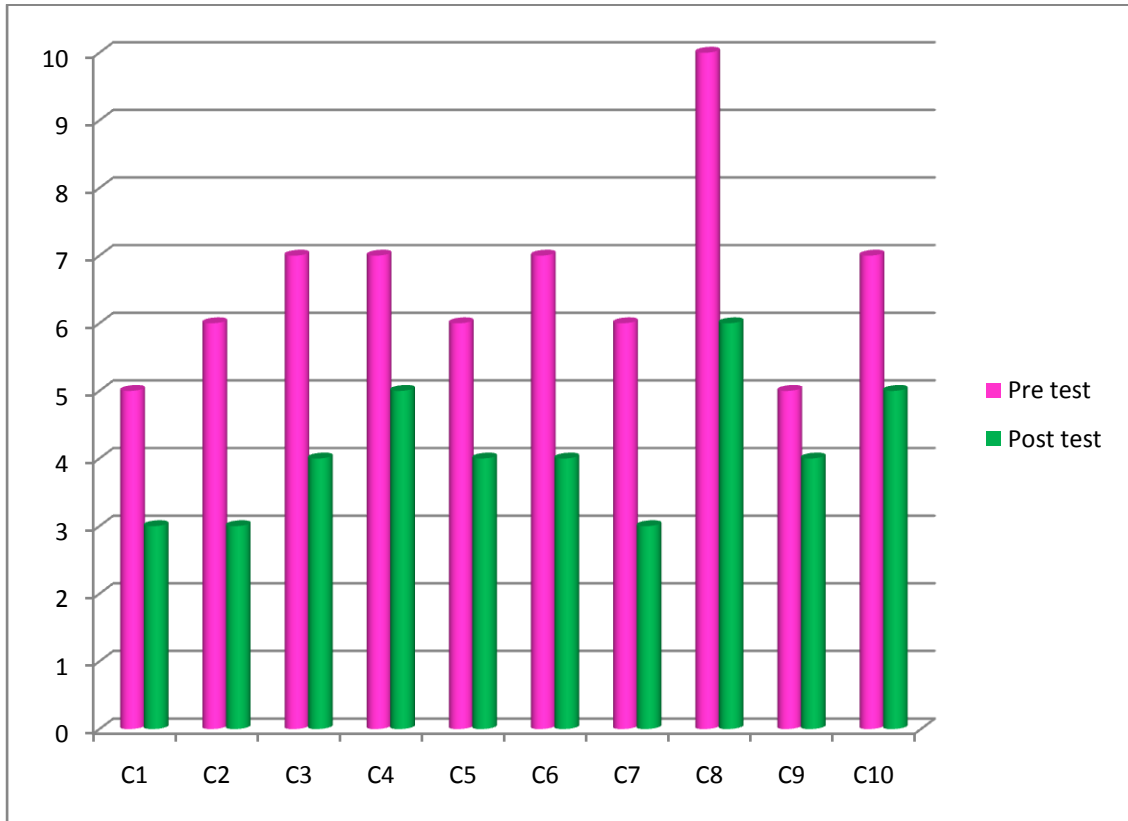
Figure- 8: Mean Pain Reduction of PLID patients in Case Group on.



Pain reduction of PLID patients in Control group

Reduction of pain is shown in the chart.

Figure – 9: Pain Reduction of PLID patients in Control Group.

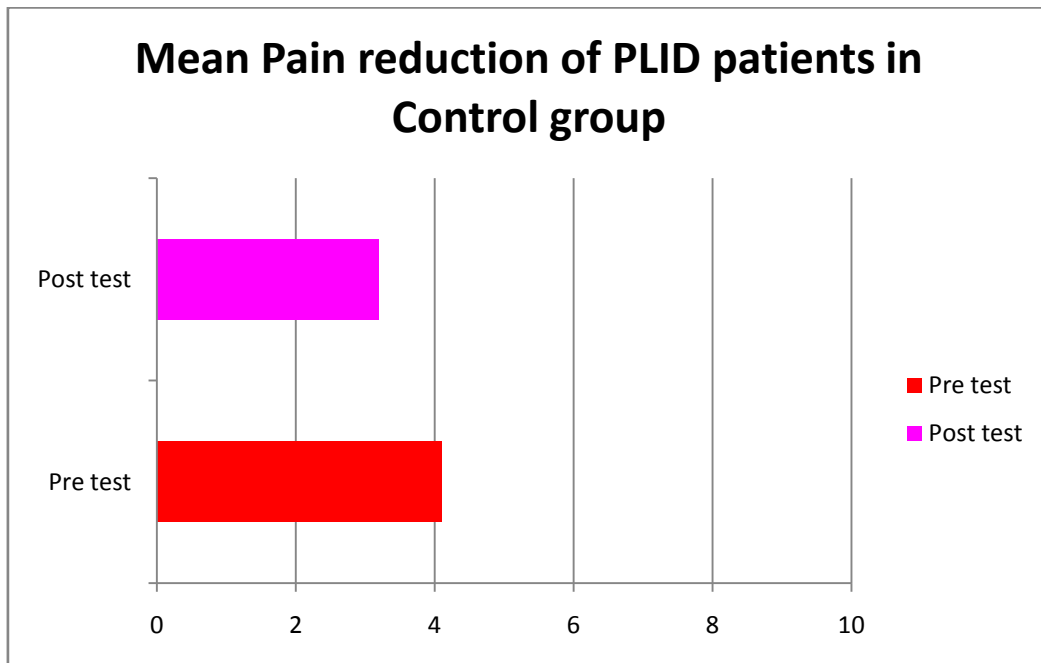


Mean Pain Reduction of PLID patients in Control Group

The mean of pain reduction of PLID patients between pre-test and post-test of control group are 4.1 and 3.2.

Mean pain reduction of PLID patients in Control group	
Pre test	4.1
post test	3.2

Figure-10 :MeanPain Reduction of PLID patients in Control Group.

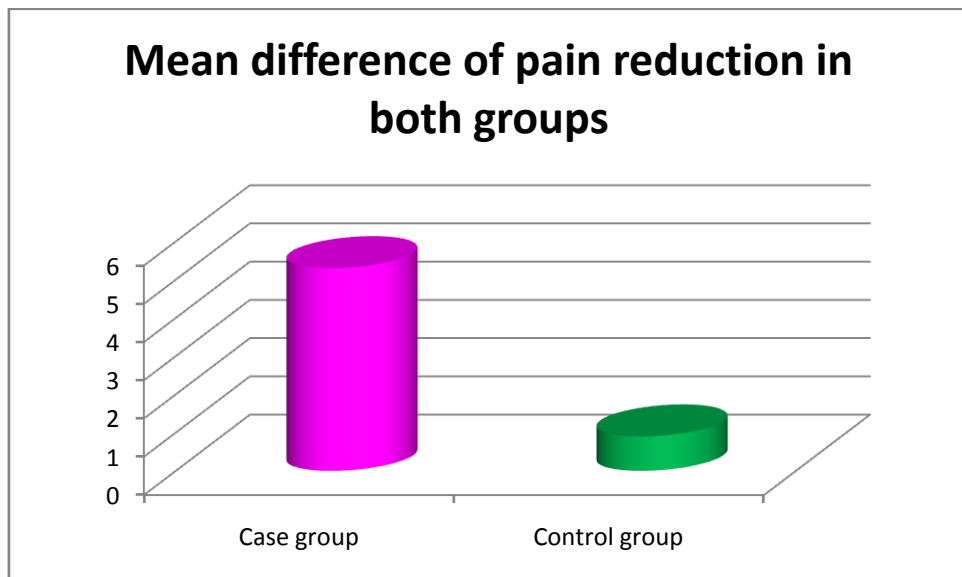


Mean Difference of Pain Reduction in Both Groups

Table of mean difference:

	Case group		Control group	
	Pre-test	Post-test	Pre-test	Post-test
Mean	7.1	1.8	4.1	3.2
Mean Difference	5.3		0.9	

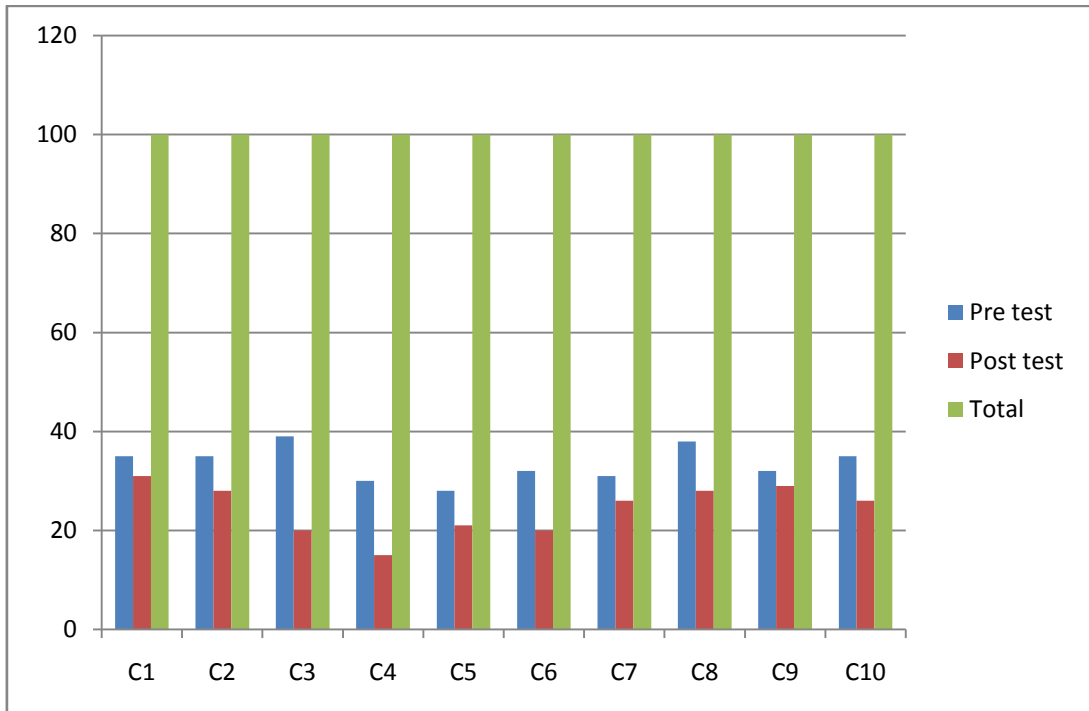
Figure-11: Mean Difference of Pain Reduction in Both Groups



ODI Score Control group

ODI score of control group is shown in the chart.

Figure-12: ODI Score in Control Group

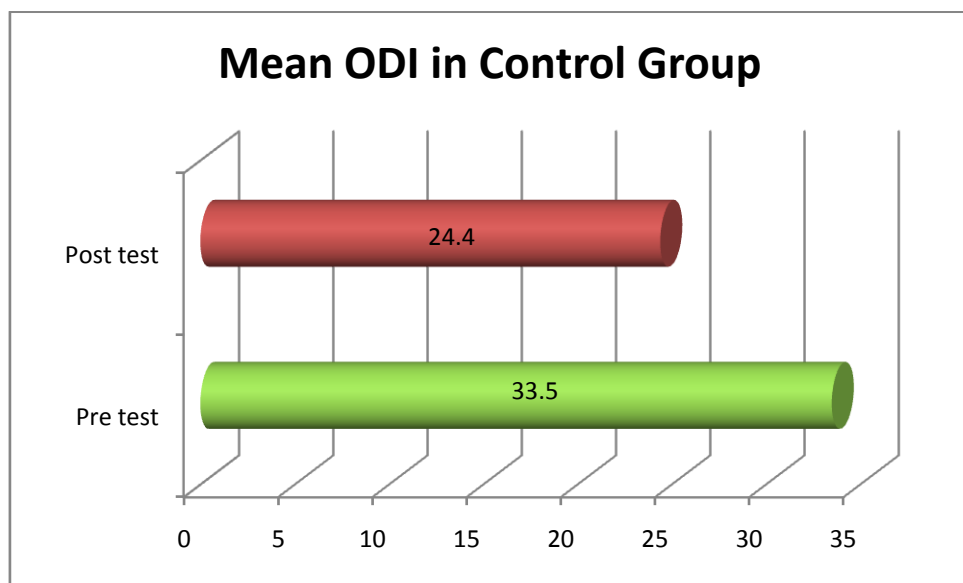


Mean ODI in Control Group

Mean ODI in control group between pre-test and post-test are 33.5 and 24.4.

Mean ODI in Control Group	
Pre test	33.5
Post test	24.4

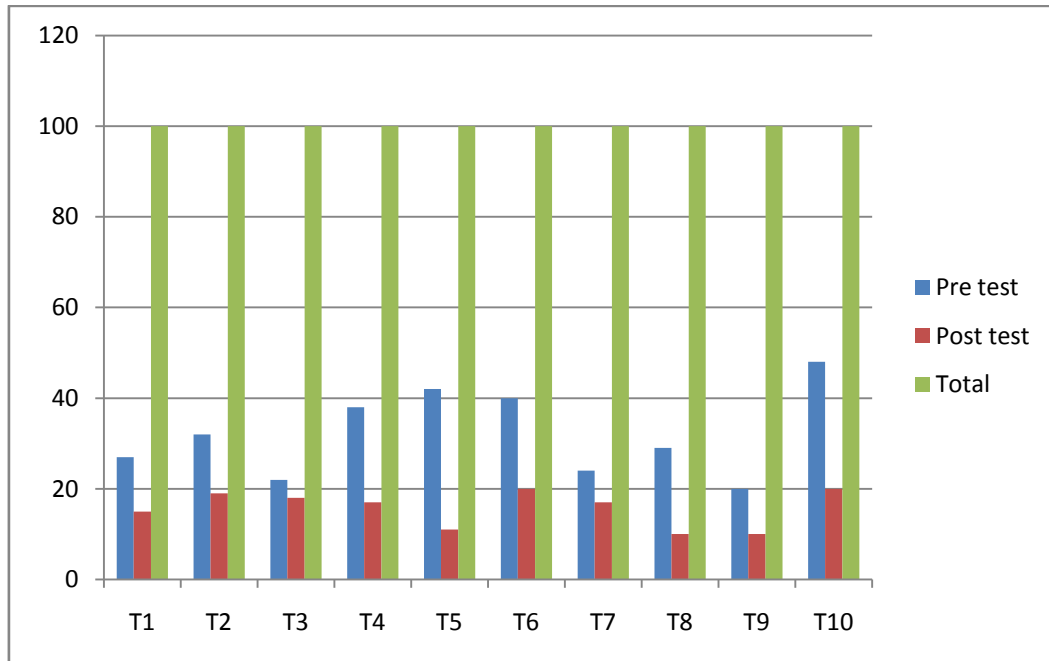
Figure-13: Mean ODI Score of Control Group



ODI Score Trial Group

ODI score of trial group is shown in the chart.

Figure-14 : ODI Score in Trial Group

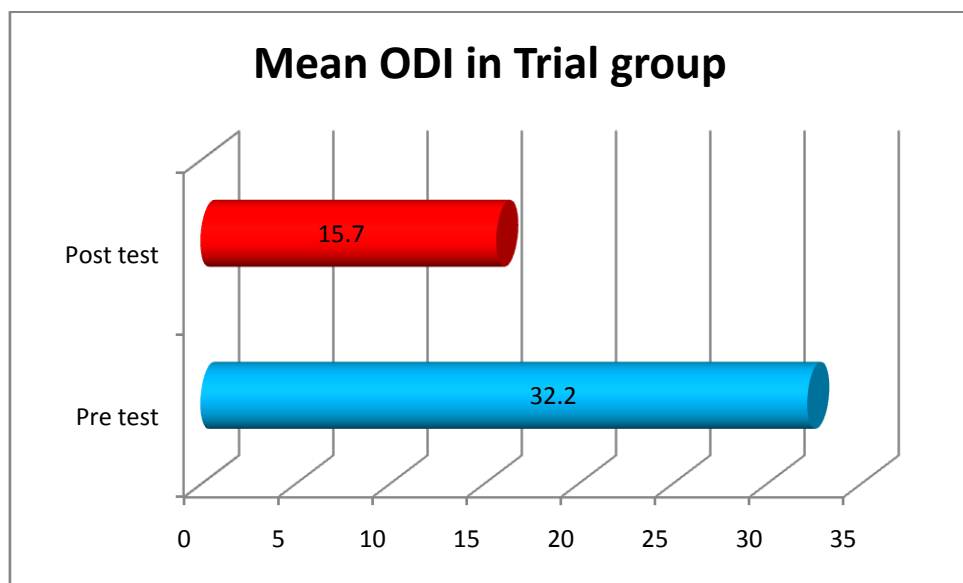


Mean ODI in Trial Group

Mean ODI in trial group between pre-test and post-test are 32.2 and 15.7

Mean ODI in Trial Group	
Pre test	32.2
Post test	15.7

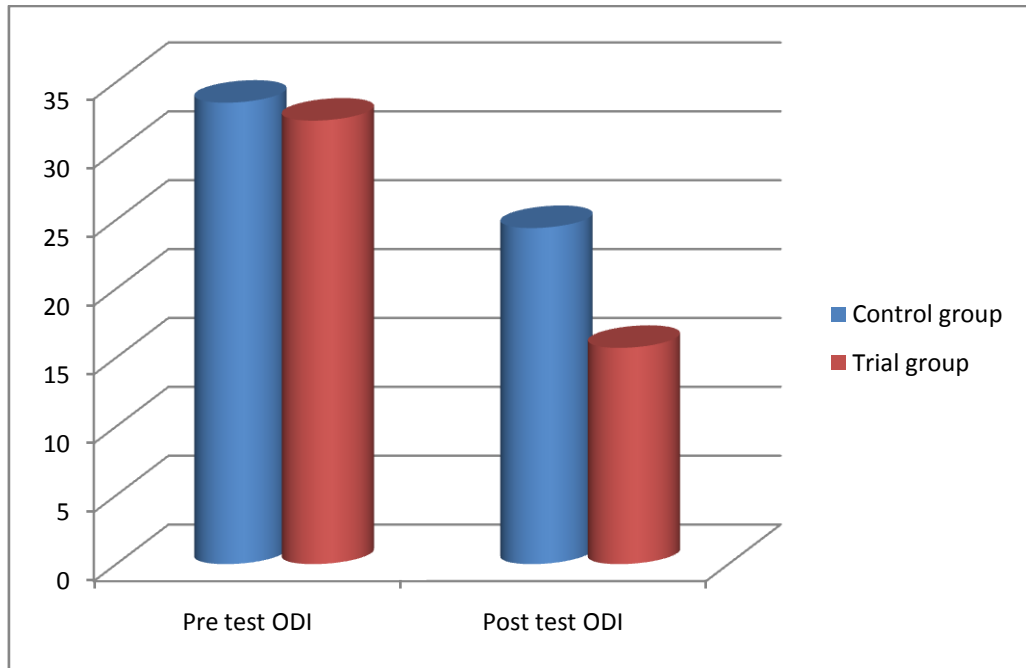
Figure-15: Mean ODI Score of Trial Group



Mean Difference in ODI Score in Both Groups

Mean difference in ODI between both groups in pre-test and post-test has been shown below in the bar chart.

Figure-16: Mean Difference of ODI Score in Both Groups



**Table-IV: Patient disability on Mann-Whitney test in between groups
Mann-Whitney U test score between group:**

Category of the patient	N	Mean Ranks	Sum of Ranks	U value	p
Trial Group	10	6.35	63.50	8.50	0 .00
Control Group	10	14.65	146.50		
Total	20				

From this data, it can be concluded that disability reduction score on the Oswestry Disability Index in trail group was statistically significantly higher than the control group ($U = 8.50$, $p = .000$).

An examination of the findings in this table shows that the results of the Mann Whitney U test applied to the posttest disability score of the participants in the trial and control groups revealed a statistically significant difference at the level of $p < 0.05$ ($p = .000$). The rank average of the posttest disability scores of the trial group participants was 6.35, while participants in the control group had a posttest disability score rank average of 14.65. This result indicates that the trial group participants who have received Neurodynamics along with conventional physiotherapy attained higher success at the disability reduction score when compared to the participants of the control group who have received only conventional physiotherapy.

Table-V: Disability comparison using Wilcoxon Signed Rank test within the control group:

Rank and test statistics of patient rated disability within the control group

Oswestry Post Test-Oswestry Post	N	Mean Rank	Sum of Ranks	Test Statistics (Wilcoxon signed – Rank Test)	
				Based on P Positive ranks Z	
Positive rank	0	0.00	0.00	-2.805	.001
Negative rank	10	5.50	55.00		
Ties	0				
Total	10				

This Table described the comparison of the participants before (pretest) and after (post-test) disability score. The table’s legend displayed that in the control group none of the participant’s experienced increased disability after only physiotherapeutic intervention (conventional physiotherapy) is given to them. 10 participants of control group had higher score before the intervention and the disability score reduced after the application of the conventional physiotherapy. In addition, no participant has experienced increase of disability after the treatment session in control group so the positive rank numbers zero. The point ‘ties’ indicate that no patient’s disability score remained same as the pretest score. P value is 0.001 which indicates that there is less than a 1% chance that the results are due to random error and it is significant.

Table-VI:Disability comparison using Wilcoxon Signed Rank test within the trail group:

Rank and test statistics of patient rated disability within the trail group

Oswestry Post Test-Oswestry Post	N	Mean Rank	Sum of Ranks	Test Statistics (Wilcoxon signed – Rank Test)	
				Based on P Positive ranks Z	
Positive rank	0	0.00	0.00	-2.803	.001
Negative rank	10	5.50	55.00		
Ties	0				
Total	10				

This Table described the comparison of the participants before (pretest) and after (post-test) disability score. The table’s legend displayed that in the trail group no increase of disability after Neurodynamics along with physiotherapeutic intervention (conventional physiotherapy) is given to them. 10 participants of trial group had higher score before the intervention and the disability score reduced after the application of the Neurodynamics along with physiotherapeutic intervention (conventional physiotherapy). In addition, no participant has experience increase of disability after the treatment session in trial group so the positive rank numbers zero. The point ‘ties’ indicate that no patient’s disability score remained same as the pretest score. P value is 0.001 which indicate that there is less than a 1% chance that the results are due to random error and it is significant.

**Table-VII: Patient pain on Mann-Whitney test in between groups:
Mann-Whitney U test score between group:**

Category of the patient	N	Mean Ranks	Sum of Ranks	U value	P
Trial Group	10	6.30	63.00	8.00	0.00
Control Group	10	14.70	147.00		
Total	20				

From this data, it can be concluded that pain reduction score on the Oswestry Disability Index in trail group was statistically significantly higher than the control group ($U = 8.000$, $p = .000$).

An examination of the findings in this table shows that the results of the Mann Whitney U test applied to the posttest pain score of the participants in the trial and control groups revealed a statistically significant difference at the level of $p < 0.05$ ($p = .000$). The rank average of the posttest pain scores of the trial group participants was 6.30, while participants in the control group had a posttest pain score rank average of 14.70. This result indicates that the trial group participants who have received Neurodynamics along with conventional physiotherapy attained higher success at the pain reduction score when compared to the participants of the control group who have received only conventional physiotherapy.

Table-VIII: Pain comparison using Wilcoxon Signed Rank test within the trail group:

Rank and test statistics of patient rated pain within the trail group

Oswestry Post Test-Oswestry Post	N	Mean Rank	Sum of Ranks	Test Statistics (Wilcoxon signed – Rank Test)	
				Based on P Positive ranks Z	
Positive rank	0	0.00	0.00	-2.825	.001
Negative rank	10	5.50	55.00		
Ties	0				
Total	10				

This Table described the comparison of the participants before (pretest) and after (post-test) pain score. The table’s legend displayed that in the trail group no increase of pain after Neurodynamics along with physiotherapeutic intervention (conventional physiotherapy) is given to them. 10 participants of trial group had higher score before the intervention and the pain score reduced after the application of the Neurodynamics along with physiotherapeutic intervention (conventional physiotherapy). In addition, no participant has experience increase of pain after the treatment session in trial group so the positive rank numbers zero. The point ‘ties’ indicate that no patient’s pain score remained same as the pretest score. P value is 0.001 which indicate that there is less than a 1% chance that the results are due to random error and it is significant.

Table-IX: Pain comparison using Wilcoxon Signed Rank test within the control group:

Rank and test statistics of patient rated pain within the control group:

Oswestry Post Test-Oswestry Post	N	Mean Rank	Sum of Ranks	Test Statistics (Wilcoxon signed – Rank Test)	
				Based on P Positive ranks Z	
Positive rank	0	0.00	0.00		
Negative rank	10	5.50	55.00	-2.840	.001
Ties	0				
Total	10				

This Table described the comparison of the participants before (pretest) and after (post-test) pain score. The table’s legend displayed that in the control group none of the participant’s experienced increased pain after only physiotherapeutic intervention (conventional physiotherapy) is given to them. 10 participants of control group had higher score before the intervention and the pain score reduced after the application of the conventional physiotherapy. In addition, no participant has experienced increase of pain after the treatment session in control group so the positive rank numbers zero. The point ‘ties’ indicate that no patient’s pain score remained same as the pretest score. P value is 0.001 which indicates that there is less than a 1% chance that the results are due to random error and it is significant.

Interpretation of results

Pain intensity

20 patients were enrolled and 10 patients were assigned to control group who receive only conventional physiotherapy. The rest of 10 patients were assigned to trial group who received Neurodynamic along with conventional physiotherapy.

Mean difference of pain between pre-test and post-test of trial group and control group were 5.3 and 0.9. Following application of treatment the study found that the trial group showed a significant improvement ($p < .05$) in case of Prolapsed Lumbar Intervertebral Disc.

ODI Score for Disability

The researcher interprets the results by using the values of disability on ODI that come from this study.

20 patients were enrolled and 10 patients were assigned to control group who receive only conventional physiotherapy. The rest of 10 patients were assigned to trial group who received Neurodynamic along with conventional physiotherapy.

Mean difference between pre-test and post-test of control group and trial group were 9.1 and 16.5. Following application of treatment the study found that the trial group showed a significant improvement in case of Disability.

The purpose of this study was to evaluate the effectiveness of the Neurodynamic along with conventional physiotherapy compare to only conventional physiotherapy for patients with prolapsed lumbar intervertebral disc.

In this trial study 20 patients were enrolled and 10 patients were assigned to control group who receive only conventional physiotherapy. The rest of 10 patients were assigned to trial group who received Neurodynamic along with conventional physiotherapy. Each group attended for 6 sessions of treatment within three weeks in the Physiotherapy outpatient Unit of CRP, Savar in order to demonstrate the improvement. The outcome was measured by using .Pain Rating Scale (NPRS) for pain intensity and Oswestry Disability Index (ODI) for measuring disability.

In this study 20 Patients with PLID were included as sample, among them 40% (n=8) were Female and 60% (n=12) were Male. Among the 20 participants 45% (n=9) was honors/masters degree, 10% (n= 2) was HSC passed, 15% (n=3) was SSC passed, 15% (n=3) was primarily educated and 15% (n=3) was illiterate. Within 20 sample 40% (n=8) were service holder, 30% (n=6) were housewife, 10% (n=2) were Farmer and 20% (n=4) were others. Among 20 patients 65% (n=13) came from rural living area and 35% (n=7) came from urban living area.

Causes of pain among the 20 participants who had PLID diagnosis are different. There are 60% (n=12) were unknown cause, 15% (n=3) were heavy weight lifting, 5% (n=1) were history of trauma, 5% (n=1) were history of prolonged forward bending activities, 5% (n=1) were cause of prolonged slouched sitting activities, 5% (n=1) had cesarean section and 5% (n=1) were history of fall from height. Clearly diagnosed PLID patient pain duration 50 % (n=10) were >24 months, 30% (n=6) were 1 to 6 months and 20% (n=4) were 19 to 24 months.

Neural compression and Neurodynamics plays important roles in decreasing pain and improving the range of motion of the PLID patients with derangement syndrome (Murphy & Hurwitz, 2007) as I have seen in this study that the Pain and disability rate decreases more in trial group in comparing to the control group.

Pain intensity has measured by NPRS. The mean of pain reduction in PLID patients between pre-test and post-test of case group are 7.1 and 1.8. The mean of pain

reduction of PLID patients between pre-test and post-test of control group are 4.1 and 3.2. Mean difference between case (5.3) and control (0.9) group is 4.4.

Liaqat, et al. (2014) found neurodynamics that reduces pressure on nerve roots by widening the intervertebral foramina and realign the spine in its optimal position may relieve symptoms. In a comparison between Neurodynamics and lumbar traction with lumbar radicular pain patients, researchers found there was significant improvement in both groups but more clinically meaningful changes were seen in the neurodynamics group (Sambyal& Kumar, 2013) and we have seen in this study that the NPRS explored better experience within trial group.

Kumar, (2010) showed his study stating that neurodynamics shows significant improvement may be because of provocation to the nerve roots compared with Conventional Physiotherapy and McKenzie approaches. But, in this study Patients treated with Conventional Physiotherapy were resulted in minimum relief of the symptoms and pain reduction.

In this study, Oswestry disability index was used to evaluate the level of disability impacted by the Chronic radiating Prolapsed Lumbar Intervertebral Disc to the subjects. According to the classification criteria determined by ODI, in trial group, the initial ODI score was 55.17 where after 5 sessions of physiotherapy management final score was 37.5. In case of control group, the initial ODI score was 56.5 which were deducted in 41.66 after 5 sessions of physiotherapy management.

The ODI had used in this study at every assessment after the treatment session to see the effectiveness where trial group has shown a better improvement in comparing to the control.

Oswestry disability index (ODI) questionnaire are used to evaluate the activities of daily living, which are badly influenced by chronic LBP/PLID. All the sections are used for trial 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 study had found that the mean disability for control group was (33.5%) at the initial day which was also in (24.4%) at the final day. On the other hand, the mean disability for trial group was (32.2%) at the initial day and in (15.7%) after treatment.

Mean difference of ODI score between pre-test and post-test of trial group and control group were 16.5 and 9.1.

In the patients with sub-acute and chronic conditions, neurodynamic is often helpful and it involves gentle repetitive movements of the nerve root/ peripheral nerve complex into the direction of restriction and pain (Murphy, 2004). Ellis & Hing, (2008) concluded that neurodynamics can be used for treatment of PLID and neural dysfunction and has positive therapeutic benefit as we have explored that the disability rates in aspect of Oswestry disability index results a better outcome in this study among the trial group. Exercise rehabilitation programs for chronic 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).

As very few studies have been done to compare the efficacy for patients of PLID with Conventional Physiotherapy and patients receiving both the conventional Physiotherapy along with neurodynamics, we have found a better outcome in all aspect of various questionnaires within the trial group. Cleland, et al. (2007) found in his study that, 23 patients received neurodynamic techniques of which 13 patients (56.5%) had a successful outcome and various Techniques that are used to mobilize components of nervous system may be used to diminish the patient's symptoms (Butler, 2001).

All the subjects were treated 6 sessions within 3 weeks. Machado, et al. (2010) explored in his RCT where the number of treatment sessions was the maximum of six sessions over 3 weeks where Physical therapists were instructed to follow the treatment principles described in McKenzie's approaches as well as neurodynamics.. McKenzie method, is a popular approach for the assessment and treatment of PLID/chronic Prolapsed Lumbar Intervertebral Disc (LBP) where 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).

Nee & Butler, (2006) proved that the neurodynamic technique is the effective in addressing musculoskeletal presentation of neuropathic pain where the peripheral neuropathic pain is because of injury to root or peripheral nerve trunk by mechanical (PLID) or chemical stimuli.

In Wilcoxon test for ODI, the result of trail group and control group are similar and both are significant. It indicates that, no participate has experienced increased disability after only conventional physiotherapy and neurodynamics along with conventional physiotherapy. The analysis of significance was carried out by using non parametric Mann-Whitney U test to compare the effectiveness of Neurodynamics along with conventional physiotherapy compared to the only conventional physiotherapy for the management of Prolapsed Lumbar Intervertebral Disc (PLID).

By using non parametric Mann-Whitney U test on the data for ODI the results were found to be significant ($p < 0.05$ for a one tailed hypothesis). The null hypothesis therefore can be rejected. That actually means that the neurodynamics along with conventional physiotherapy is more effective than only conventional physiotherapy technique to reduce disability in the patients with prolapsed lumbar intervertebral disc (PLID).

The researcher found significant improvement of disability. Oswestry disability index was used in the study to measure disability level in participants in pretest and after intervention.

In Wilcoxon test for pain, the result of trail group and control group both are significant. It indicates that, no participate has experienced increased disability after only conventional physiotherapy and neurodynamics along with conventional physiotherapy.

By using non parametric Mann-Whitney U test on the data for pain the results were found to be significant ($p < 0.05$ for a one tailed hypothesis). The null hypothesis therefore can be rejected. That actually means that the neurodynamics along with conventional physiotherapy is more effective than only conventional physiotherapy technique to reduce disability in the patients with prolapsed lumbar intervertebral disc (PLID). The researcher found significant improvement of pain.

Limitations of the Study

The study was conducted with 20 patients with PLID, which was a very small number of samples in both groups and was not sufficient enough for the study to generalize the wider population of this condition.

It is limited by the fact daily activities of the subject were not monitored which could have influenced. Researcher only explored the effect of Neurodynamic after 5 sessions of treatments, so the long term effect of Neurodynamic was not explored in this study.

The research was carried out in CRP, Savar such a small environment, so it was difficult to keep confidential the aims of the study for blinding procedure. Therefore, single blind method was used in this study.

There was no available research done in this area in Bangladesh. So, relevant information about PLID with specific intervention for Bangladesh was very limited in this study.

6.1 Conclusion

The result of the study have identified that the effectiveness of Neurodynamicwithconventional physiotherapy was better than the conventional physiotherapy alone for prolapsed lumbar intervertebral disc (PLID) patients which was a Quantitative trial study. The result of the current study indicates that the conventional physiotherapy with Neurodynamiccan be an effective therapeutic approach for patient with prolapsed lumbar intervertebral disc (PLID). Participants in the conventional physiotherapy with Neurodynamic group showed a greater benefit than those in the only conventional physiotherapy group. The result indicate that the significant changes in both groups are due to the selection of a well- defined population of prolapsed lumbar intervertebral disc (PLID) patients using specific inclusion and exclusion criteria. It may be helpful for patient with prolapsed lumbar intervertebral disc (PLID) to increase return to normal daily activities, work and to measure longer term effects for determining cost effectiveness of Neurodynamic in conjunction with conventional physiotherapy as an intervention for prolapsed lumbar intervertebral disc (PLID).

6.2 Recommendation

In this study, the researcher provided 5 session of treatment to both groups and measure pain intensity and disability in different functional positions.

As a consequence of the research it is recommended that with further well-controlled double blinding study include comparison of the conventional physiotherapy with Neurodynamicgroup with the conventional physiotherapy alone and assessing effects and efficacy of these treatments. In particular, since the back is sensitive area this is a frequent cause of functional disability and pain. This study directed towards an assessment of the specific management in treating back of specific back problem in an outpatient, if pursued further could prove extremely fruitful. Furthermore, chronic associated with many cases of back pain, and the extensive pathology that exists in the surrounding structure that was joints, tissues and bone, may suggest a further study of a longer duration as this may give even better results.

These samples were selected between the age group of 18-60 years, but the researcher could not find out which age group was more effective. If the most effective age group were found then the study will be more effective.

REFERENCES

- Ahmed, N., Tufel, S., Khan, M.H., and Khan, P.B., (2013). Effectiveness of neurodynamic in the management of sciatica. *Journal of Musculoskeletal Research*, 16(03).
- Albert, H. B., (2012). The efficacy of systemic active conservative treatment for patient with severe sciatica, 37(7):531-542.
- Alkherayf, F., Eugene, K. W., and Eve, C.T., (2010). Daily smoking and lower back pain in adult Canadians: The Canadians community health survey,3 :155-160.
- Allison, G.T., Nagy, B.M., and Hall, T., (2012).A randomized clinical trial of manual therapy for cervico-brachial pain syndrome—a pilot study.*Manual Therapy*, 7(2): 95-102.
- Apfel, C.C., Cakmakkaya, O.S., Martin, W., Richmond, C., Macario, A., George, E., and Pergolizzi, J.V., (2010). Restoration of disk height through non-surgical spinal decompression is associated with decreased discogenicProlapsed Lumber Intervertebral Disc: a retrospective cohort study. *BMC Musculoskeletal Disorders*, 11(1): 155.
- Balague, F., Mannion, A.F., Pellise, F. and Cedraschi, C., (2012).Non-specific Prolapsed Lumber Intervertebral Disc.*The Lancet*, 379(9814), pp.482-491.
- Bekkering, G.E., Engers, A.J., Wensing, M., Hendriks, H.J., Tulder, M.W., Oostendorp, R.A., and Bouter, L.M., (2003). Development of an implementation strategy for physiotherapy guidelines on Prolapsed Lumber Intervertebral Disc. *Australian Journal of Physiotherapy*, 49(3): 208-214.
- Bogduk, N., and McGuirk, B., (2012). Medical management of acute and chronic Prolapsed Lumber Intervertebral Disc: an evidence-based approach, USA: Elsevier Health Sciences, 13.
- Boyles, R., Toy, P., and Mellon, J., (2011). Effectiveness of manual physical therapy in the treatment of cervical radiculopathy: a systematic review. *J. Manipulative Therapy*, 19: 135-142.
- Brox, J.I., Reikeras, O., Nygaard, O., Sorensen, R., Indahl, A., Holm, I., and Friis, A., (2006). Lumbar instrumented fusion compared with cognitive intervention and exercises in patients with chronic back pain after previous

surgery for disc herniation: a prospective randomized controlled study. *Pain*, 122(1): 145-155.

- Bruehl, S., Harden, R.N., Galer, B.S., Saltz, S., Backonja, M., and Stanton-Hicks, M., (2012). Complex regional pain syndrome: are there distinct subtypes and sequential stages of the syndrome. *Pain*, 95(1): 119-124.
- Burns, S.A., and Hangee, J., (2008). Use of thrust and nonthrust manipulation in recurrent lumbar radiculopathy. *Journal of Manual & Manipulative Therapy*, 16(3): 161–181.
- Butler, D., (2010). Mobilization of the nervous system. The sensitive nervous system. Adelaide, Australia.
- Calmels, P., Queneau, P., Hamonet, C., Le Pen, C., Maurel, F., Lerouvreur, C., and Thoumie, P., (2009). Effectiveness of a lumbar belt in sub-acute Prolapsed Lumbar Intervertebral Disc: an open, multicentric, and randomized clinical study. *Spine*, 34(3): 215-220.
- Chou, R., Gilbert, J.F., and Perry, G., (2009). Clinical guidelines for the use of chronic opioid therapy in chronic noncancer pain. *The Journal of Pain*, 10(2):113-130.
- Clarke, J.A., Tulder, M.W., and Blomberg, S.E.I., (2010). Traction for Prolapsed Lumbar Intervertebral Disc with or without sciatica. *Cochrane Database Syst. Rev.* CD003010.
- Cleland J.A., Fritz J.M., Whitman J.M., and Heath R., (2007). Predictors of short-term outcome in people with a clinical diagnosis of cervical radiculopathy. *Physical Therapy*, 87:1619–32
- Colakoviae, H., and Avdiae, D., (2013). Effects of neurodynamic on pain, straight leg raise test and disability in patients with radicular Prolapsed Lumbar Intervertebral Disc. *Journal of Health Sciences*, 3(2):109-112.
- Coppieters, M.W., Stappaerts, K.H., Wouters, L.L., and Janssens, K., (2003). The immediate effects of a cervical lateral glide treatment technique in patients with neurogenic cervicobrachial pain. *Journal of Orthopaedic & Sports Physical Therapy*, 33(7): 369-378.
- Cowell, I.M., and Philips, D.R., (2002). Effectiveness of manipulative physiotherapy for the treatment of a neurogenic cervicobrachial pain syndrome: a single case study – trial design. *Manual Therapy*, 7(1): 31-38.

- DePoy, E., and Gitlin, L.N., (2013). Introduction to research: Understanding and applying multiple strategies. USA: Elsevier Health Sciences.
- Desveaux, L., Nanavaty, G., and Ryan, J., (2012). Exploring the concept of leadership from the perspective of physical therapists in Canada, 64(4):367-375.
- Doherty, M., (2012). Musculoskeletal disorders, In: C Hslett, ER Chilvers, JAA Hunter & NA Boon (eds), Davidson's Principles and Practice of Medicine. 19th ed. London: Churchill Livingstone, 981-982.
- Ebadi, S., Ansari, N. N., andNaghdi, S., (2012). BMC musculoskeletal disorders, 13:191-192.
- Ellis, R.F., and Hing, W.A., (2008). Neurodynamics: A Systematic Review of Randomized Controlled Trials with an Analysis of Therapeutic Efficacy. Journal of Manual and Manipulation Therapy, 16(1): 8–22.
- Erdogmus, (2007). Physiotherapy based rehabilitation following disc herniation,32(19):2041-2049.
- Fabrizi, A.P., Maina, R. and Schiabello, L., (2011). Interspinous spacers in the treatment of degenerative lumbar spinal disease: our experience with DIAM and Aperius devices. European Spine Journal, 20(1), pp.20-26.
- Ferguson, S.A., and Marras, W.S., (2010). A literature review of low back disorder surveillance measures and risk factors. Clinical Biomechanics, 12(4): 211-226.
- 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 Prolapsed Lumbar Intervertebral Disc.Archives of internal medicine, 169(3), pp.251-258.
- Freeman, B.J., Fraser, R.D., Cain, C.M., Hall, D.J., and Chapple, D.C., (2007). A randomized, double-blind, controlled trial: intradiscalelectrothermal therapy versus placebo for the treatment of chronic discogenicProlapsed Lumbar Intervertebral Disc. Spine, 30(21): 2369-2377.
- Furlan, A.D., Brosseau, L., Imamura, M., and Irvin, E., (2012). Massage for low-back pain: a systematic review within the framework of the Cochrane Collaboration Back Review Group. Spine, 27(17): 1896-1910.

- Hahne, A.J; Ford, J.J; and McMeeken, J.M, (2010). Conservative management of lumbar disc herniation with associated radiculopathy: A systemic review,35(11):488-504.
- Hamouda, M., (2013).The Neural Tissue Provocation Test as a Diagnostic Tool in the Assessment of Cervicobrachial Pain Disorders: A Critical Appraisal. M. Hamouda.
- Heijden, G.J., Beurskens, A.J., Koes, B.W., Assendelft, W.J., de Vet, H.C., and Bouter, L.M., (2009). The efficacy of traction for back and neck pain: a systematic, blinded review of randomized clinical trial methods. *Physical Therapy*, 75(2): 93-104.
- Hills, E.C., (2006). Mechanical Prolapsed Lumbar Intervertebral Disc, Retrieved January 22, 2015, from <http://www.emedicine.com/pmr/topic73>
- Hossain, M., (2011). Statement on the rationale and grounds for introducing the bill, Bangladesh persons with disability welfare act-2001, National Forum of Organization Working with the Disable-NFOWD, Dhaka.
- Hoy, D., Bain, C., Williams, G., March, L., Brooks, P., Blyth, F., and Buchbinder, R., (2012). A systematic review of the global prevalence of Prolapsed Lumbar Intervertebral Disc. *Arthritis & Rheumatism*, 64(6): 2028-2037.
- Hunt, G.C., (2002). Peripheral nerve biomechanics: application to neuromobilization approaches. *Physical Therapy Reviews*, 7(2): 111-121.
- Johanning, E., (2008). Evaluation and management of occupational low back disorders. *American Journal of Industrial Medicine*, 37(1): 94-111.
- Jordon, J., Konstantinou, K., and O'Dowd, J., (2009). Herniated lumbar disc, [BMJ ClinEvid](#), 2009: 1118.
- Kaila-Kangas, L., Kivimäki, M., Riihimäki, H., Luukkonen, R., Kirjonen, J., and Leino-Arjas, P., (2007). Psychosocial factors at work as predictors of hospitalization for back disorders: a 28-year follow-up of industrial employees. *Spine*, 29(16): 1823-1830.
- Karppinen, J., (2007). New perspectives on sciatica. Immune and glial regulation of pain, 1: 385-406.

- Khruakhorn, S., (2010). Prevalence and risk factors of Prolapsed Lumber Intervertebral Disc among the university staff. *Journal of Medical Association of Thailand*, 93(7):142-8.
- Koes, B.W., Van Tulder, M.W., and Thomas, S., (2010). Diagnosis and treatment of Prolapsed Lumber Intervertebral Disc. *BMJ: British Medical Journal*, 332(7555): 1430.
- Kostopoulos, D., (2004). Treatment of carpal tunnel syndrome: a review of the non-surgical approaches with emphasis in Neurodynamics. *Journal of bodywork and movement therapies*, 8(1), pp.2-8.
- Kovacs, F. M., Urrutia, G., and Alarcon, J.D., (2011). Surgery versus conservative treatment for symptomatic lumber spinal stenosis, 36(20):1335-1351.
- Kumar, S., (2010).A prospective randomized controlled trial of Neurodynamics and Mackenzie manipulation in cervical radiculopathy.*Indian Journal of Physiotherapy and Occupational Therapy*, 4(3): 69-75.
- Kumar, S.D., (2013). Effectiveness of intermittent pelvic traction vs. intermittent pelvic traction with self-neurodynamic on Prolapsed Lumber Intervertebral Disc- A comparative study. *International Journal of Physiotherapy and Research*, 03:71-76.
- Kutty, R.K., Gebrekidan, H.G., Lerebo, W.T., and Gebretsadik, M.A., (2014). Neurodynamic a therapeutic efficacy in Piriformis Syndrome model: Antrial study. *International Journal of Physiotherapy and Research*, 2(3): 577-583
- Liaqat, S., Fatima, U. and Bhukhari, S., (2014). The effect of intermittent traction along with Neurodynamics in cervical radiculopathy.*International Journal of Engineering, Science and Mathematics*, 3(3), p.15.
- Linton, S.J., and Ryberg, M., (2011). A cognitive-behavioral group intervention as prevention for persistent neck and back pain in a non-patient population: a randomized controlled trial. *Pain*, 90(1): 83-90.
- Longo, Matthew, R.,Azanon, E., and Haggard, P., (2010) More than skin deep: body representation beyond primary somatosensory cortex. *Neuropsychologia* 48 (3), pp. 655-668. ISSN 0028-3932.
- Louw, J., (2007). *SA journal of physiotherapy*, 66(2):2-5.

- [Machado, L.](#), [Maher, C.](#), [Herbert, D.](#), [Clare, H.](#), and [McAuley, JH.](#), (2010). The effectiveness of the McKenzie method in addition to first-line care for acute Prolapsed Lumber Intervertebral Disc: a randomized controlled trial, *BMC Med*, 26:8-10.
- Maher, C., Sherrington, C., Herbert, R., Moseley, A., and Elkins, M., (2003). Reliability of the PEDro Scale for rating quality of randomized controlled trials. *PhysTher*, 83:713–721.
- Mainiadakis, N., and Gray, A., (2000). The economic burden of back pain in the UK, *Pain*, 84:95-108.
- Malik, N., Kataria, C. and Sachdev, N.B., (2012). Comparative effectiveness of straight leg raise and slump stretching in subjects with Prolapsed Lumber Intervertebral Disc with adverse neural tension. *International Journal of Health and Rehabilitation Sciences (IJHRS)*, 1(1), pp.2-10.
- Manusov, E.G., (2012). Evaluation and diagnosis of Prolapsed Lumber Intervertebral Disc. *Primary care*, 39(3): 471-77.
- May, S., and Aina, A., (2012). Centralization and directional preference: A systematic review. *Manual Therapy*, 17:497-506.
- McCaffery, M., and Pasero, C., (1999). Teaching patients to use a pain-rating scale. *The American Journal of Nursing*, 99(12): 22.
- McCracking, H.V., (2008). The long-term effects of a neurodynamic treatment technique using a treatment-based classification approach to Prolapsed Lumber Intervertebral Disc. *Journal of Manual & Manipulative Therapy*, 16(3): 161–181.
- McGill, S., (2007). *Low back disorders: Evidence based prevention and rehabilitation*. 2nd edition, Human kinetics, Ontario.
- McKenzie, R., (1995). *The lumbar spine*. New Zealand: Spinal Publication.
- McKenzie, R., and May, S., (2003). *The lumbar spine: mechanical diagnosis and therapy* (2nded). Waikanae, New Zealand: Spinal publications.
- McKenzie, R.A., (1990). *The lumbar spine: Mechanical diagnosis and therapy*. Waikanae New Zealand: Spinal Publications.
- Merskey, H., and Bogduk, N., (2008). *Classification of chronic pain, Descriptions of chronic pain syndromes and definitions of pain terms* (2nded.) Seattle, WA: IASP Press.

- Michael, A. A., and Peter, J.R., (2006). What is Intervertebral Disc Degeneration, and What Causes It? retrieved on 7th oct 2012
- [Middelkoop, M.](#), [Rubinstein, S.M.](#), [Kuijpers, T.](#), [Verhagen, A.P.](#), [Ostelo, R.](#), [Koes, B.W.](#), [van Tulder, and M.W.](#), (2011). A systematic review on the effectiveness of physical and rehabilitation interventions for chronic non-specific Prolapsed Lumber Intervertebral Disc, *European Spine Journal*, 20(1):19-39.
- Middlekoop, M., Assendelft, W.J., and de Boes, M.R., (2011). Spinal manipulative therapy for chronic Prolapsed Lumber Intervertebral Disc, 36(13):825-846.
- Miranda, H., Kaila-Kangas, L., Heliövaara, M., Leino-Arjas, P., Haukka, E., Liira, J., and Viikari-Juntura, E., (2010). Musculoskeletal pain at multiple sites and its effects on work ability in a general working population. *Occupational and Environmental Medicine*, 67(7): 449-455.
- Mohammad, A., and Mazroa, A., (2012). *Journal of Applied and Natural Science*, 7(1):92-97.
- Murphy, D.R., (2004). A clinical model for the diagnosis and management of patients with cervical spine syndromes. *Australasian Chiropractic & Osteopathy*, 12(2): 57
- Murphy, D.R., and Hurwitz, E.L., (2007). A theoretical model for the development of a diagnosis-based clinical decision rule for the management of patients with spinal pain. *BMC Musculoskeletal Disorders*, 8(1): 75.
- Nachemson, A., (2013). Introduction to treatment of neck and back pain. *Neck and Back Pain. The Scientific Evidence of Causes, Diagnosis, and Treatment*. Philadelphia, PA: Lippincott Williams & Wilkins, 237-9.
- Nachemson, A., Waddell, G., and Norlund, A. L., (2009). Epidemiology of neck and Prolapsed Lumber Intervertebral Disc. *Neck and Back Pain: The Scientific Evidence of Causes, Diagnosis and Treatment*, 165-188.
- Nee, R.J., and Butler, D.S., (2010). Management of peripheral neuropathic pain, integrating neuro biology, neurodynamics and clinical evidence. *Physical Therapy in Sports*, 7(2):110-111.

- Orthofracs., (2013). Lumbar disc prolapsed, retrived on 10 July 2016 <<http://www.orthofracs.com/adult/elective/spine/lumbar-disc-prolapse/epidemiology.html>>.
- Oskay, Meric, A., Kirdi, Firat, Ayhan and Leblebicioglu, G., (2010). Neurodynamic Mobilization in the Conservative Treatment of Cubital Tunnel Syndrome. *Journal of Manipulative and Physiological Therapeutics*, 33(2):156-163.
- Phansopkar, A.P., and Kage,V., (2014). *International journal of physiotherapy and research*, 2(5):733-741.
- Pinar, L., Enhos, A., Ada, S., and Gungor, N., (2005). Can we use nerve gliding exercises in women with carpal tunnel syndrome? *Advances in Physical Therapy*.,22:467–475.
- Pinto, R.Z., Maher, C.G., Ferreira, M.L., Hancock, M., Oliveira, V.C., McLachlan, A.J., Koes, B. and Ferreira, P.H., (2012). Epidural corticosteroid injections in the management of sciatica: a systematic review and meta-analysis. *Annals of internal medicine*, 157(12), pp.865-877.
- Polston, D.W., (2007). Cervical radiculopathy.*Neurologic clinics*, 25(2):373-385.
- Rhon, R., and Fritz, J., (2015). *The journal of the American Medical Association*, 314(14):1459-1467.
- Richard, F., Ellis, B.P., and Waney, A.H., (2008). Neurodynamic, a systematic review of randomized controlled trials with an analysis of therapeutic efficacy. *The Journal of Manual & Manipulative Therapy*, 16(1):8-22.
- Rodine, R.J. and Vernon, H., (2012). Cervical radiculopathy: a systematic review on treatment by spinal manipulation and measurement with the Neck Disability Index. *J Can ChiroprAssoc*, 56(1):18-28.
- Rubinstein, S.M., Terwee, C.B., Assendelft, W.J., de Boer, M.R. and van Tulder, M.W., (2012). Spinal manipulative therapy for acute low-back pain.*The Cochrane Library*.
- Sahar, M.A., (2011). Efficacy of Neurodynamic in Treatment of Low Back Dysfunctions. *Journal of American Science*, 7(4):566-573.
- Sambyal, S., and Kumar, S., (2013).Comparison between Nerve Mobilization and Conventional Physiotherapy in Patients with Cervical

Radiculopathy. *International Journal of Innovative Research & Development*, 2(8): 442-445.

- Sarkari, E., and Multant, N.K., (2007). Efficacy of neurodynamic in sciatica. *Journal of Exercise Science and Physiotherapy*, 3(2):136-141.
- Sarker, A., and Rahman, A., (2007). Mobilization significantly effective for treatment of prolonged Prolapsed Lumber Intervertebral Disc sufferers. *Bangladesh Physiotherapy Journal*, 3(1): 15
- Saunders, D.G., Walker, J.R. and Levine, D., (2005). Joint mobilization. *Veterinary Clinics: Small Animal Practice*, 35(6):1287-1316.
- Schafer, A., Hall, T.M., Ludtke, K., Mallwitz, J. and Briffa, N.K., (2009). Interrater reliability of a new classification system for patients with neural low back-related leg pain. *Journal of Manual & Manipulative Therapy*, 17(2):109-117.
- Shacklock, M., (2011), Neuro dynamics, *Physiotherapy*, 81(1): 9-15.
- Shiri, R., Karppinen, J., Leino-Arjas, P., Solovieva, S., and Viikari-Juntura, E., (2010). The association between obesity and Prolapsed Lumber Intervertebral Disc: a meta-analysis. *American Journal of Epidemiology*, 171(2): 135-154.
- Srivastava, T., Thakur, K.C., Kumar, N., and Srivastava, S., (2013). Efficacy of McKenzie over conventional physiotherapy treatment in Prolapsed Lumber Intervertebral Disc [dysfunction syndrome]. *Journal of Evolution of Medical and Dental Sciences*, 2(28): 5231-5238.
- Swinkels, A., Cochrane, K., and Burt, A., (2009). Exercise intervention for non-specific Prolapsed Lumber Intervertebral Disc: an overview of systematic review. *Physical Therapy Reviews*, 14: 247-259.
- Sykova, E., Homola, A., Mazanec, R., Lachmann, H., LangkramerKonradova, S., Kobyłka, P., Padr, R., Neuwirth, J., Komrska, V., Vavra, V. and Stulik, J., (2006). Autologous bone marrow transplantation in patients with subacute and chronic spinal cord injury. *Cell transplantation*, 15(8-9):675-687.
- Taechasubamorn, P., (2011). Prevalence of Prolapsed Lumber Intervertebral Disc among rice farmers in a rural community in Thailand. *Journal of the Medical Association of Thailand*, 94(5):616-21.
- Takasaki, H., and May, S., (2014) Mechanical Diagnosis and Therapy has similar effects on pain and disability as 'wait and see' and other approaches in

people with neck pain: a systematic review. *Journal of Physiotherapy*, 60:78–84

- vanTulder, M., Becker, A., Bekkering, T., Breen, A., Gil del Real, M.T., Hutchinson, A., and Malmivaara, A., (2011). Chapter 3 European guidelines for the management of acute nonspecific Prolapsed Lumbar Intervertebral Disc in primary care. *European Spine Journal*, 15: 169-191.
- vanTulder, M., Becker, A., Bekkering, T., Breen, A., Gil del Real, M.T., Hutchinson, A., and Malmivaara, A., (2007). Management of acute nonspecific Prolapsed Lumbar Intervertebral Disc in primary care. *European Spine Journal*, 15:169-191.
- Vargas, A.C., Morales, M.A., and Daly, D., (2012). Exercise, Manual Therapy and Education for chronic Prolapsed Lumbar Intervertebral Disc, 90(7):526-534.
- Vingard, E., Alfredsson, L., Hagberg, M., Kilbom, A., Theorell, T., and Waldenstrom, M.,(2008). To What Extent Do Current and Past Physical and Psychosocial Occupational Factors Explain Care-Seeking for Prolapsed Lumbar Intervertebral Disc in a Working Population? Results from the Musculoskeletal Intervention Center-Norrtaevlje Study. *Spine*, 25(4): 493-500.
- Waddell, G., (2013). Pain and Disability. In: *The back pain revolution*. Churchill: Livingstone, 27-45.
- West, W., West,K.P., Younger, E.N., and Cornwall. D., (2010).Degenerative disc disease of the lumbar spine on MRI, *West Indian medical journal*, 59:2.
- Wheeler, A.H., (2007). Pathophysiology of chronic back pain, Retrieved January 21, 2015, from <http://www.emedicine.com/neuro/topic516.htm>
- William, S.M., Sue, A.F., and Deborah, B., (2007). Prolapsed Lumbar Intervertebral Disc recurrence in occupational environment. *Spine*,32(21):2387-2397.
- Xavier, A., and Farrell, C.E., (2012). Effect of distal movement on peripheral nociceptors of sciatic nerve. *Pain*, 40: 77-82.

APPENDIX

February 17, 2016
The Chairman
Institutional Review Board (IRB)
Bangladesh Health Professions Institute (BHPI)
CRP-Savar, Dhaka-1343, Bangladesh

Subject: **Application for review and ethical approval.**

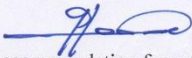
Sir,

With due respect I would like to draw your kind attention that I am a student of Bachelor of Science in Physiotherapy at Bangladesh Health Professions Institute (BHPI)- an academic institute of CRP under Faculty of Medicine of University of Dhaka (DU). I have to conduct a thesis entitled, "Effectiveness of Neurodynamics along with conventional physiotherapy for patients with Prolapsed Lumber Intervertebral Disc (PLID), Md. Obaidul Haque, Associate Professor & Head, Department of Physiotherapy, BHPI, CRP, Savar, Dhaka. The purpose of the study is to find out the effectiveness of Neurodynamics along with conventional physiotherapy for patients with Prolapsed Lumber Intervertebral Disc (PLID). Questionnaire will be used that will take about 10 to 15 minutes. Data collectors will receive informed consents from all participants. Any data collected will be kept confidential.

Therefore I look forward to having your kind approval for the thesis proposal and to start data collection. I can also assure you that I will maintain all the requirements for study.

Sincerely yours,

Kaniz Fatima Camy
Bachelor of Science in Physiotherapy (B.Sc PT)
Session: 2011-2012, DU Reg. No: 1729
BHPI, CRP, Savar, Dhaka-1343, Bangladesh


Recommendation from the thesis supervisor:
Md. Obaidul Haque
Associate Professor & Head
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka

Attachment: Thesis Proposal including measurement tools and process and procedure for maintaining confidentiality, Questionnaire (English and Bengali version), Information sheet & consent.



বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
Bangladesh Health Professions Institute (BHPI)

(The Academic Institute of CRP)

Ref.

CRP-BHPI/IRB/04/17/64

Date 05/04/17

To
Kaniz Fatima Camy
Bachelor of Science in Physiotherapy (B.Sc PT)
Session: 2011-2012 DU Reg. No: 1729
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal – Effectiveness of Neurodynamics along with conventional physiotherapy for patients with Prolapsed Lumbar Intervertebral Disc (PLID).

Dear Kaniz Fatima Camy

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application on February 17, 2016 to conduct the above mentioned thesis, with yourself, as the Principal investigator. The Following documents have been reviewed and approved:

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

Since the study involves answering a questionnaire that takes 10 to 15 minutes, have no likelihood of any harm to the participants, 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 or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,

Muhammad Millat Hossain

Muhammad Millat Hossain
Assistant Professor, Dept. of Rehabilitation Science
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

Permission Letter

31st August, 2016

To

The Head of the Physiotherapy Department.
Centre For The Rehabilitation of The Paralysed (CRP)
Chapain, Savar, Dhaka-1343.

Subject- Seeking permission for data collection to conduct research project.

Sir,

With due respect and humble submission to state that I am Kaniz Fatima Camy, student of 4th year B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). As a part of my academic curriculum I have to do a research project. The Ethical Committee "Institutional Review Board (IRB)" has approved my research title on 'Effectiveness of Neurodynamic along with conventional physiotherapy for patients with Prolapsed Lumber Intervertebral Disc' under the supervision of Md. Obaidul Haque, Associate professor, Head of Physiotherapy Department and Acting principal of Bangladesh Health Professions Institute (BHPI). I have to collect data from Musculoskeletal unit of Physiotherapy Department. I would like to assure that anything of my study will not be harmful for the participants.

I, therefore, pray and hope that you would be kind enough to grant my application and give me the permission for data collection from the musculoskeletal department and oblige thereby.

Yours obediently,

Kaniz Fatima Camy

Kaniz Fatima Camy

Roll: 25

Session: 2011-2012

Physiotherapy Department, BHPI, CRP-Chapain
Savar, Dhaka-1343.

Forwarded
7/01/16
Md. Obaidul Haque
Associate Professor & Head of the Department
Department of Physiotherapy
Bangladesh Health Professions Institute (BHPI)
CRP, Chapain, Savar, Dhaka-1343

Approved
MHB
7/8/16
Mohammad Arif Hossain
Associate Professor &
Head of Physiotherapy Dept.
CRP, Chapain, Savar, Dhaka-1343

সম্মতিপত্র

আসসালামু আলাইকুম/নমস্কার, আমি কানিজ ফাতেমা ক্যামি, ৪র্থ বর্ষ ঢাকা বিশ্ববিদ্যালয়ের চিকিৎসা অনুষদের অধীনে বাংলাদেশ হেল্থ প্রফেশন স ইনস্টিটিউট (বিএইচপিআই) এর বি.এস.সি.ইন ফিজিওথেরাপি বিভাগ এর একজন শিক্ষার্থী।
অধ্যয়নের অংশ হিসেবে আমাকে একটি গবেষণা সম্পাদন করতে হবে এবং এটা আমার প্রাতিষ্ঠানিক কাজের একটি অংশ নিম্নোক্ত তথ্যাদি পাঠ করার পর অংশগ্রহণকারীদের অধ্যয়নে অংশগ্রহণের জন্য অনুরোধ করা হলো।

আমার গবেষণার শিরোনাম " প্রলাম্পড লাম্বার ইন্টারভারটিব্রাল ডিস্ক রোগীদের ক্ষেত্রে গতানুগতিক ফিজিওথেরাপির সাথে নিউরোডাইনামিক এর কার্যকারিতা "। এই গবেষণা র মাধ্যমে আমি প্রলাম্পড লাম্বার ইন্টারভারটিব্রাল ডিস্ক রোগের চিকিৎসার জন্য গতানুগতিক ফিজিওথেরাপি সঙ্গে নিউরোডাইনামিক এর কার্যকারিতা খুঁজে বের করার চেষ্টা করবো। আমার গবেষণার উদ্দেশ্য হলো থেরাপী দেবার পূর্বে ও পরে রোগীদের ব্যথা, নড়াচড়া ও প্রতিবন্ধকতা পরিমাপ করা। আমি যদি আমার গবেষণাটি সার্থকভাবে সম্পূর্ণ করতে পারি তবে যেসব রোগীরা প্রলাম্পড লাম্বার ইন্টারভারটিব্রাল ডিস্ক রোগে ভুগছেন তারা উপকৃত হবেন এবং এটি হবে একটি পরীক্ষামূলক প্রমাণ।

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

আপনার গবেষণা সম্পর্কে যদি কোনো জিজ্ঞাসা থাকে তবে আপনি অনুগ্রহপূর্বক যোগাযোগ করতে পারেন গবেষক কানিজ ফাতেমা ক্যামি, ফিজিওথেরাপি বিভাগ বিএইচপিআই, সিআরপি, সাভার, ঢাকা-১৩৪৩ এ।

শুরু করার আগে আপনার কি কোন প্রশ্ন আছে?

আমি কি শুরু করতে পারি?

হ্যাঁ

না

অংশগ্রহণকারীর স্বাক্ষর ও তারিখ

সাক্ষীর স্বাক্ষর ও তারিখ

গবেষকের স্বাক্ষর ও তারিখ

প্রশ্নাবলী (বাংলা)

এই প্রশ্নপত্রটি তৈরি করা হয়েছে কোমরব্যথার রোগীদের ব্যথা ও অক্ষমতা পরিমাপ করার জন্য।

পর্ব-ক: ব্যক্তিগত তথ্যাবলী

কোড নং: রেজিস্ট্রেশন নং:

তারিখ:

লিঙ্গ:

রোগীর নাম: ফোন নম্বর:

ঠিকানা:

পর্ব-খ: আর্থ সামাজিক তথ্য

প্রশ্ন	উত্তর
বাসস্থান	১) শহর
	২) গ্রাম
শিক্ষাগত যোগ্যতা	১) প্রাতিষ্ঠানিক শিক্ষা নেই
	২) প্রাইমারি
	৩) মাধ্যমিক
	৪) উচ্চ মাধ্যমিক
	৫) স্নাতক অথবা স্নাতকোত্তর
পেশা	১) কৃষক
	২) দিনমজুর
	৩) শিক্ষক
	৪) চাকুরীজীবী
	৫) গৃহিণী
	৬) অন্যান্য

মাসিক আয়	১) <৫০০০
	২) ৫০০০-১০০০০
	৩) ১০০০০-১৫০০০
	৪) ১৫০০০-২০০০০
	৫) > ২০০০০
বৈবাহিক অবস্থা	১) বিবাহিত
	২) অবিবাহিত
	৩) বিবাহ বিচ্ছেদ
	৪) বিধবা
কতদিন যাবত কোমর ব্যথায় ভুগছেন?	১) বছর
	২) মাস
	৩) সপ্তাহ
ব্যথার কারন কি?	

পর্ব-গ:ব্যথা বিষয়ক প্রশ্নাবলী (চিকিৎসার পূর্বে)

প্রশ্নাবলীর এই অংশ রোগীর দ্বারা পূরণ করা হবে। নিম্নলিখিত প্রশ্নে আপনার ব্যথার পরিমাণ লাইনে গোল দাগ দিয়ে চিহ্নিত করুন।

এই মুহূর্তে আপনার কোমর ব্যথার তীব্রতা কতোটুকু?

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

অসুস্থের প্রতিবন্ধিতা সূচক (বিবৃতি ২.১ এ)

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

অনুগ্রহপূর্বক সবগুলো প্রশ্নের উত্তর দিন। প্রতিটি অংশে শুধুমাত্র একটি বাস্তব/উত্তর চিহ্নিত করুন যা আজ আপনার অবস্থাকে সর্বাপেক্ষা কাছাকাছি বর্ণনা করে।

অংশ ১ - ব্যথার তীব্রতা

- এ মুহূর্তে আমার কোন ব্যথা নেই।
- এ মুহূর্তে ব্যথা অত্যন্ত কম।
- এ মুহূর্তে ব্যথা মোটামুটি।
- এ মুহূর্তে ব্যথা যথেষ্ট পরিমাণে তীব্র।
- এ মুহূর্তে ব্যথা অত্যন্ত তীব্র।
- এ মুহূর্তে ব্যথা এমন যে তা কল্পনার সর্বোচ্চ খারাপ।

অংশ ২- ব্যক্তিগত যত্ন (ধৌতকরণ, পোশাক পরিধান ইত্যাদি)

- কোন ধরণের ব্যথা ছাড়াই আমি আমার নিজের স্বাভাবিক যত্ন নিতে পারি।
- আমি আমার নিজের স্বাভাবিক যত্ন নিতে পারি, কিন্তু এটি অত্যন্ত ব্যথাদায়ক।
- আমার নিজের যত্ন নেওয়া ব্যথাদায়ক এবং এ জন্যে আমি ধীর ও সতর্কতা অবলম্বন করি।
- আমার কিছু সাহায্যের দরকার হয়, কিন্তু আমি আমার অধিকাংশ ব্যক্তিগত কাজ নিজেই সম্পাদন করি।
- প্রতিদিন আমার নিজের অধিকাংশ কাজের জন্যে অন্যের সাহায্য প্রয়োজন হয়।
- আমি আমার পোশাক-পরিচ্ছদ পরিধান করতে পারি না, ধৌতকরণ করা যথেষ্ট কষ্টদায়ক এবং আমি বিছানাতেই থাকি।

অংশ ৩- উত্তোলন

- আমি কোন বাড়তি ব্যথা ছাড়াই ভারী ওজন উত্তোলন করতে পারি।
- আমি ভারী ওজন উত্তোলন করতে পারি, কিন্তু এটা বাড়তি ব্যথা সৃষ্টি করে।
- ব্যথার কারণে আমি মেঝে থেকে ভারী ওজন উত্তোলনে বাঁধার সম্মুখীন হই, কিন্তু যদি এগুলো সুবিধাজনক অবস্থানে যেমন, টেবিলে রাখা হয়, তাহলে আমি তা উত্তোলন করতে পারি।
- ব্যথা আমাকে ভারী ওজন উত্তোলনে বাঁধা সৃষ্টি করে, কিন্তু যদি এগুলো সুবিধাজনক অবস্থানে রাখা হয়, তাহলে আমি হালকা থেকে মাঝারি ধরণের ওজন উত্তোলন করতে পারি।
- আমি কেবল অত্যন্ত হালকা ওজন উত্তোলন করতে পারি।
- আমি একেবারেই কোনকিছু উত্তোলন বা বহন করতে পারি না।

অংশ ৪- হাঁটা-চলা

- ব্যথার কারণে আমার যে কোন দূরত্বে হাঁটতে সমস্যা হয় না।
- ব্যথার কারণে আমি ১ মাইলের অধিক হাঁটতে পারি না।
- ব্যথার কারণে আমি ১ মাইলের চার ভাগের এক ভাগের অধিক হাঁটতে পারি না।
- ব্যথার কারণে আমি ১০০ গজের অধিক হাঁটতে পারি না।

- আমি কেবল লাঠি বা ক্রাচ ব্যবহার করে হাঁটতে পারি।
- অধিকাংশ সময়েই আমি বিছানায় থাকি এবং আমাকে হামাগুড়ি দিয়ে টয়লেটে যেতে হয়।

অংশ ৫- বসে থাকা

- আমি যে কোন চেয়ারে যতক্ষণ খুশি ততক্ষণ বসে থাকতে পারি।
- আমি আমার পছন্দের চেয়ারে যতক্ষণ খুশি ততক্ষণ বসে থাকতে পারি।
- ব্যথার জন্য আমি ১ ঘন্টার বেশি বসে থাকতে পারি না।
- ব্যথার জন্য আমি ১/২ ঘন্টার বেশি বসে থাকতে পারি না।
- ব্যথার জন্য আমি ১০ মিনিটের বেশি বসে থাকতে পারি না।
- ব্যথার কারণে আমি মোটেই বসতে পারি না।

অংশ ৬- দাঁড়ানো

- আমি কোন বাড়তি ব্যথা ছাড়াই যতক্ষণ খুশি দাঁড়িয়ে থাকতে পারি।
- আমি যতক্ষণ খুশি দাঁড়িয়ে থাকতে পারি, কিন্তু এটি আমার বাড়তি ব্যথার সৃষ্টি করে।
- ব্যথার জন্য আমি ১ ঘন্টার বেশি দাঁড়িয়ে থাকতে পারি না।
- ব্যথার জন্য আমি ১/২ ঘন্টার বেশি দাঁড়িয়ে থাকতে পারি না।
- ব্যথার জন্য আমি ১০ মিনিটের বেশি দাঁড়িয়ে থাকতে পারি না।
- ব্যথার জন্য আমি একেবারেই দাঁড়িয়ে থাকতে পারি না।

অংশ ৭- ঘুমানো

- ব্যথার কারণে আমার ঘুম কখনোই ব্যাহত হয় না।
- ব্যথার কারণে আমার ঘুম মাঝে মাঝে ব্যাহত হয়।
- ব্যথার কারণে আমার ঘুম ৬ ঘন্টারও কম হয়।
- ব্যথার কারণে আমার ঘুম ৪ ঘন্টারও কম হয়।
- ব্যথার কারণে আমার ঘুম ২ ঘন্টারও কম হয়।
- ব্যথার কারণে আমি মোটেই ঘুমাতে পারি না।

অংশ ৮- যৌন জীবন (যদি প্রযোজ্য হয়)

- আমার যৌন জীবন স্বাভাবিক এবং কোন অতিরিক্ত ব্যথার সৃষ্টি করে না।
- আমার যৌন জীবন স্বাভাবিক, কিন্তু এতে কিছুটা অতিরিক্ত ব্যথার সৃষ্টি হয়।
- আমার যৌন জীবন প্রায় স্বাভাবিক, কিন্তু তা অত্যন্ত ব্যথাদায়ক।
- আমার যৌন জীবন ব্যথার কারণে ভীতভাবে সীমাবদ্ধ।
- আমার যৌন জীবন ব্যথার কারণে প্রায়ই অনুপস্থিত।
- ব্যথার কারণে আমি আদৌ কোন যৌন জীবন যাপন করতে পারি না।

অংশ ৯- সামাজিক জীবন

- আমার সামাজিক জীবন স্বাভাবিক এবং তা কোন অতিরিক্ত ব্যথার সৃষ্টি করে না।
- আমার সামাজিক জীবন স্বাভাবিক, কিন্তু ব্যথার পরিমাণ বাড়ায়।
- আমার অধিক শক্তি প্রয়োজনীয় আগ্রহসমূহকে (যেমন, খেলাধুলা) সীমাবদ্ধ করা ছাড়া আমার সামাজিক জীবনে ব্যথার তেমন কোন তাৎপর্যপূর্ণ প্রভাব নেই।
- ব্যথা আমার সামাজিক জীবনকে সীমাবদ্ধ করেছে এবং আমি প্রায়শই বাইরে যাই না।
- ব্যথা আমার সামাজিক জীবনকে গৃহে সীমাবদ্ধ করেছে।

- ব্যথার কারণে আমার কোন সামাজিক জীবন নেই।

অংশ ১০- ভ্রমণ/ঘুরে বেড়ানো

- কোন ধরনের ব্যথা ছড়াই আমি যে কোন স্থানে ভ্রমণ করতে পারি।
- আমি যে কোন স্থানে ভ্রমণ করতে পারি, কিন্তু এটা অতিরিক্ত ব্যথার সৃষ্টি করে।
- ব্যথার অবস্থা খারাপ থাকে, কিন্তু আমি ২ ঘন্টা পর্যন্ত ভ্রমণ করতে পারি।
- ব্যথা আমার ভ্রমণকে ১ ঘন্টার কম সময়ের মধ্যে সীমাবদ্ধ করে।
- ব্যথা আমাকে ৩০ মিনিটের নিচের অল্প প্রয়োজনীয় ভ্রমণসমূহে সীমাবদ্ধ করে।
- ব্যথা আমাকে চিকিৎসা গ্রহণ ব্যতীত যে কোন ধরনের ভ্রমণ প্রতিরোধ করে।

ফল:

আপনার অসুযোগে প্রতিবন্ধিতা সূচক = %

Score: /50 Transform to percentage: Score x 100 = % points

Scoring:

If the first statement is marked the section score = 0,

If the last statement is marked the section score = 5.

After completing all ten sections the score is calculated as follows:

Example:

If total score is 15:

$15 \text{ (total score)} / 50 \text{ (total possible score)} \times 100 = 30\%$

If one section is missed or not applicable the score is calculated:

$15 \text{ (total score)} / 45 \text{ (total possible score)} \times 100 = 33.3\%$

Minimum Detectable Change (90% confidence): 5 points or 10% points.

Consent Form

Title: Effectiveness of Neurodynamics along with conventional physiotherapy for patients with Prolapsed Lumber Intervertebral Disc (PLID).

Assalamualaikum\ Namashker,

I am Kaniz Fatima Camy, the 4th year B.Sc. (Hon's) in Physiotherapy student of Bangladesh Health Professions Institute (BHPI) under Medicine faculty of University of Dhaka. To obtain my Bachelor degree, I shall have to conduct a research and it is a part of my study. The participants are requested to participate in the study after reading the following.

My research title is “**EFFECTIVENESS OF NEURODYNAMICS ALONG WITH CONVENTIONAL PHYSIOTHERAPY FOR PATIENTS WITH PROLAPSED LUMBER INTERVERTEBRAL DISC (PLID)**”. Through this study I will find the effectiveness of Neurodynamics Along With Other Physiotherapy for the Treatment of Prolapsed Lumber Intervertebral Disc. If I can complete the study successfully, the patients may get the benefits of improve musculoskeletal outdoor physiotherapy service. To implement my research project, I need to collect data from the musculoskeletal patients. Therefore, you could be one of my valuable subjects for my study.

I am committed that the study will not pose any harm or risk to you. You have the absolute right to withdraw or discontinue at any time without any hesitation or risk. I will keep all the information confidential which I obtained from you and personal identification of the participant would not be published anywhere.

If you have any query about the study, you may contact with the researcher Kaniz Fatima Camy.

Do you have any questions before I start?

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

Yes..... No.....

Signature of the participant & Date.....

Signature of the researcher & Date.....

Signature of the witness & Date.....

Questionnaire (English)

This questionnaire is developed to measure pain and disability of Prolapsed Lumbar Intervertebral Disc (PLID) patients.

Section-A: Personal Information

Code no.:

Reg.no.:

Date:

Sex:

Patient's Name:

Phone no.:

Address:

Section-B: Socio-Demographic Information

Question	Answer
Living Area	1)City 2)Village
Educational Qualification	1)Illiterate 2)Primary 3)S.S.C 4)H.S.C 5)Graduate
Profession	1)Farmer 2)Day Labor 3)Teacher 4)Service Holder 5)House Wife 6)Others

Monthly Income	1)<5000 2)5000-10000 3)10000-15000 4)15000-20000 5)>20000
Marital Status	1)Married 2)Unmarried 3)Divorce 4)Widow
Duration of Pain	1)Year..... 2)Month..... 3)Week.....
Cause of Pain	

Section-C: Pain Related Question (Before Treatment)

This Part of Questionnaire will filled by the patient. Mark out your pain intensity with circle on the question written below.

How severe is your back pain now?

0 1 2 3 4 5 6 7 8 9 10

Oswestry Low Back Pain Disability Questionnaire

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

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

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

Scoring instructions

For each section the total possible score is 5: if the first statement is marked the section score = 0; if the last statement is marked, it = 5. If all 10 sections are completed the score is calculated as follows:

Example: 16 (total scored)
 50 (total possible score) x 100 = 32%

If one section is missed or not applicable the score is calculated:

 16 (total scored)
 45 (total possible score) x 100 = 35.5%

Minimum detectable change (90% confidence): 10% points (change of less than this may be attributable to error in the measurement)

Interpretation of scores

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

Oswestry Low Back Pain Disability Questionnaire

Instructions

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

Section 1 – Pain intensity

- I have no pain at the moment
- The pain is very mild at the moment
- The pain is moderate at the moment
- The pain is fairly severe at the moment
- The pain is very severe at the moment
- The pain is the worst imaginable at the moment

Section 2 – Personal care (washing, dressing etc)

- 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, I wash with difficulty and stay in bed

Section 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 placed eg. 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 very light weights
- I cannot lift or carry anything at all

Section 4 – Walking*

- Pain does not prevent me walking any distance
- Pain prevents me from walking more than ~~FA 3^~~
- Pain prevents me from walking more than ~~10A 3^~~
- Pain prevents me from walking more than ~~FCCÁ 3^~~
- I can only walk using a stick or crutches
- I am in bed most of the time

Section 5 – Sitting

- I can sit in any chair as long as I like
- I can only sit in my favourite chair as long as I like
- Pain prevents me sitting more than one hour
- Pain prevents me from sitting more than 30 minutes
- Pain prevents me from sitting more than 10 minutes
- Pain prevents me from sitting at all

Section 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

Section 7 – Sleeping

- My sleep is never disturbed by pain
- My sleep is occasionally disturbed by pain
- Because of pain I have less than 6 hours sleep
- Because of pain I have less than 4 hours sleep
- Because of pain I have less than 2 hours sleep
- Pain prevents me from sleeping at all

Section 8 – Sex life (if applicable)

- 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

Section 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 my more energetic interests eg, sport
- 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

Section 10 – Travelling

- I can travel anywhere without pain
- I can travel anywhere but it gives me extra pain
- Pain is bad but I manage journeys over two hours
- Pain restricts me to journeys of less than one hour
- Pain restricts me to short necessary journeys under 30 minutes
- Pain prevents me from travelling except to receive treatment

References

1. Fairbank JC, Pynsent PB. The Oswestry Disability Index. Spine 2000 Nov 15;25(22):2940-52; discussion 52.

Score: /50 Transform to percentage: Score x 100 = % points

Scoring:

If the first statement is marked the section score = 0,

If the last statement is marked the section score = 5.

After completing all ten sections the score is calculated as follows:

Example:

If total score is 15:

$15 \text{ (total score)} / 50 \text{ (total possible score)} \times 100 = 30\%$

If one section is missed or not applicable the score is calculated:

$15 \text{ (total score)} / 45 \text{ (total possible score)} \times 100 = 33.3\%$

Minimum Detectable Change (90% confidence): 5 points or 10% points.