

**EFFECTIVENESS OF BENT LEG RAISE EXERCISE ALONG  
WITH CONVENTIONAL PHYSIOTHERAPY COMPARING  
WITH CONVENTIONAL PHYSIOTHERAPY ALONE FOR THE  
PATIENTS WITH CHRONIC RADIATING LOW BACK PAIN**

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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 Bent Leg Raise Exercise along with Conventional Physiotherapy comparing Conventional Physiotherapy alone for the Patients with Chronic Radiating Low Back Pain**

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## **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 of my supervisor from the Department of Physiotherapy of Bangladesh Health Professions Institute (BHPI).

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## Acronyms

<b>BLR</b>	Bent Leg Raise
<b>BHPI</b>	Bangladesh Health Professions Institute.
<b>CRP</b>	Centre for the Rehabilitation of the Paralysed.
<b>DP</b>	Directional Preference
<b>LBP</b>	Low Back Pain
<b>MS</b>	Musculoskeletal
<b>NPRS</b>	Numeric Pain Measurement Scale
<b>NSAID's</b>	Non-Steroidal Anti-inflammatory Drugs
<b>ODI</b>	Oswestry Disability Index
<b>PT</b>	Physiotherapy
<b>RCT</b>	Randomized Control trail
<b>ROM</b>	Range of Movement
<b>SR</b>	Systematic Review
<b>USA</b>	United States of America
<b>WHO</b>	World Health Organization
<b>BMRC</b>	Bangladesh Medical Research Council
<b>IRB</b>	Institutional Review Board

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## Abstract

*Purpose:* The purpose of the study was to explore the efficacy of Bent Leg Raise Exercise with conventional physiotherapy compare to only conventional physiotherapy for the treatment of Chronic radiating Low Back Pain. *Objectives:* To determine the socio-demography of Low Back Pain and to analyze the efficacy of Bent Leg Raise Exercise in reducing pain and improving function by reducing disability. *Methodology:* This study is an experimental design. Twenty patients with chronic radiating Low Back Pain were conveniently selected from musculo-skeletal outpatient unit, CRP and then 10 patients were randomly assigned to Bent Leg Raise Exercise with conventional physiotherapy group and 10 patients to the only conventional physiotherapy group. Numeric Pain Rating Scale (NPRS) was used to measure pain and Oswestry Disability Index (ODI) was used to measure disability. Statistical analysis was done by using Mann- Whitney *U* test and *Wilcoxon test*. *Results:* The majority of the participants 45% (n=9) were in “31-40” years of age followed by 20% (n=4) were in “41-50” years, 20% (n=4) were in “51-60” years and 15% (n=3) were in “21-30” years of age range group. In this study there were total 20 participants. Among them 10 were in experimental group and 10 were in control group. The mean age of experimental group is 40.10 years and the mean age of control group is 41.60 years. Mean difference of pain between pre-test and post-test of experimental group and control group were 4.2 and 5.2 and mean difference of ODI score between pre-test and post-test of experimental group and control group were 18.36% and 33.86%. Following application of treatment the study found that the experimental group showed a significant improvement ( $p < .05$ ) in case of low back pain. *Conclusion:* This experimental study shows that Bent Leg Raise Exercise with conventional physiotherapy is more effective than conventional physiotherapy alone for patients with chronic radiating Low Back Pain.

**Keywords:** *Bent Leg Raise Exercise, Conventional Physiotherapy, Chronic Radiating Low Back Pain.*

## 1.1 Background

Low Back Pain (LBP) is the most common symptoms experienced by people throughout the world (Charoenchai et al., 2006). Globally, Low back pain is one of the most common health problems which create a large personal, community and functional burden (Hoy et al., 2012). Low back pain (LBP) is well documented as an extremely common health problem it is the leading cause of activity limitation and work absence throughout much of the world, and it causes an enormous economic burden on individuals, families, communities, industry and governments (Kent and Keating, 2005).

The initial case definition for LBP was ‘activity limiting LBP ( $\pm$  pain referred into one or both lower limbs) that lasts for at least one day’ (Hoy et al., 2010). It could be acute, sub-acute and chronic in its clinical presentation. It affects 80% of people at some point in their lives (Srivastava, 2013). LBP which lasts for more than 3 months is called chronic LBP and most of the costs are associated with persistent or chronic LBP (Alsaadi et al., 2011).

Low Back Pain (LBP) is a widespread and costly problem in many countries (Mainiadakis & Gray, 2000). In Bangladesh, the number of people complaining low back pain is increasing and is a matter of concern. 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, 2001). Low back pain 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). Low back pain is the most common condition in the developed Western countries (Doherty, 2002). Approximately 80% of all human beings experience LBP in their lives (Hills, 2006). It is the number one most common cause of activity limitation, the second most frequent cause of doctor’s visit and the third most common cause of surgical procedure in USA (Apfel et al., 2010).

Low back pain may be radiated to the lower limb. The prevalence of leg pain, as a referred symptom associated with back pain has been shown to be approximately 35%, while true prevalence of sciatica is 2-5% (Nachemson et al., 2000). The annual prevalence of low back pain has ranged between 25% and 60% (2–4), and that of sciatic pain or sciatica has ranged between 2% and 34% , depending on definition occurrence of radiating low back pain is higher in men compared with women (Kaaria et al., 2006).

The incidence of LBP peaks in middle age and the most common age range is between 35 to 55 years, but it declines in older age. Men and women are equally affected but after 60 year often women report more low-back syndromes than men (Wheeler, 2007). Another research shows that prevalence of Low Back Pain is higher among female than male in all age groups. And the incidence of Low Back Pain is more frequently occur in age group of 40-69 (Hoy et al., 2012). It is a common condition that affects an estimated 70% to 80% of adults at same points during their lifetimes (Tavafian, 2005).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).

LBP 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, 2000)

Pain in the low back area is a common phenomenon . It is a primary cause of disability & work loss for chronic Low back pain patients and results in direct and indirect social costs (Fujii & Matsudaira, 2013). 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 lumber disk herniation is the most regular condition of the backbone degenerative procedures, and they cause of 30% to 80% of the lower back problems cases (Miller et al, 2006).

The cause of LBP depends on different factors. Hills (2006) mention that the mechanical low back pain is the most common cause of work related occupational disability. Low back pain 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 low back pain although disk protrusion and herniation have been popularized as cause of LBP (Wheeler, 2007).

## **1.2 Rationale**

The incidence of Low Back Pain is more frequently occur in age group of 40-69 (Hoy et al., 2012). Low back pain 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. 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, neural mobilization, bent leg raise exercise 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, bent leg raise technique, orthotics, ergonomics etc.

In this area of bent leg raise technique there are few researches published and in Bangladesh, no research has been published yet to find out the efficacy of bent leg raise exercise along with conventional physiotherapy comparing with only conventional physiotherapy.

The study is designed to investigate the efficacy of bent leg exercise for the treatment of Low Back Pain.

The study will help other physiotherapist to know the actual effectiveness of this treatment approach.

### **1.3 Hypothesis**

Bent leg raise exercise along with conventional physiotherapy is more effective than only conventional physiotherapy for the management of patient with chronic radiating Low Back Pain.

### **1.4 Null hypothesis**

Bent leg raise exercise along with conventional physiotherapy is no more effective than only conventional physiotherapy for the management of patient with chronic radiating Low Back Pain.

## **1.5 Aim of the study**

The aim of the study is to find out the effectiveness of Bent leg raise exercise along with conventional physiotherapy for the management of patient with chronic radiating Low Back Pain.

## **1.6 Objectives of the study**

### **General objective**

To identify the therapeutic effectiveness of Bent leg raise exercise for the treatment of chronic radiating Low Back Pain.

### **Specific Objectives**

1. To determine the socio-demography of Low Back Pain.
2. To analyze the efficacy of Bent leg raise exercise in reducing pain of the patients with chronic radiating Low Back Pain
3. To identify the effectiveness of Bent leg raise exercise in reducing disability and improving functional ability of the patient with chronic radiating Low Back Pain.

## **1.7 Operational Definitions**

### **1.7.1 Low Back Pain**

Low back pain refers to pain felt in lower back. It may also have back stiffness, decreased movement of the lower back, and difficulty standing straight.

### **1.7.2 Mechanical Low Back Pain**

Mechanical low back pain is defined as low back pain not attributable to recognizable, known specific pathology (eg, Tumor, Infection, osteoporosis, Lumber spine fracture etc).

### **1.7.3 Chronic Low Back Pain**

LBP which lasts for more than 3 months is called chronic LBP and most of the costs are associated with persistent or chronic LBP (Alsaadi et al., 2011).



#### **1.7.4 Radiating Low back pain**

Pain in the lumbosacral area of the spine surrounding the distance from the 1st lumbar vertebrae to the 1st sacral vertebrae (12th rib to the inferior gluteal fold) and its radiation towards lower limb.

#### **1.7.5 Bent Leg Raise Exercise**

The Mulligan's bent leg raise (BLR) technique is a method of stretching which is painless in nature. It consist of gentle stretching of hamstring muscles performed in a specific direction progressively towards hip flexion.

The BLR technique consist of three repetitions of pain free, 5s, isometric contraction of the hamstrings, performed in five progressively greater positions of hip flex. The Mulligan bent leg raise (BLR) technique is used for improving range of straight leg raise (SLR) in subjects with LBP and/or referred thigh pain and also in order to improve flexibility of hamstring in clients with tight hamstrings. The intention of this technique is to restore normal mobility and reduce LBP and physical impairment. It stretches the lower extremity muscles in combination of hamstring, adductors and rotators.

#### **1.7.6 Conventional physiotherapy**

Physiotherapy interventions that are widely accepted and practiced by the mainstream medical community are called Conventional Physiotherapy. The researcher formulated a list of evidence based physiotherapy interventions of Low back pain and provided those to the physiotherapist to mark the interventions commonly used as conventional physiotherapy for low back.

### **1.8 Variables**

#### **Independent variable:**

1. Bent Leg Raise Exercise along with conventional physiotherapy.
2. Conventional physiotherapy.

#### **Dependent variable**

1. Chronic radiating Low Back Pain.

Pain is a defense mechanism of the body to create an awareness of the subject to protect the injured part from further damage. Low back pain more accurately called lumbago or lumbosacral pain occurs below the 12th rib and above the gluteal fold (Sikiru & Hanifa, 2010). 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, 1994).

Low back pain is often described as sudden, sharp persistent or dull pain felt below the waist. It is difficult to describe low back pain. It may refer to complex symptoms in which pain is either localized to the lumbar spine or referred to the legs or feet and where other specific conditions causing such pain have been excluded (Hoque, 2005).

Low back pain has several different possible causes: strain on the muscles of the lower back may be caused by obesity; pregnancy; or job-related stooping, bending, or other stressful postures (Walker et al., 2009). According to the anatomical view, the term LBP refers to pain in the lumbosacral area of the spine encompassing the distance from 1st lumbar vertebra to 1st sacral vertebra. This is the area of the spine where the lordotic curve forms. The most frequent site of LBP is in the 4th and 5th lumbar segment (Kravitz et al., 2011).

Low back pain defined as tiredness, discomfort or pain, in the low back area (between the bottoms of ribs, at the back, top of the lower limb) with or without radiating pain on the legs.

According to Manusov (2012), Low back pain 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.

LBP is specific if its cause can be shown (e.g. infection, tumor, osteoporosis, ankylosing spondylitis, fracture, inflammatory process, radicular syndrome or cauda equine syndrome) and non-specific LBP if not attributed to recognizable, known specific pathology (van Tulder et al., 2006).

LBP 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 LBP 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., 2002).

LBP is one of the commonest causes of disability in the working population. Disability due to LBP has been defined as restricted functioning, involving limitation of activity and restriction of participation in life situations. Disability often accompanies LBP, varies in extent and may be temporary or even permanent (Waddell, 2004). 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 LBP according to tissue healing 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, 2002).

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 LBP 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 low back pain (Freeman et al, 2005).

Any of the structures of the lumbar spine that receives innervation could be a source of LBP. Thus pain could arise from the ligaments, muscles, tendons, fasciae, joints, vertebral bodies, nerves, dura or discs of the lumbar spine. (Bogduk & McGuirk, 2002). Radicular pain may be 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 low back pain classified as in three relatively simple categories that are postural syndrome, dysfunction symptom and derangement syndrome.

Freeman et al (2005) proposed that there are several possible non-mechanical causes of low back pain such as small fracture to the spine from osteoporosis, low back pain 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 low back pain. In some cases psychological factors can lead to low back pain.

There are numerous risk factors assumed to be related to LBP. Epidemiological studies have generally divided these factors into three dimensions: individual and life style factors, physical or biomechanical factors and psychosocial factors (Ferguson & Marras, 1997). Individual factors such as age, gender, anthropometric measures and muscle strength and flexibility have been considered as possible risk factor for LBP. Factors related to lifestyle such as smoking and obesity have been shown to be risk factors for LBP (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 prolanger or repeated bending, driving, sitting and twisting have been considered to be associated with back pain and disc prolapse (Vingard et al, 2000). In addition people dissatisfied with their work, low social support, low job control and low supervisor support in workplace are more likely to report LBP (Kaila-Kangas et al, 2004).

Symptoms of low back pain depend on the cause. In case of back sprain or strain Muscle spasms, cramping, and stiffness, Pain in the back and buttocks. Certain movements make it worse, and resting makes it feel better. The worst pain usually lasts 48 to 72 hours and may be followed by days or weeks of less severe pain. In case of Nerve-root pressure if leg pain extends below the knee, it is more likely to be due to pressure on a nerve than to a muscle problem. Most commonly, it's a pain that starts in the buttock

and travels down the back of the leg as far as the ankle or foot. In case of nerve-related problems, such as tingling, numbness, or weakness in one leg or in the foot, lower leg, or both legs. Tingling may begin in the buttock and extend to the ankle or foot. Weakness or numbness in both legs, and loss of bladder and/or bowel control, are symptoms of cauda-equina syndrome, which requires immediate medical attention (Sultana, 2012).

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 LBP history, clinical examination, neurophysiological and radiological studies (Nachemson, 2000).

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 low back pain, 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 LBP, 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 (van Tulder et al, 2006).

Lumbar supports (braces or orthoses) are used to prevent back injuries and also as a treatment for people with low back pain. Several potential mechanisms of action of lumbar supports are reported in the literature that may support their use in the treatment of low back pain. 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 low back pain. The exercise was to have been supervised or “prescribed” (Koes et al 2006). A recent study examined systematic reviews provided strong

evidence that exercise programs reduce pain and disability in people with non-specific LBP (Swinkels et al, 2009).

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 LBP (van Tulder et al., 2006), Spinal mobilization involves low-velocity, passive movements within or at the limit of joint range (Brox et al., 2006). 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 (van der Heijden et al., 1995).

Massage can be defined as soft tissue manipulation using the hands or a mechanical device (Furlan et al., 2002). 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. The application of heat is thought to have beneficial effects on blood circulation and muscle stiffness. By these mechanisms it may result in relaxation, pain relief and improvement in functional disability.

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, 2001). The approach seemed to be an effective treatment for patients with

chronic LBP, but it is unknown what type of patients benefit from what type of behavioral treatment (van Tulder et al., 2006).

In McKenzie method the therapy of Low Back Pain 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).

The Mulligan’s bent leg raise (BLR) technique is a method of stretching which is painless in nature. It consist of gentle stretching of hamstring muscles performed in a specific direction progressively towards hip flexion. Mulligan’s BLR technique involves hip flexion results in caudal loading of lumbosacral nerve roots and sciatic nerve in the pelvis which has unloaded cranially during hip extension (Khuman et al., 2014).

Mulligan’s (2004) found that Mulligan bent leg raise (BLR) technique is used for improving range of straight leg raise (SLR) in subjects with LBP and/or referred thigh pain and also in order to improve flexibility of hamstring in clients with tight hamstrings. The intention of this technique is to restore normal mobility and reduce LBP and physical impairment. It stretches the lower extremity muscles in combination of hamstring, adductors and rotators.

Hanten (1994) suggested that clinicians use BLR for the treatment in the low back and the improving SLR mobility reduces the degree of impairment in LBP.

Dixon and Keating (2000) suggest that improvement in range of SLR must be greater than 6 degree to state that a real change in SLR range has occurred. Consequently, the change in range produced by the BLR is of clinical relevance only 24 h after the intervention.

BLR is a part of manual therapy that has been reported to be an effective intervention for certain condition including low back pain, sciatica (Kutty et al., 2014).

Mulligan (2006) proved that the traction straight leg raise (TSLR) and bent leg raise (BLR) techniques, which are said to improve range of motion of hip flexion in patients with low back pain. Indications for use of Mulligan’s Traction Straight Leg Raise and Bent Leg Raise techniques are limited range of motion of hip flexion together with low



back pain with or without referred leg pain. The Traction Straight Leg Raise and Bent Leg Raise techniques are painless interventions that are said to have immediate benefits.

Pawar and Metgud (2010) proved that the Mulligan bent leg raise (BLR) techniques has a great role in management of low back pain with radiculopathy and has long term effects for patient with non-specific low back pain.

This research was an randomized controlled trail (RCT) design to evaluate the effectiveness of Bent Leg Raise Exercise along with conventional physiotherapy comparing conventional physiotherapy alone for the management of pain and improvement of different functional activities of the patients with chronic radiating Low back pain .

To identify the effectiveness of this treatment regime, Numeric Pain Rating Scale (NPRS) and Oswestry Disability Index (ODI) ware used as measurement tools for measuring the pain intensity and how the pain affect different functional abilities to manage in everyday life.

### **3.1 Study Design**

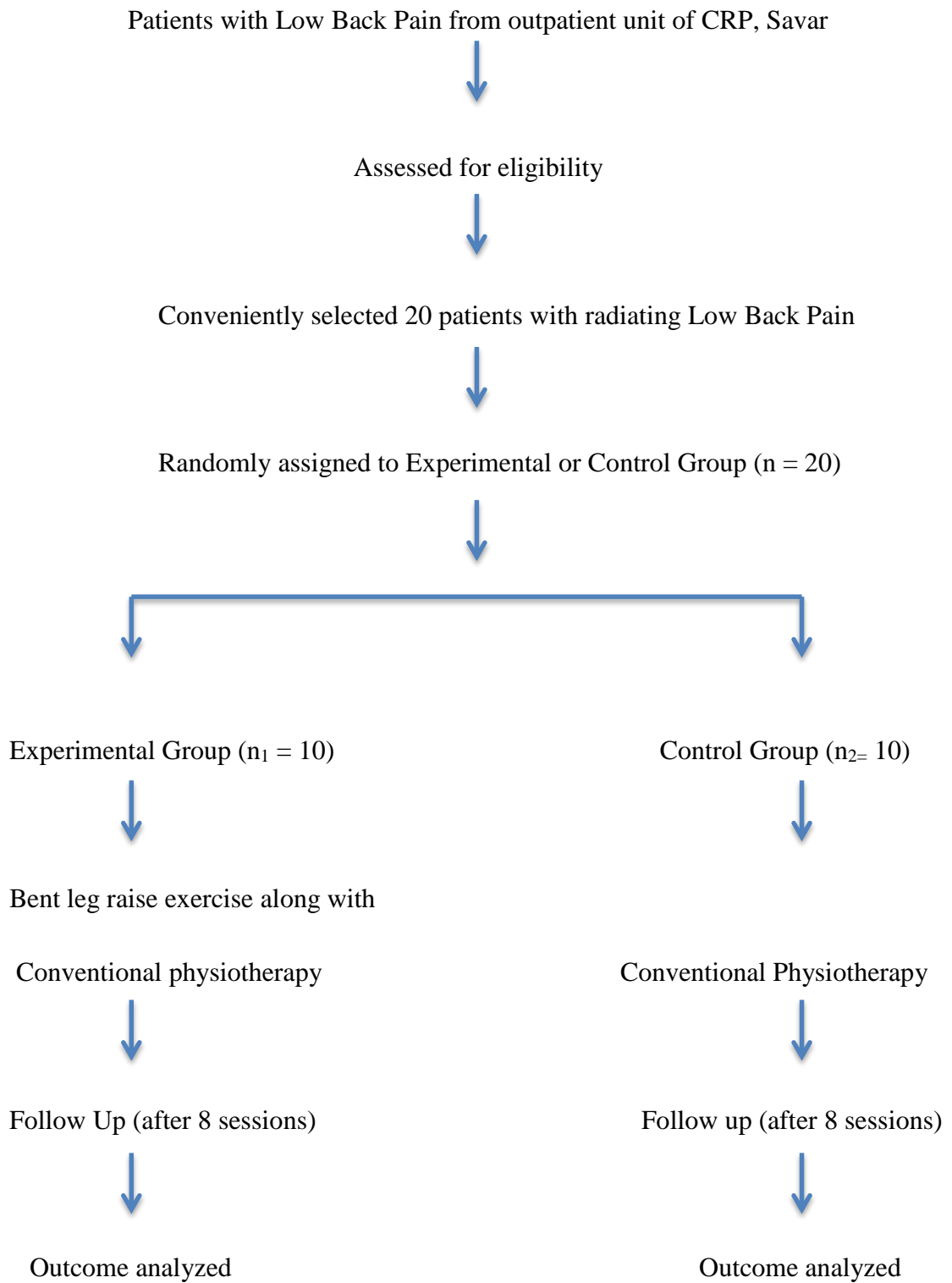
The study was conducted by Randomized Control Trail (RCT). 20 Patients were selected by simple random sampling from the musculoskeletal outpatient unit who meet the inclusion criteria. They were assigned by a randomization process done by using computer generated randomization technique. This study is a single blinded study. 10 patients with chronic radiating low back pain were assigned randomly as the experimental group receiving bent leg raise exercise along with conventional physiotherapy for their condition and other 10 patients were assigned to the control group who were receiving only conventional physiotherapy treatment for their condition.

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.

The study was designed using an experimental design quantitative research. According to DePoy & Gitlin (2013) the design could be shown by:

Experimental Group	:	R	O1	X	O2
Control Group	:	R	O1		O2

## Flow-chart of the phases of Randomized Controlled Trial



### **3.2 Study area**

The study area was Musculoskeletal Outpatient Unit of Physiotherapy Department of Centre for the Rehabilitation of the Paralyzed (CRP), Savar, Dhaka.

### **3.3 Study Population**

The study population was the patients diagnosed with chronic radiating Low Back Pain attended in the Musculo-skeletal Unit of Physiotherapy Department at CRP, Savar, Dhaka.

### **3.4 Sample size**

In this study, 20 participants were selected according to inclusion and exclusion criteria. 10 participants were in experimental group and 10 participants in control group.

### **3.5 Sampling Technique**

Randomly selection and assigned.

Subjects, who was met the inclusion criteria, was taken as sample in this study. 20 patients with chronic radiating Low Back Pain was selected from outpatient musculoskeletal unit of physiotherapy department of CRP, Savar and then 10 patients was randomly assigned to Experimental group comprising of treatment approaches of Bent leg raise exercise along with conventional Physiotherapy treatment and 10 patients to the only other Physiotherapy treatment for this study. The study was a single blinded technique. When the samples was collected, the researcher randomly assigned the participants into experimental and control group, because it improves internal validity of experimental research. The samples was given numerical number C1, C2, C3 etc. for the control group and E1, E2, E3 etc. for experimental group. Total 20 samples was included in this study, among them 10 patients was selected for the experimental group [received Bent leg raise exercise along with conventional physiotherapy treatment] and rest 10 patients was selected for control group (receive only conventional Physiotherapy treatment)].

### **3.6 Inclusion criteria**

1. Patient who is diagnosed by Chronic Low Back Pain & radiating up to below knee.
2. Mechanical cause of Low Back Pain and its radiation to the lower limb.
3. Age group:18-60 year (McKenzie, 1990)
4. Both sex.
5. All subjects with unilateral or bilateral radiation of pain in the sciatic nerve distribution.
6. Subject who are willingly participate.

### **3.7 Exclusion Criteria**

1. Patients with clinical disorder where Bent leg raise exercise is contraindicated.
2. Acute disc prolapse patient.
3. Any fracture of the lower limb.
4. Knee and ankle pathology causing limitation of movement.
5. Clinical conditions such as oversensitive skin, patients with cardiac pacemakers, pregnancy etc.
6. Diagnosis of secondary complications such as tumour, TB spine, fracture, dislocation and severe osteoporosis, Paget's disease.
7. All sorts of infection, Rheumatoid Arthritis, Ankylosing Spondylitis.
8. History of any malignant disease.
9. Subject with psychological low back pain.
10. Patients those are taking pain killer.

## **3.8 Methods of Data Collection**

### **3.8.1 Data Collection Tools**

In this particular study, a written questionnaire, pen, paper and a Numeric Pain Rating Scale (NPRS) and the Oswestry Disability Index (ODI) were used as a data collection tools.

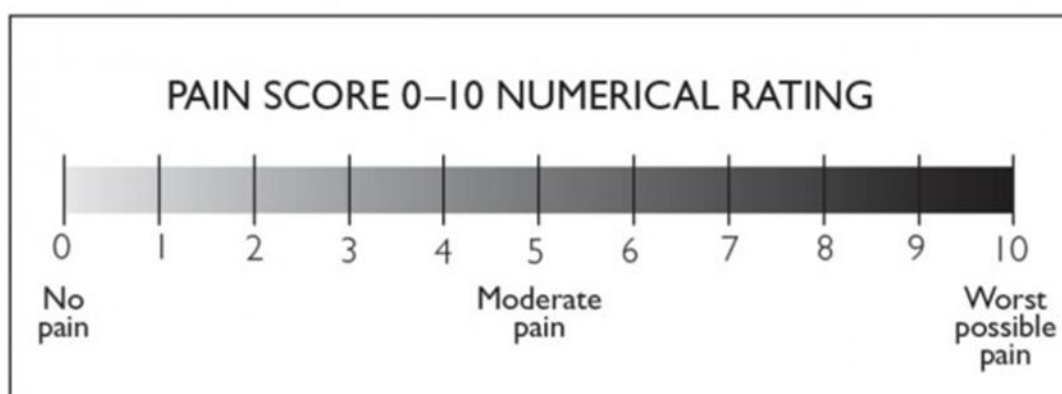
### **3.8.2 Questionnaire-**

The questionnaire for this study was carefully developed under the constant observations, advice and permission of the supervisor following certain guidelines. There were close ended questions with Numeric Pain Rating Scale (NPRS) and the Oswestry Disability Index (ODI) Disability Questionnaire with some objective questions which were measured by the examiner and each question was formulated to identify the effect of Bent leg raise exercise along with the conventional physiotherapy for the treatment of chronic radiating low back pain.

### 3.9 Measurement Tools

#### 3.9.1 Numeric Pain Rating Scale (NPRS):

The Numeric Pain Rating Scale (NPRS) is a segmented numeric version of the visual analog scale (VAS) in which a respondent selects a whole number (0–10 integers) that best reflects the intensity of the individual’s pain (Rodriguez, 2001). According to McCaffery et al. (1989) and later on Stevens, Lin, & Maher, (2016) the Numeric Pain Rating Scale (NPRS -11) is an 11-point scale for the patient self-reporting of pain. It is for adults and children of 10years old or older (McCaffery & Beebe , 1989).



#### 3.9.2 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. The Oswestry disability index (ODI) was included 10 sections of questions. The sections had selected from experimental questionnaires that aimed to assess several aspects of daily living. The ODI domains were the following: pain intensity, personal care, lifting, walking, sitting, standing, sleeping, sex life and social life. Each section contained six statements that were scored from 0 (minimum degree of difficulty in that activity) to 5 (maximum degree of difficulty). If more than one statement was marked in each section, the highest score should be taken. The total score is obtained by summing up the scores of all sections, giving a maximum of 50 points.



### **3.10 Data Collection Procedure**

The data collection procedure was carried away by an examiner who has no connection with this research. This procedure conducted through assessing the patient on the basis of inclusion and exclusion criteria, randomization through using Microsoft Office 2013 plus Excel, pretest data collection, 8 treatment sessions and final post test data collection.

After screening the patient at department and randomization, the patients were assessed and treated by the qualified physiotherapist. Twenty participants were chosen based on the inclusion criteria and they were given 8 session of treatments individually. The randomization procedure was carried out by the data collector using Microsoft Office 2013 plus Excel and grouping procedure also carried out by using the same manner. Code 1C (10) for the control group and Code 2E (10) for the experimental or trial group. Experimental group received Bent leg raise exercise along with conventional physiotherapy and the control group participants only received conventional physiotherapy according to their condition.

A pilot study was carried out prior to the main data collection procedure to determine the responsiveness and side effect of the exercise as it is applied to the chronic radiating Low back pain patients.

Data was gathered through a randomization, pretest, and intervention and post-test procedure and by using a written questionnaire form which was formatted and prepared by the researcher under the supervision of the supervisor which also includes the Numeric Pain Rating Scale (NPRS) to measure pain intensity level and Oswestry Disability Index (ODI) to measure the disability level. Pretest was performed before the intervention and the same procedure was performed to collect the post-test data. The researcher gave vague instruction to the data collector how to proceed with the questionnaire and the scales used in that. A Bangla questionnaire of Oswestry Disability Index (ODI) was used as the participants are native Bangla speaker and the Bangla translation of was used with the permission from the Developers of the questionnaire.

The data collector collected the data both in experimental and control group in presence of the qualified physiotherapist in order to reduce the biasness. The patient was totally blind about the procedure and the researcher has no connection with the data collection procedure. The data collector only gave her the participants filled up questionnaires. At the end of the trail, specific test were performed for statistical analysis.

### **3.11 Data analysis**

In order to ensure that the research have some values, the meaning of collected data has to be presented in ways that other research workers can understand. In other words the researcher has to make sense of the results. As the result came from an experiment in this research, data analysis was done by using the software named Statistical Package for Social Science (SPSS) version 20.

*Mann Whitney U test and Wilcoxon test* had used to analysis the collected data. All participants were code according to group to maintain participant's confidentiality and both the experiment and control group participants score their pain intensity on the Numeric Pain Rating Scale (NPRS) and disability level through Oswestry Disability Index (ODI) prior to the trial and after the intervention sessions. Reduction of pain intensity level for both groups and improvement of functional disability are the differences between pre-test and post-test score and it should be analysed with the help of U test. The Mann-Whitney U and Wilcoxon tests were used for the analysis after 8 session of treatment.

The U test was done for the analysis of the pain and disability after eight session treatment of both control and experimental groups. Experimental studies with the different subject design where two groups are used and each tested in two different conditions and the data is ordinal should be analyzed with Mann-Whitney U test.

Mann-Whitney U test is a non-parametric test that is simply compares the result obtained from the each group to see if they differ significantly. This test can only be used with ordinal or interval/ ratio data.

*Wilcoxon matched pair signed rank test* was performed for the analysis of the pain and disability within group data.

When there are two measures to be compared from the same case and the data are not normally distributed, then *Wilcoxon test* is applied.

The study has an experimental study and has unmatched groups of different participants, who was randomly assigned by computer generated random allocation using Excel to conventional physiotherapy along with bent leg raise exercise and only conventional physiotherapy group.

### 3.12 Significant level

To find out the significant level of the study, it is undoubtedly important to calculate the “P” (Probability) value. This experimental study hypothesis was one tailed because it was producing a specific direction of the result.

A “P” values refer the probability of the results for the experimental study. The word probability refers to the accuracy of the findings. A ‘p’ value is called the level of significance for an experiment and If P value is < 0.05 which will be accepted by the researcher to show the significant result of the study to prove or support the hypothesis and reject the null hypothesis. ‘The statistical approach to determining sample size is the power calculation. Statistical power is a measure of how likely the result is to produce a statistically significant result for a difference between groups of a given magnitude’. Statistical test of significant apply probability theory to work out the changes of obtaining the observer result the significance levels of 0.05, 0.01, 0.001 are commonly used an indicated of statistically significant difference between variables (Bowling, 2014).

Calculating the degree of freedom from the formula:

$$\text{Degrees of freedom (df)} = (n_1 - 1) + (n_2 - 1) = (10 - 1) + (10 - 1) = 18$$

Df	0.1	0.05	0.25	0.01	0.005	0.0005
18	25.99	28.87	31.53	34.81	37.16	44.435

**Table-1: Level of significance for one tailed hypothesis**

### **3.13 Ethical consideration**

A power point presentation was done for the approval of the research proposal in front of the teachers of BHPI, CRP. After that presentation, a supervisor was selected to conduct this research under his close supervision and guideline. Again before beginning the data collection, researcher has obtained the permission from the concerned authorities ensuring the safety of participants. The whole process of this research project was done by following the Bangladesh Medical Research Council (BMRC) guidelines and World Health Organization (WHO) Research guidelines. In order to avoid ethical claims, the participants were set free to receive treatment for other purposes as usual. Each participant was informed about the purpose and goal of the study before collecting data. The information regarding the study had kept confidential and after the study all the documents had been destroyed.

### **3.14 Informed Consent**

A signed informed consent was ensured from every participants prior to the beginning of the trial and the data collector. The researcher obtained consent to participate from every subject. All participants stopped taking medicine willingly for the particular trial period and that was known prescribed by the responsible physiotherapist. All participants are informed that they have full authority over the decision. Participants were informed that they were completely free to decline answering any questions during the study and were free to withdraw their consent and terminate participation at any time. Withdrawal of the participation from the study, it would not affect their treatment in the Physiotherapy Department and they would still get the same facilities and treatment according to their condition.

Every subject had the opportunity to discuss their problem with the senior authority or administration of CRP and have any questioned answer to their satisfaction. Any query or questions related to the study or participation would be welcomed by the researcher herself.

### **3.15 Treatment Protocol**

#### **3.15.1 Control Group Treatment Protocol**

##### **Conventional Physiotherapy:**

1. Lumber Mobilization
2. Maitland Mobilization
3. Back muscle strengthening
4. Soft tissue technique
5. IRR
6. Core muscle strengthening
7. Lumber Traction

#### **3.15.2 Experimental Group Treatment Protocol**

##### **Mulligan's Bent Leg Raise Exercise Procedure:**

Every patient of experimental group was given the Mulligan bent Leg Raise Exercise. Mulligan bent Leg Raise techniques were performed with the patient in supine. The subjects remain relaxed and comfortable on the bed.

##### **Procedure:**

The therapist position was stands at the limited hamstrings flexibility side of the supine subject on the bed. Then Therapist bent the patient's knee and Hip 90 degree flexion in position. At first Therapist place the patient's flexed knee over his (therapist's) shoulder and now asks the patient to push his leg on the therapist shoulder and then relax. At this point patients push his bent knee up as far as possible in the direction of his (therapist's) shoulder on the same side. Sustain this stretch for 30 seconds for 3 repetitions. And again therapist increase range and further patient push his leg on the therapist shoulder. And same procedure is done for the other side of limited hamstrings flexibility.



**Figure-1: Patient's Position.**



**Figure -2: Starting position**



**Figure-3: Ending position**

Three repetitions of pain free isometric contraction of the hamstring performed in progressively of Hip flexion position. With the Bent knee over the therapist shoulder include a traction component with this technique.

### **3.16 Rigor of the study**

The rigorous manner was maintained to conduct the study. The study was conducted in a clean and systemic way. During the data collection it was ensured participants were not influenced by the data collector. The answer was accepted whether they were negative or positive impression. No leading questions were asked or no important questions were avoided. The participant's information was checked by the supervisor to eliminate any possible errors. In the result section, outcome was not influenced by showing any personal interpretation. During conduct the study every section of the study was checked and rechecked by the research supervisor.

For this study 20 patients with Chronic radiating Low Back Pain were taken as sample from Musculo-skeletal out patient unit of Center for Rehabilitation of Paralyzed (CRP), Savar to explore the effectiveness of Bent leg Raise exercise for the treatment of Low Back Pain.

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

### Age Range

The majority of the participants 45% (n=9) were in “31-40” years of age followed by 20% (n=4) were in “41-50” years, 20% (n=4) were in “51-60” years and 15% (n=3) were in “21-30” years of age range group.

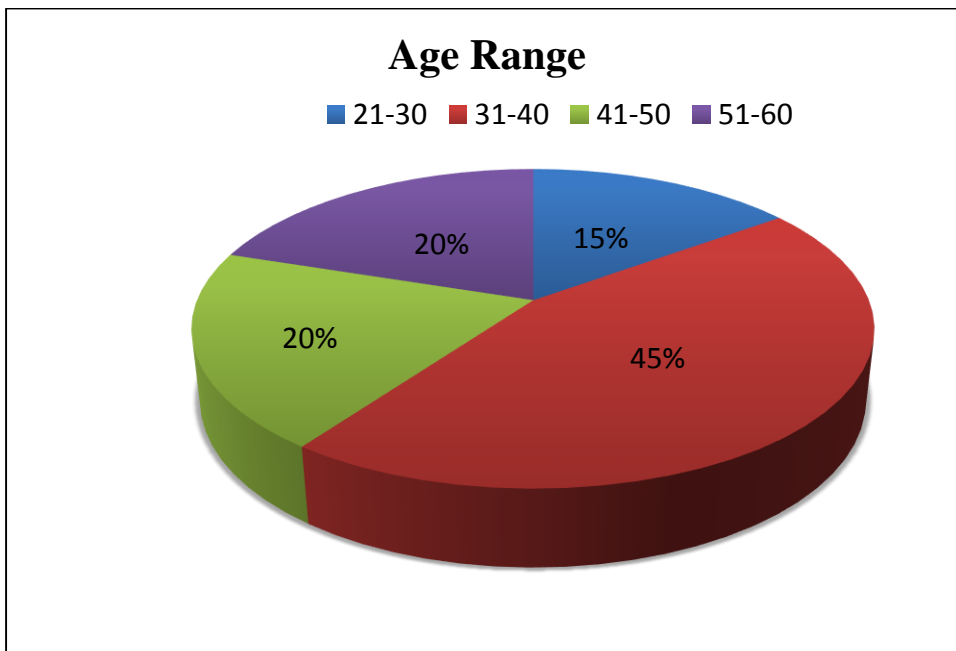


Figure -4: Age range of the participants



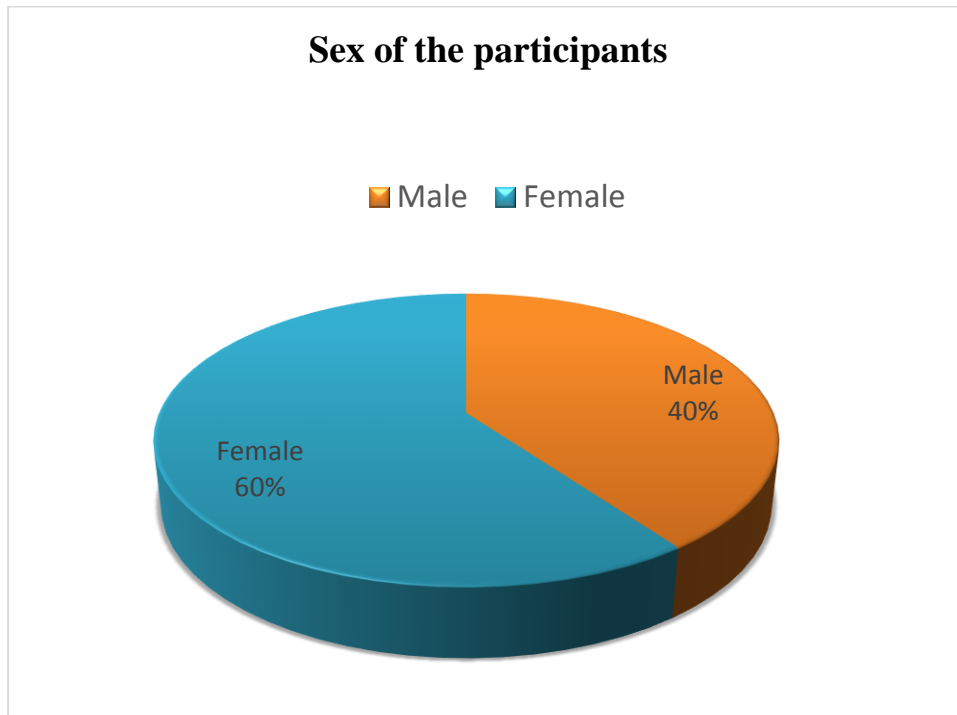
**Table 2: Mean age of the participants**

<b>Experimental Group</b>		<b>Control Group</b>	
<b>Subjects</b>	<b>Age (Years)</b>	<b>Subjects</b>	<b>Age (Years)</b>
E1	22	C1	35
E2	49	C2	35
E3	26	C3	40
E4	60	C4	52
E5	35	C5	22
E6	50	C6	40
E7	42	C7	52
E8	40	C8	40
E9	42	C9	60
E10	35	C10	40
<b>Mean Age</b>	<b>40.1 years</b>	<b>Mean Age</b>	<b>41.60 years</b>

In this study there were total 20 participants. Among them 10 were in experimental group and 10 were in control group. The mean age of experimental group is 40.10 years and the mean age of control group is 41.60 years.

## Sex of the Participants

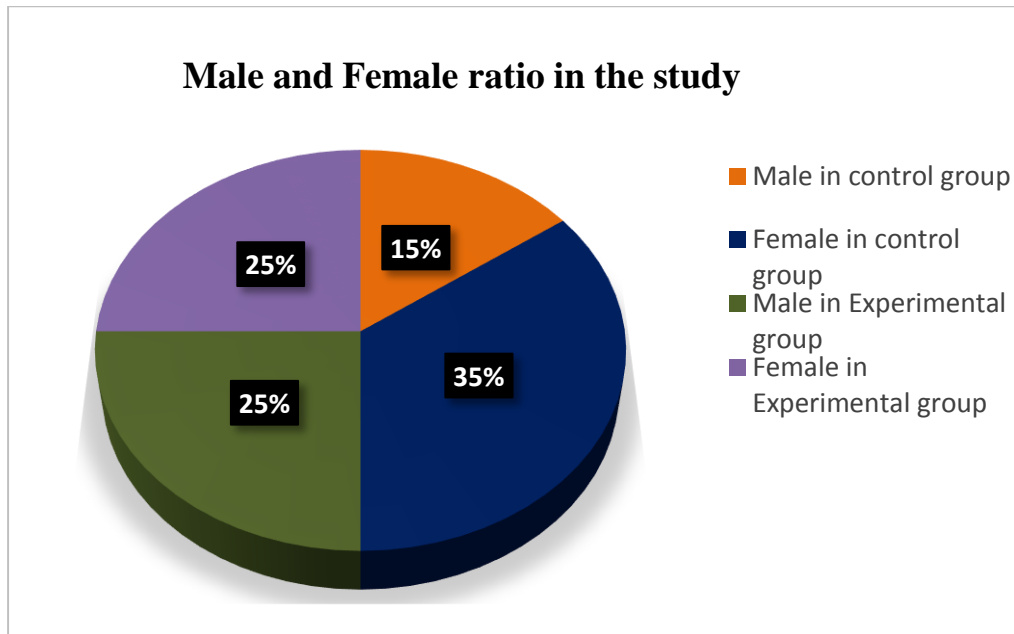
20 Patients with chronic radiating Low back pain were included as sample of the study, among them 60% (n=12) were Female and 40% (n=8) were Male.



**Figure – 5: Gender Distribution**

### Male and Female Percentage between groups:

Among them, In Experimental Group 25% (n=5) were Male and 25% (n=5) were Female and in Control Group 15% (n=3) were Male and 35% (n=7) were Female.



**Figure – 6: Male and Female Percentage between groups**

### Symptoms of Lower Limb Pain:

According to the patients opinion most of the patients 45% (n=9) feeling numbness, 30% (n=6) feels paresthesia , 10% (n=2) feels weakness of his/her lower limb ,5% (n=1) feels burning sensation 10% (n=2) feels all of the symptoms due to suffering from radiating low back pain.

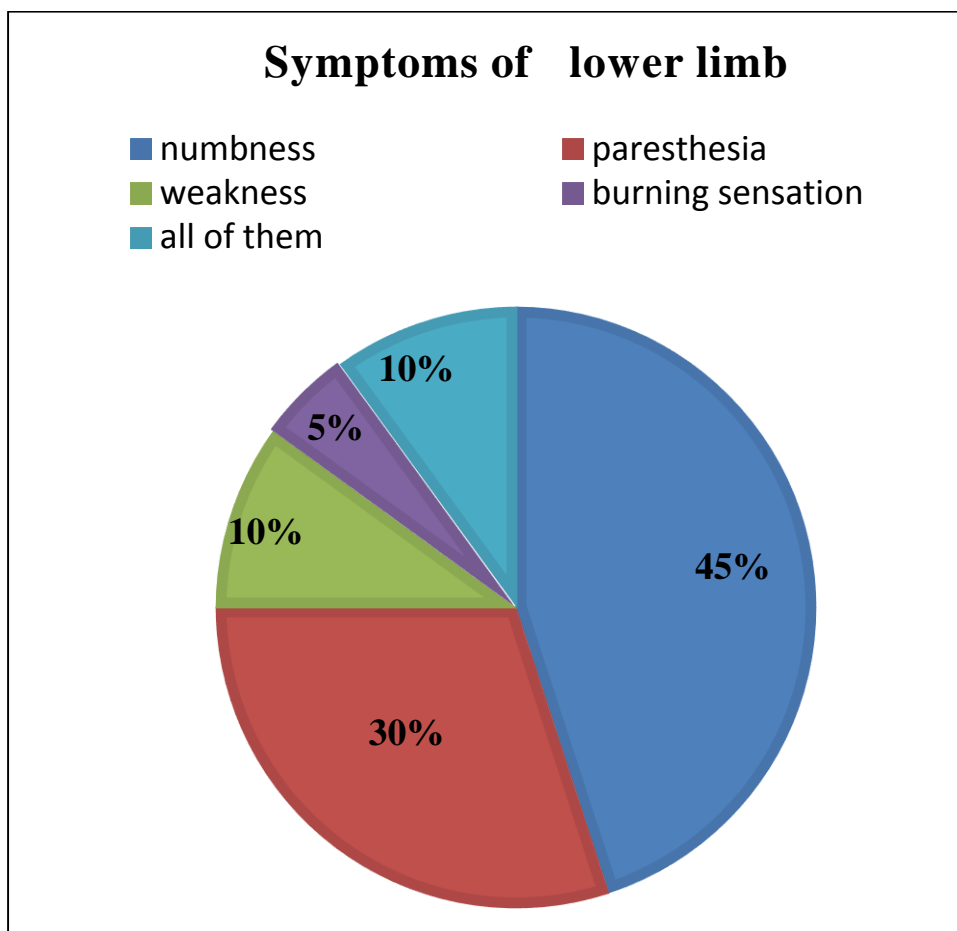


Figure 7: Symptoms of lower limb pain

## Causes of Low Back Pain

According to the patients opinion most of the patients 40% (n=8) suffering from low back pain due to unknown cause, 25% (n=5) due to injury/trauma, 20% (n=4) due to heavy weight lifting and 15% (n=3) due to unknown cause were suffering from low back pain.

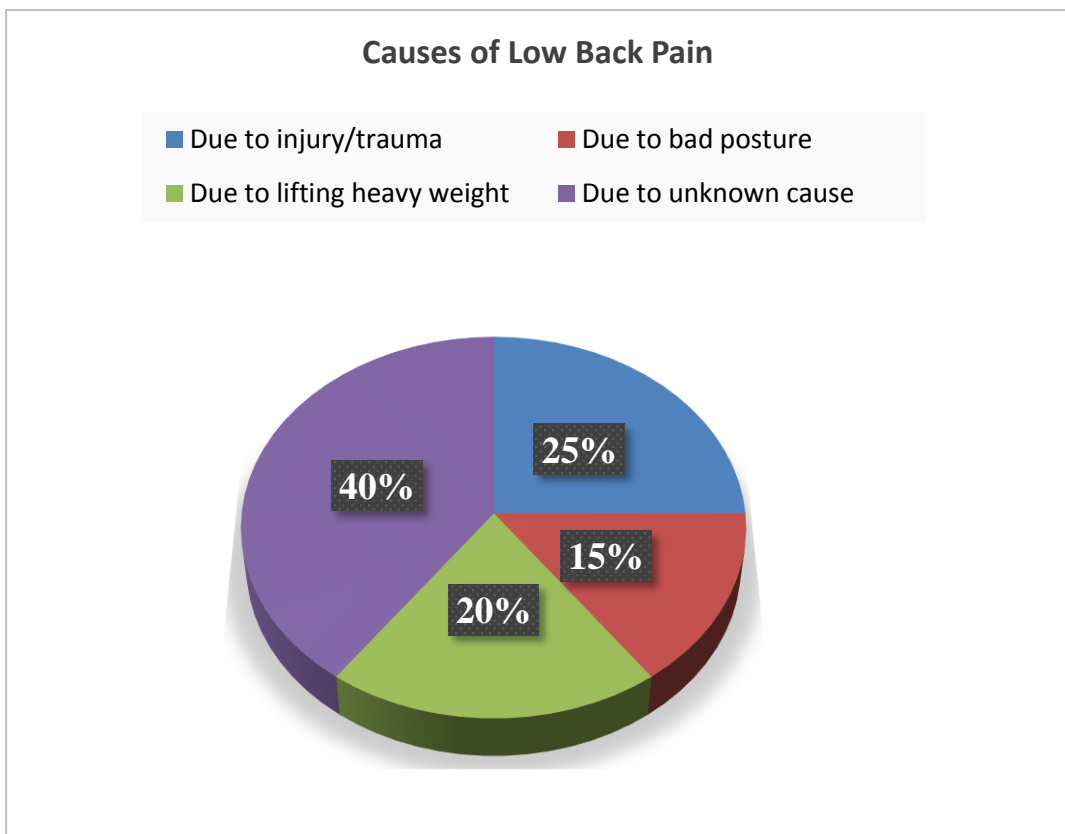
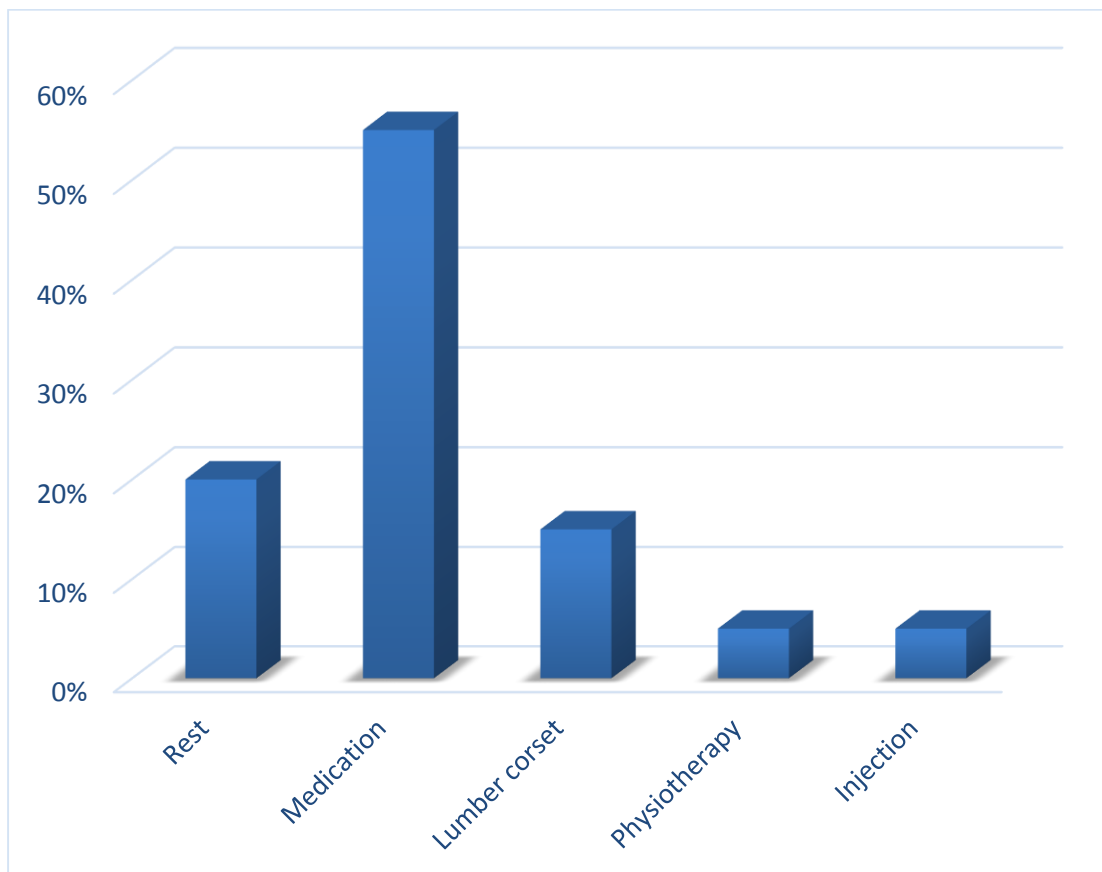


Figure- 8: Causes of low back pain

### Frequency of taking treatment previously

All the patient 55% (n=11) took Medication (pain killer) for low back pain. Among them 15% (n=3) used Lumber corset, 20% (n=4) took Rest, 5% (n=1) took Physiotherapy and 5% (n=1) took Injection therapy for their Low Back Pain previously. None of them had any operation or other treatment.



**Fig-9: Frequency of taking previous treatment**

## Pain progression

After taking previous treatment 55% (n=11) patients complained that their pain was not changing and 20% (n=4) patients complained that their pain was worsening. Only 25% (n=5) patients told that their pain was improving.

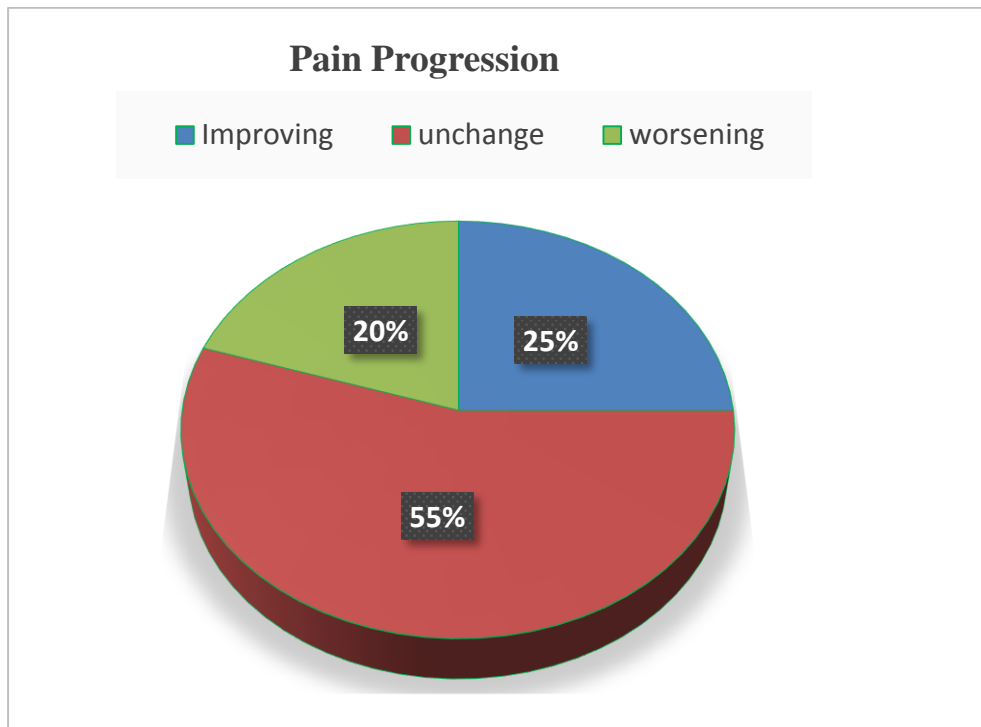


Figure -10: Pain Progression

**Pain and Disability related information :**

**Mann Whitney U test analysis of post- test pain condition among the participants ( Between Group Analysis).**

**Table-3: Analysis of posttest pain (Between group analysis)**

Numerical pain rating scale score	Category of the participant	Number	Mean of post- test pain	Mean Rank	Mean Whitney U score	P
	Control	10	4.40+1.074	14.35	11.00	0.001
	Experimental	10	2.30+0.675	5.50		
	Total	20				

From this data, it can be concluded that pain reduction score on the Numerical Pain Rating Scale (NPRS) in experimental group was statistically significantly higher than the control group ( $U = 11.00, p = .001$ ).

An examination of the findings in Table shows that the results of the Mann Whitney U test applied to the post-test pain score of the participants in the experimental and control groups revealed a statistically significant difference at the level of  $p < 0.01$  ( $p = .001 < 0.01$ ). The rank average of the post-test pain scores of the experimental group participants was 5.50, while participants in the control group had a posttest pain score rank average of 14.35. The analyses had shown rank averages of the posttest trial and control group pain scores demonstrates that the participants in the experimental group had reduced pain sensation score on the Numerical Pain Rating Scale (NPRS) than those in the control group. This result indicates that the experimental group participants who have received Bent Leg Raise Exercise 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.



**Mann Whitney U test analysis of post- test disability condition among the participants ( Between Group Analysis).**

**Table-4: Analysis of post- test disability (Between group analysis)**

Oswestry Disability Index(ODI)	Category of the participant	Number	Mean of post- test pain	Mean Rank	Mean Whitney U score	P
	Control	10	34.00+6.055	15.25	2.500	0.000
	Experimental	10	18.20+4.185	5.50		
	Total	20				

The above mentioned tabulated data, it can be concluded that disability reduction score on the Numerical Pain Rating Scale (NPRS) in experimental group was statistically significantly higher than the control group ( $U = 2.500, p = 0.000$ ).

An examination of the findings in Table shows that the results of the Mann Whitney U test applied to the post-test disability score in ODI of the participants in the experimental and control groups revealed a statistically significant difference at the level of  $p < 0.01$  ( $p = 0.000 < 0.01$ ). The rank average of the posttest disability scores of the experimental group participants was 5.50, while participants in the control group had a posttest pain score rank average of 15.25. The analyses had shown rank averages of the posttest experimental and control group disability scores in ODI demonstrates that the participants in the experimental group had reduced disability level score on ODI than those in the control group. This result indicates that the experimental group participants who have Bent Leg Raise Exercise received 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.

## Reduction of pain in control group

Reduction of pain is shown in the chart

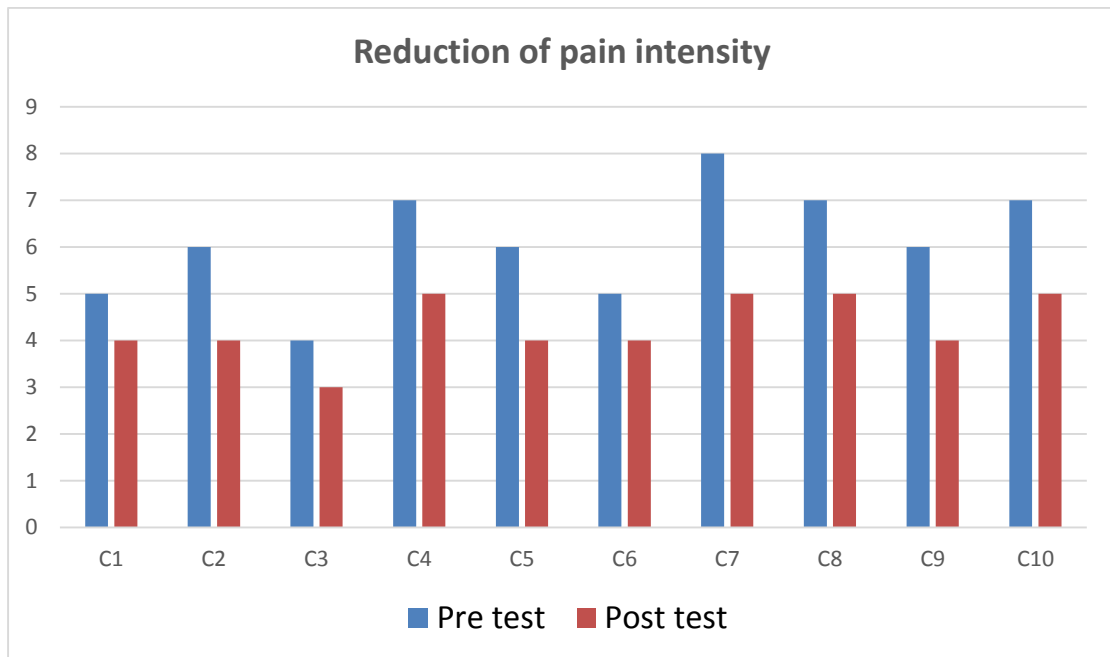


Figure – 11: Reduction of Low Back Pain on NPRS in Control Group

## Mean Reduction of Back Pain in Control Group

The mean of pain reduction in back between pre-test and post-test of control group are 6.14 and 4.3.

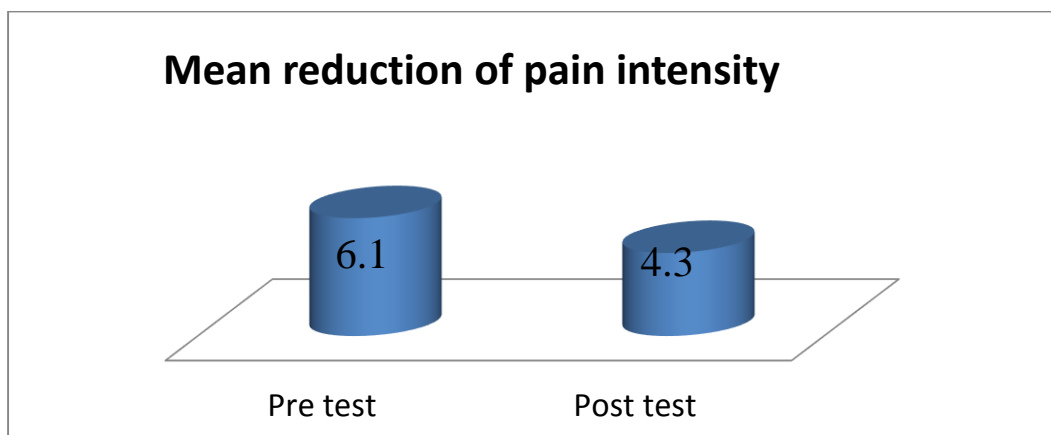


Figure – 12: Mean Reduction of Back Pain on NPRS

### Reduction of Back Pain in Experimental Group

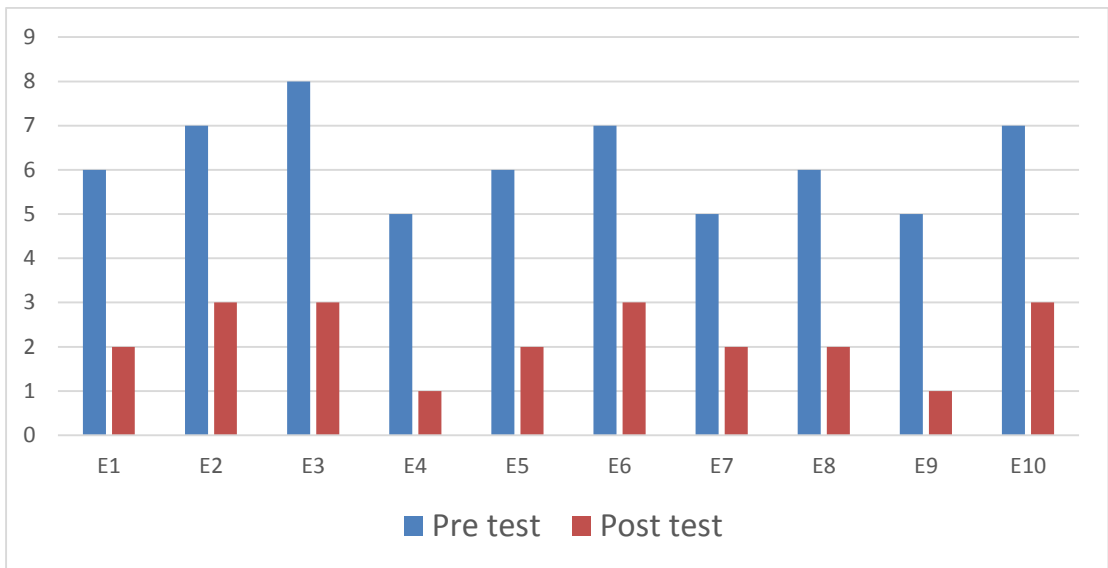


Figure – 13: Reduction of Pain at Lower Back in Experimental Group

### Mean Reduction of Back Pain in Experimental Group

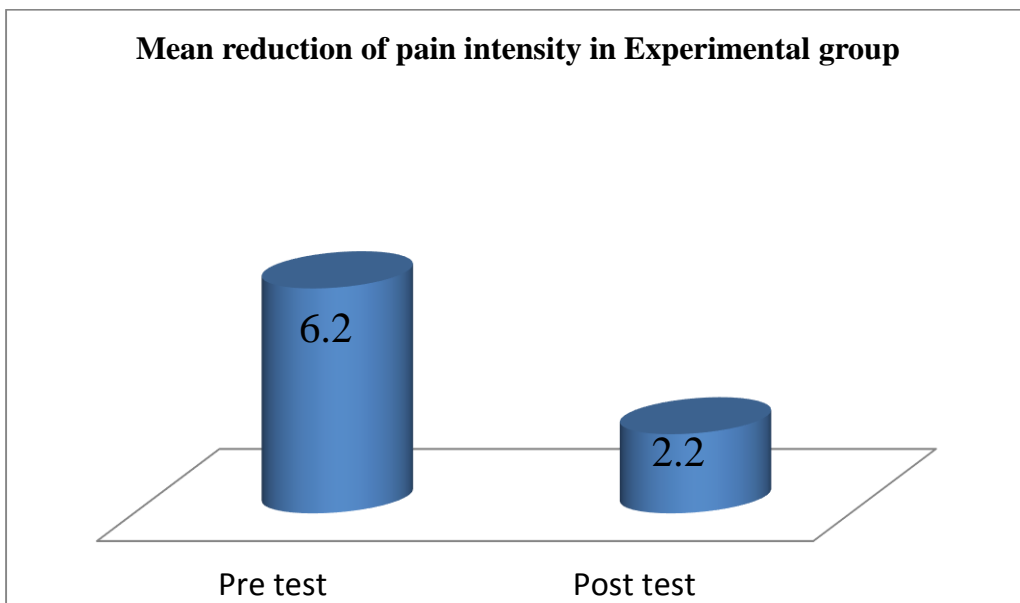


Figure -14: Back Pain in experimental Group Mean NPRS

### Reduction of disability in experimental group

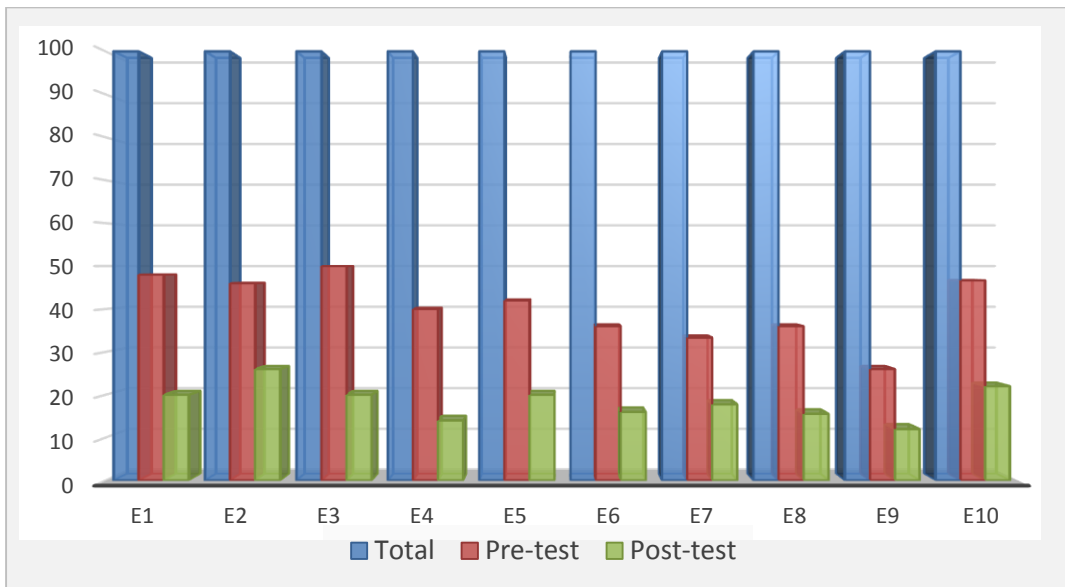


Figure – 15: ODI Score in Experimental Group

### Reduction of disability in control group

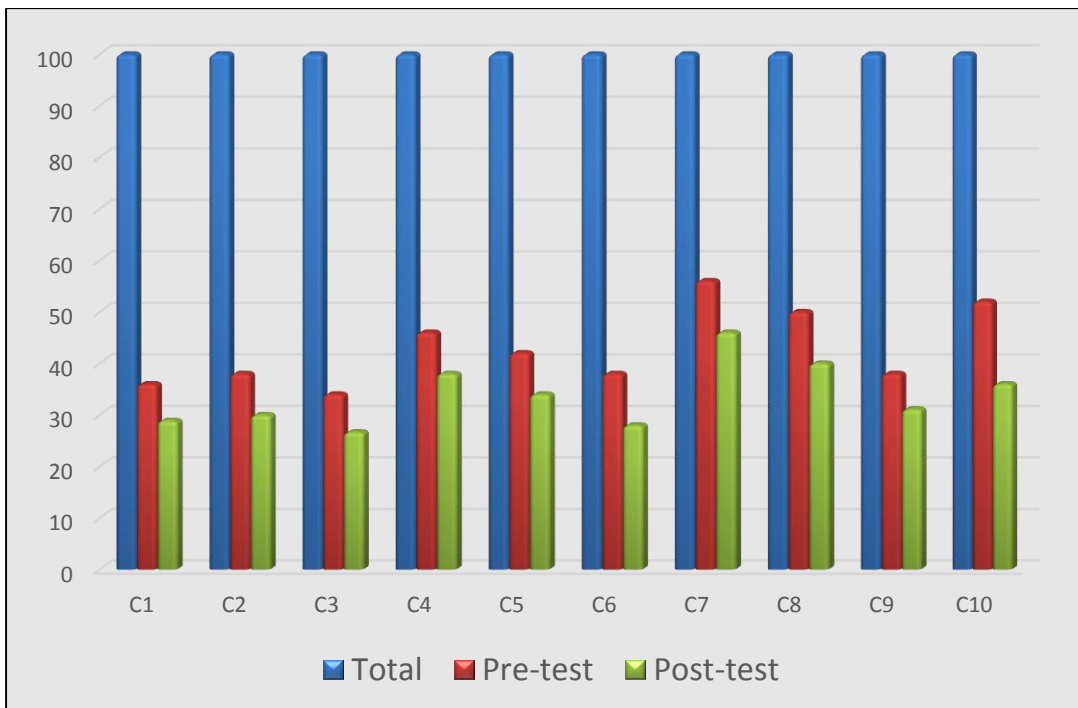


Figure-16: Reduction of disability in control group

**Patient rated general pain within the experimental group:**

**Table-5: Rank and test statistics of patient rated general pain in the experimental group**

Pain at resting position (cm) post-test - Pain at resting position (cm) post-test	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	5.55	55.00	-2.859	0.001
Ties	0				
Total	10				

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 Bent Leg Raise Exercise along with conventional physiotherapy given to them. 10 participants of experimental group had higher score before the intervention and the pain score reduced after the application of the Bent Leg Raise Exercise along with conventional physiotherapy. In addition, no participant has experienced increase of pain after the treatment session in experimental 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 <0.01 which that there is less than a 1% chance that the results are due to random error and it is significant. Therefore it is can be said that, the hypothesis is accepted and the null hypothesis is rejected.

**Patient rated general pain within the control group:**

**Table- 6. Patient rated general pain within the control group**

Pain at resting position (cm) post-test - Pain at resting position (cm) post-test	N	Mean Rank	Sum of Ranks	Test Statistics (Wilcoxon Signed-Rank Test)	
				Based on positive ranks Z	P
Positive rank	0	0.00	0.00		
Negative rank	10	5.50	55.00	-2.873	0.001
Ties	0				
Total	10				

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 <0.01 which that there is less than a 1% chance that the results are due to random error and it is significant. Therefore it is can be said that, the hypothesis is accepted and the null hypothesis is rejected.

**Patient rated general disability in ODI within the control group.**

**Table-7: Rank and test statistics of patient rated general disability in ODI within the control group.**

Disability score in ODI at post-test - Disability score in ODI at pre test	N	Mean Rank	Sum of Ranks	Test Statistics (Wilcoxon Signed-Rank Test)	
				Based on positive ranks Z	P
Positive rank	0	0.00	0.00		
Negative rank	10	5.50	55.00	-2.820	0.001
Ties	0				
Total	10				

Table described the comparison of the participants before (pretest) and after (post-test) disability score in ODI. The table’s legend displayed that in the control group none of the participant’s experienced increased disability level or score after only physiotherapeutic intervention (conventional physiotherapy) is given to them. 10 participants of conventional physiotherapy (control group) had higher score in ODI before the intervention and the disability score reduced after the application of the only conventional physiotherapy. In addition, no participant has experienced increase of disability level after the treatment session in control group so the positive rank numbers zero. The point ‘ties’ indicate that no patient’s disability score in ODI remained same as the pretest score. P value is <0.01 which that there is less than a 1% chance that the results are due to random error and it is significant. Therefore it is can be said that, the hypothesis is accepted and the null hypothesis is rejected.

**Patient rated general disability in ODI within the trail group:**

**Table-8: Rank and test statistics of patient rated general disability in ODI within the trail group.**

Disability score in ODI at post-test - Disability score in ODI at pre test	N	Mean Rank	Sum of Ranks	Test Statistics (Wilcoxon Signed-Rank Test)	
				Based on positive ranks Z	P
Positive rank	0	0.00	0.00		
Negative rank	10	5.50	55.00	-2.805	0.001
Ties	0				
Total	10				

Table described the comparison of the participants before (pretest) and after (post-test) disability score in ODI. The table's legend displayed that in the control group none of the participant's experienced increased disability level or score after the Bent Leg Raise Exercise along with physiotherapeutic intervention (conventional physiotherapy) are given to them. 10 participants of trail group had higher score in ODI before the intervention and the disability score reduced after the application of the Bent Leg Raise Exercise along with physiotherapeutic intervention (conventional physiotherapy). In addition, no participant has experienced increase of disability level after the treatment session in trial group so the positive rank numbers zero. The point 'ties' indicate that no patient's disability score in ODI remained same as the pretest score. P value is <0.01 which that there is less than a 1% chance that the results are due to random error and it is significant. Therefore it is can be said that, the hypothesis is accepted and the null hypothesis is rejected.



The purpose of the study was to evaluate the effectiveness of Bent Leg Raise Exercise with conventional physiotherapy compare to only conventional physiotherapy for the patients with Chronic Radiating Low Back Pain.

In this experimental study 20 patients were enrolled and 20 patients were randomly assigned to control group who receive only conventional physiotherapy. The rest of 10 patients were randomly assigned to experimental group who received Bent leg raise exercise along with conventional physiotherapy. Each group attended for eight sessions of treatment within four weeks in the Physiotherapy outpatient Unit of CRP, Savar in order to demonstrate the improvement. The outcome was measured by using Numeric Pain Measurement Scale (NPMS) for pain intensity and Oswestry Disability Index (ODI) for measuring disability.

In this study there were total 20 participants. The mean age of experimental group was 40.1 years and the mean age of control group is 41.60 years.

Pawar & Metgud in (2012) had a study on “Comparative Effectiveness of Mulligan’s Traction Straight Leg Raise and Bent Leg Raise in Low Back Ache with Radiculopathy” – A Randomized Clinical Trial. In their study there was 40 patients. The result of their study about age told that the mean age of experimental group was 41years and the mean age of control group is 45years.

The researcher found the male female ratio between 20 patients and 60% (n=12) were Female and 40% (n=8) were Male. Among them, In Experimental Group 25% (n=5) were Male and 25% (n=5) were Female and in Control Group 15% (n=3) were Male and 35% (n=7) were Female.

Pawar & Metgud in (2012) in their study found 37% (n=15) Male and 63% (n=25) female. Among them, In Experimental Group 15% (n=9) were Male and 35% (n=14) were Female, and in Control Group 22.5% (n=9) were Male and 27.5% (n=11) were Female.

The researcher found significant improvement ( $p = <.05$ ) of back pain in experimental group on NPRS. In Experimental group, the post-test Mean on NPRS was 2.20. Also there was significant improvement of pain in Back ( $p = <.05$ ), as the post-test mean were consecutively 2.2 and 3 times more in experimental group than control group.

In this study the researcher found a significant improvement in case of Disability on ODI. Mean difference reducing disability between pre-test and post-test of experimental group and control group were 33.86 and 18.36.

Phansopkar & Kage (2014) had a study on Efficacy of Mulligan's Two Leg Rotation and Bent Leg Raise Techniques in Hamstring Flexibility in Subject with Acute Non Specific Low Back Pain with 40 patients. In this study they found significant improvement in case of Disability on ODI. Mean difference reducing disability between pre-test and post-test of experimental group and control group were 38.74 and 18.27.

The analysis of significance was carried out by using Mann whitney U-test to compare the effectiveness of Bent Leg Raise Exercise with conventional physiotherapy compare to only conventional physiotherapy for Chronic Radiating Low Back Pain.

### **Limitations of the Study**

The study was conducted with 20 patients of Chronic Radiating Low Back Pain, 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 after Bent Leg Raise Exercise 6 sessions of treatments, so the long term effect of was not explored in Bent Leg Raise Exercise 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 Low Back Pain 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 conventional physiotherapy with Bent Leg Raise Exercise was better than the conventional physiotherapy alone for Chronic radiating Low Back Pain patients which was a Quantitative experimental study. The result of the current study indicates that the conventional physiotherapy with Bent Leg Raise Exercise can be an effective therapeutic approach for patient with chronic radiating low back pain. Participants in the conventional physiotherapy with Bent Leg Raise Exercise 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 radiating low back pain patients using specific inclusion and exclusion criteria. It may be helpful for patient with radiating low back pain to increase return to normal daily activities, work and to measure longer term effects for determining cost effectiveness of Bent Leg Raise Exercise in conjunction with conventional physiotherapy as an intervention for Chronic radiating low back pain.

## **6.2 Recommendation**

In this study, the researcher provided 8 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 Bent Leg Raise Exercise group 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.

It is recommended to do further study with more number of subjects and with a longer time frame. It is also recommended to include the Range of Motion outcome assessment of patient and to identify the average number of sessions that are needed to be discharged from treatment to validate the treatment technique

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## **ANNEXURE**

1. Consent Form (English Version)
2. Questionnaire (English Version)
3. Consent Form (Bangla Version)
4. Questionnaire (Bangla Version)
5. Permission Letter

## Inform Consent

Assalamualaikum\ Namashker,

I am Shamima Nasrin Rina, 4th Professional, B. Sc. in Physiotherapy student at Bangladesh Health Professions Institute (BHPI) under the Faculty of Medicine, University of Dhaka. To obtain my Bachelor degree, I shall have to conduct a research project and it is a part of my study. My research title is “**Effectiveness of Bent Leg Raise Exercise along with Conventional Physiotherapy comparing Conventional Physiotherapy alone for the Patients with Chronic Radiating Low Back Pain**”. I would like to know some personal and other related questions about your low back pain .To fulfill my research project I need to collect data. So, you can be a respected participant of this research and the conversation time will be two times. Each time consists of 20-30 minutes. I would like to inform you that this is a purely academic study and will not be used for any other purposes. I also assure that all data will be kept confidential. Your participation will be voluntary. You may have the rights to withdraw consent and discontinue participation at any time from this study. You also have the rights to reject a particular question that you don't like.

I am committed that the study will not pose any harm or risk to you. If you have any query about the study, you may contact with the researcher Shamima Nasrin Rina or research supervisor Nasirul Islam, Associate Professor & Principal (Acting), BHPI.

Do you have any questions before I start?

So, I can proceed with the interview.

Yes  No

Signature of the participant and Date.....

Signature of the researcher and Date.....

Signature of the witness and Date.....

## Questionnaire (English Version)

### Part – I: Subjective Information

This questionnaire is developed to measure the pain intensity & disability of patient with chronic radiating Low Back Pain and this portion will be filled by physiotherapist/researcher using a pencil.

Code No:

Date:

Patient's name:

Sex: M / F

Age:

Occupation:

Address:

Contact No:

1. How long have you been suffering from low back pain?

Years.....

Months.....

2. In which side of your back pain is more?

Right

Left

Middle

Both

3. In which side of your lower limb you mostly feel pain?

- Right
- Left
- Both

4. In which area you feel pain most?

- Low Back Pain is more than thigh\leg pain.
- Thigh\leg pain is more than back pain.
- Back pain and thigh\leg pain are equal.

5. What is the symptoms you feel in your leg?

- Numbness
- Paresthesia
- Weakness
- Burning sensation
- All of them
- None

6. What do you think about the cause of your pain?

- Due to injury
- Due to bad posture
- Due to lifting heavy weight
- Others

7. When you feel worse pain?

- At morning
- At evening
- As the day progresses
- All day

8. What treatment options you have tried before?

- Rest
- Pain Killer
- Lumber corset
- Physiotherapy
- Massage
- Injection
- Surgery
- Others

9. Is the problem

- Improving.....
- Worsening.....
- Staying the same....

## **Part– II**

### **Pain Intensity Related Information**

**Pre- test data:**

#### **Pain Rating Scale**

McCaffery & Beebe (1993) suggested Numeric Pain Rating Scale.

1. How much you feel pain today?

---

0      1      2      3      4      5      6      7      8      9      10



## **Part– III**

### **Disabilities Information**

#### **Oswestry Low Back Disability Questionnaire**

This questionnaire has been designed to give us information as to how your back pain has affected your ability to manage in everyday life. Please answer every section and **mark in each section only the one box that applies to you.**

##### **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 e.g. 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 1 miles
- Pain prevents me from walking more than half mile
- Pain prevents me from walking more than 100 gauge
- 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 e.g., 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

## **Part– II**

### **Pain Intensity Related Information**

#### **Post test data:**

McCaffery & Beebe (1993) suggested Numeric Pain Rating Scale.

1. How much you feel pain today?

---

0      1      2      3      4      5      6      7      8      9      10

## **Part– III**

### **Disabilities Information**

#### **Oswestry Low Back Disability Questionnaire**

This questionnaire has been designed to give us information as to how your back pain has affected your ability to manage in everyday life. Please answer every section and **mark in each section only the one box that applies to you.**

##### **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 e.g. 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 1 miles
- Pain prevents me from walking more than half mile
- Pain prevents me from walking more than 100 gauge
- 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 e.g., 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

প্রশ্নপত্র (বাংলা)

অংশ-১ : ব্যক্তিগত তথ্যাবলী

এই প্রশ্নপত্রটি তৈরি করা হয়েছে দীর্ঘদিন ধরে কোমর ব্যথা রোগীদের ব্যথার পরিমাপ এবং অক্ষমতা জনিত তথ্যাবলী। এই অংশটি ফিজিওথেরাপিস্ট / গবেষক কালো কলাম / পেন্সিল দ্বারা পূরণ করবেন।

কোড নং :

তারিখঃ

রোগীর নামঃ

লিঙ্গ :

বয়সঃ

পেশাঃ

ঠিকানা :

ফোন নম্বরঃ

১। আপনি কতদিন যাবত কোমর ব্যথায় ভুগছেন ?

মাস

বছর

২। আপনার কোমরের ব্যথা কোন পাশে সবচেয়ে বেশী ?

ডান পাশ

বাম পাশ

মাঝখানে

উভয় পাশে সমান

৩। আপনার নিম্নাঙ্গের কোন পাশে সবচেয়ে বেশী ব্যথা অনুভব করেন?

ডান পাশ

বাম পাশ

উভয় পাশ

৪। আপনি কোন জায়গায় / অংশে সবচেয়ে বেশী ব্যথা অনুভব করেন?

- কোমরের ব্যথা পায়ের ব্যথার চেয়ে বেশী।
- পায়ের ব্যথা কোমরের ব্যথার চেয়ে বেশী।
- কোমর ও পায়ের ব্যথা সমান

৫। আপনার পায়ের / নিম্নাঙ্গে কি ধরনের উপসর্গ অনুভব করেন?

- অবসভাব
- ঝি ঝি ভাব
- দুর্বলতা
- জ্বালাপুড়া
- সবগুলোই
- কোনটাই না

৬। আপনার ব্যথা কি কারণে সৃষ্টি হয়েছে বলে আপনি মনে করেন?

- কারণ আঘাতের ফলে
- কারণ ভারী বস্তু তুলতে গিয়ে
- কারণ খারাপ অঙ্গবিন্যাস
- অন্যান্য

৭। আপনার ব্যথা কখন তীব্র হয়?

- সকালে
- সন্ধ্যায়
- দিন বাড়ার সাথে সাথে
- সারাদিন

৮। এখানে আসার আগে পর্যন্ত আপনি কি কি ধরনের চিকিৎসা নিয়েছেন?

ক) বিশ্রাম	হ্যাঁ	<input type="checkbox"/>	না	<input type="checkbox"/>
খ) ঔষধ	হ্যাঁ	<input type="checkbox"/>	না	<input type="checkbox"/>
গ)কোমরের বেল্ট	হ্যাঁ	<input type="checkbox"/>	না	<input type="checkbox"/>
ঘ)ফিজিওথেরাপি	হ্যাঁ	<input type="checkbox"/>	না	<input type="checkbox"/>
ঙ)ম্যাসেজ	হ্যাঁ	<input type="checkbox"/>	না	<input type="checkbox"/>
চ)ইঞ্জেকশন	হ্যাঁ	<input type="checkbox"/>	না	<input type="checkbox"/>
ছ) অস্ত্রপ্রচার	হ্যাঁ	<input type="checkbox"/>	না	<input type="checkbox"/>
জ) অন্যান্য	হ্যাঁ	<input type="checkbox"/>	না	<input type="checkbox"/>

৯। আপনার সমস্যাটার অগ্রগতি কেমন?

- উন্নতির দিকে
- অবনতির দিকে
- অপরিবর্তিত

চিকিৎসার পূর্ববর্তী প্রশ্নাবলী

অংশ-২: ব্যথার পরিমাণ

এই প্রশ্নাবলী কোমরব্যথা রোগীদের জন্য পরিকল্পনা করা হয়েছে

McCaffery & Beebe,(১৯৯৩) রোগীদের ব্যথার অভিজ্ঞতা ব্যাখ্যা করার জন্য নিওমেরিক পেইন রেটিং স্কেল করেন। এটা সংখ্যাসূচক ব্যথা নির্ধারক স্কেল হিসেবে পরিচিত।

১। আজ আপনার ব্যথার তীব্রতা কতটুকু?

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০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

চিকিৎসার পরবর্তী প্রশ্নাবলী

অংশ-২: ব্যথার পরিমাণ

এই প্রশ্নাবলী কোমরব্যথা রোগীদের জন্য পরিকল্পনা করা হয়েছে

McCaffery & Beebe,(১৯৯৩) রোগীদের ব্যথার অভিজ্ঞতা ব্যাখ্যা করার জন্য নিওমেরিক পেইন রেটিং স্কেল করেন। এটা সংখ্যাসূচক ব্যথা নির্ধারক স্কেল হিসেবে পরিচিত।

১। আজ আপনার ব্যথার তীব্রতা কতটুকু?

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০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

## অসওয়েস্টি প্ৰতিবন্ধকতা সূচক প্ৰশ্নাবলীঃ

### অংশ ১- ব্যথার তীব্রতা

- এ মুহূর্তে আমার কোন ব্যথার নাই
- 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 সর্বচ্চ খাৰাপা

### অংশ ২- বাস্তবিকতায় যত্ন (ধৌতকরণ, পোশাক পরিধান ইত্যাদি)

- কোন ধরণে ব্যথা ছাড়াই আমি আমার নিজের স্বাভাবিক যত্ন নিতে পারি।
- আমি আমার নিজের স্বাভাবিক যত্ন নিতে পারি, কিন্তু এটি অত্যন্ত ব্যথাদায়ক।
- আমার নিজের স্বাভাবিক যত্ন নেওয়া ব্যথাদায়ক এবং এ জন্যে আমি ধীর ও সতর্কতা অবলম্বন করি।
- আমার কিছু সাহায্যের দরকার হয়, কিন্তু আমি আমার অধিকাংশ বাস্তবিকতায় কাজ নিজেই সম্পাদন করি।
- প্রতিদিন আমার নিজের অধিকাংশ কাজের জন্যে অন্যের সাহায্যের দরকার 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 ব্যথার সম্মুখীন হই, কিন্তু যদি এগুলো সুবিধাজনক অবস্থানে যেমন, টেবিল এ 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 হালকা ওজন উত্তোলন করতে পারি।
- আমি একেবারেই কোন ওজন উত্তোলন করতে পারি।

#### 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 কাবল লাঠি ব্যবহার করে হাঁটতে পারি।
- অধিকাংশ সময়ই আমি বিছানাতেই থাকি এবং আমাকে হামাগুড়ি দিয়ে টয়লেটে যেতে হয়।

#### অংশ ৫- বসে থাকা

- আমি যে কোন চেয়ার এ ব্যথা ছাড়াই যতক্ষণ খুশি বসে থাকতে পারি।
- আমি আমার পছন্দের চেয়ার এ যতক্ষণ খুশি ততক্ষণ বসে থাকতে পারি।
- ব্যথার কারণে আমি ১ ঘন্টার বেশি বসে থাকতে পারি না।
- ব্যথার কারণে আমি ১/২ ঘন্টার বেশি বসে থাকতে পারি না।
- ব্যথার কারণে আমি ১০ মিনিট বেশি বসে থাকতে পারি না।
- ব্যথার কারণে আমি মুটেই বসে থাকতে পারি না।

#### অংশ ৬-দাঁড়ানো

- আমি কোন বারতি ব্যথা ছাড়াই যতক্ষণ খুশি দাঁড়িয়ে থাকতে পারি।
- আমি যতক্ষণ খুশি দাঁড়িয়ে থাকতে পারি, কিন্তু এটা আমার বাড়তি ব্যথা সৃষ্টি করে।
- ব্যথার কারণে আমি ১ ঘন্টার বেশি দাঁড়িয়ে থাকতে পারি না।
- ব্যথার কারণে আমি ১/২ ঘন্টার বেশি দাঁড়িয়ে থাকতে পারি না।
- ব্যথার কারণে আমি ১০ মিনিট বেশি দাঁড়িয়ে থাকতে পারি না।
- ব্যথার কারণে আমি একেবারেই দাঁড়িয়ে থাকতে পারি না।

#### অংশ ৭-

- ব্যথার কারণে আমার ঘুম কখনোই ব্যহত হয় না।
- ব্যথার কারণে আমার ঘুম মাঝে মাঝে ব্যহত 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 মুটেই ঘুমাতে পারি না।

#### অংশ ৮- যৌন জীবন

- আমার যৌন জীবন স্বাভাবিক এবং কোন অতিরিক্ত ব্যথার সৃষ্টি করে না।
- আমার যৌন জীবন স্বাভাবিক, কিন্তু এতে কিছুটা কোন অতিরিক্ত ব্যথার সৃষ্টি হয়।
- আমার যৌন জীবন প্রাই স্বাভাবিক, কিন্তু তা অত্যন্ত ব্যথাদায়ক।
- আমার যৌন জীবন ব্যথার কারণে তীব্রভাবে সীমাবদ্ধ।
- আমার যৌন জীবন ব্যথার কারণে প্রায়ই অনুপস্থিত।
- ব্যথার কারণে আমি 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 বাড়াই।
- আমার অধিক শক্তি প্রয়োজনীয় আগ্রহসমূহকে (যেমন, খেলা খেলা) সীমাবদ্ধ করা ছাড়া আমার সামাজিক জীবনে ব্যথার তেমন কোন তাৎপর্য পূর্ণ প্রভাব নাই।
- ব্যথা আমার সামাজিক জীবনকে সীমাবদ্ধ করেছে এবং আমি প্রায়ইশ বাইরে যাই না।
- ব্যথা আমার সামাজিক জীবনকে গৃহে সীমাবদ্ধ করেছে।

#### অংশ ১০- ভ্রমণ

- কোন ধরনের ব্যথা ছাড়াই 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 ভ্রমণ কে ১ ঘন্টার কম সময়ের মধ্যে সীমাবদ্ধ করে।
- ব্যথা আমার ভ্রমণ কে ৩০ মিনিট কম সময়ের মধ্যে সীমাবদ্ধ করে।
- ব্যথা আমাকে চিকিৎসা গ্রহণ ব্যতীত যে কোন ধরনের ভ্রমণ প্রতিরোধ করে।



August 31, 2016

Head

Department of Physiotherapy

Centre for the Rehabilitation of the Paralysed (CRP)

Chapain, Savar, Dhaka-1343.

Through: Head, Department of Physiotherapy, BHPI.

Subject: Prayer for seeking permission to collect data for research project.

Sir,

With due respect and humble submission, I beg most respectfully to state that I am Shamima Nasrin Rina, student of 4th Professional B. Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). I am seeking your permission to collect data at musculoskeletal outpatient physiotherapy unit of CRP, Savar for my research project in regards to the partial fulfillment of requirements for the Bachelor degree. My research project is entitled, "Effectiveness of Bent Leg Raise Exercise along with Conventional Physiotherapy among Patients with Chronic Radiating Low Back Pain". Data will be collected before application of treatment and after completion of six treatment sessions. Data collector would be Physiotherapist who will deliver treatment to each patient. I hereby also assure you that during data collection procedure, any participant would not feel any disadvantage of regular service.

In the light of above circumstances, I favorably pray and hope that you would be kind enough to give me permission for data collection and oblige thereby.

Yours faithfully

Shamima Nasrin

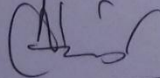
Shamima Nasrin Rina

Student of 4th Professional B. Sc. in Physiotherapy

Class roll :19 Session: 2011-2012

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

Approved



Mohammad Anwar Hossain  
Associate Professor &  
Head of Physiotherapy Dept.  
CRP, Chapain, Savar, Dhaka-1343

Forwarded

9/10  
31/08/16

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