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EFFECTIVENESS OF NEURAL MOBILIZATION VERSUS STATIC STRETCHING FOR THE TREATMENT OF RADIATING LOW BACK PAIN PATIENTS

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EFFECTIVENESS OF NEURAL MOBILIZATION VERSUS STATIC STRETCHING FOR THE TREATMENT OF RADIATING LOW BACK PAIN PATIENTS

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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 from the Department of Physiotherapy, BHPI.

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List of Contents

Contents

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Acronyms

ADL	Activity of Daily Living
BHPI	Bangladesh Health Professions Institute
BMRC	Bangladesh Medical Research Council
CRP	Centre for the Rehabilitation of the Paralysed
IASP	International Association for the Study of Pain
IRB	Institutional Review Board
IRR	Infrared Radiation
LBP	Low Back Pain
NPRS	Numeric Pain Rating Scale
ODI	Oswestry Disability Index
SPSS	Statistical Package for the Social Sciences
SWD	Short Wave Diathermy
TENS	Transcutaneous Electrical Nerve Stimulator
WHO	World Health Organization

List of Tables

List of Figures

Abstract

Purpose: To identify the effectiveness of Neural Mobilization and Static Stretching for the treatment of radiating low back pain patients and also to determine which treatment is superior to the other. Experimental design of quantitative research which was Clinical Trial design was chosen because the experimental study was the best way to find out the effectiveness of the study. **Objectives:** To explore socio-demographic (age, gender, educational status, occupation) characteristics of patients with radiating low back pain. To compare the rating of pain intensity before and after Neural Mobilization with conventional physiotherapy in one group and Static Stretching with conventional physiotherapy in another group. To compare the functional disability before and after Neural Mobilization with conventional physiotherapy in one group and Static Stretching with conventional physiotherapy in another group. **Methodology:** This study was conducted by Clinical Trail study design in which a total 42 participants were selected randomly included 21 in Group A and 21 in Group B. Data was collected by using Oswestry Disability Index questionnaire to evaluate disability level and pain measured by Numeric Pain Rating Scale questionnaire. SPSS was used for data analysis which was displayed through table, pie chart, bar chart and parametric test- paired t-test and unpaired or unrelated t-test & Non-parametric test – Wilcoxon Matched Pair Signed-Rank test & Mann Whitney U test. **Results:** In this study, the result shows a significant improvement in more reduction of pain in Group A by using Neural Mobilization with conventional physiotherapy & more reduction of disability in Group B by using Static Stretching with conventional physiotherapy. **Conclusion:** The result of this study suggest that both Neural Mobilization with conventional physiotherapy and Static Stretching with conventional physiotherapy was effective for radiating low back pain patients but Neural Mobilization was more effective than Static Stretching in reducing pain but Static Stretching was more effective in reducing disability than Neural Mobilization.

Key words: Radiating low back pain, Neural Mobilization, Static Stretching, Conventional Physiotherapy, Pain and Disability.

CHAPTER- I INTRODUCTION

1.1 Background

Low back pain (LBP) stands the foremost basis of disability universally, and a key sponsor to incapacity for work among young and middle-aged adults (Coggon et al., 2019). Low back pain (LBP) is well-defined as ache or pain in the lowest part of the back that is a common experience among people all over the world (Sundel et al., 2019). Low back pain is one of the most common health complications and generates a considerable personal, community, and financial burden globally (Hoy et al., 2012). LBP is also defined as pain, muscle tension, or stiffness localized below the costal margin and above the inferior gluteal folds with or without leg pain (Kang et al., 2012). A case study by Theriault (2018) tells that the lumbar spine stands a complex chain of joints and can be very susceptible to injury. Pain and dysfunction of the lumbar spine consumes the uppermost occurrence of any other musculoskeletal condition. The 2010 Global Burden of Disease study exposed that musculoskeletal disorders are the second biggest contributor to disability worldwide (Basson et al., 2017).

Report of World Health Organization (WHO) on WHO Technical Report Series No 919/2003 with theme "The Burden of Musculoskeletal Conditions at The Start of the New Millennium" presented that musculoskeletal disorders are very common and comprise in excess of 150 different diseases and syndromes, which are typically allied with pain and loss of function. Besides the pain and function loss are the effect of lower back pain syndrome. (Ray et al., 2017).

Disability associated with low back dysfunction (LBD) endures to upsurge and Health care expenses among individuals with LBD are also 60% greater than those lacking LBD with 37% of the costs a direct increase of physical therapy services (Adel, 2011). It has been mentioned to as a 20th century enigma continuing to cause disability and distress in a large share of the adult population (Odole et al., 2010). It consumes propensity of flattering persistent or chronic that habitually lead to disability (Buselli et al., 2011).

A rationalized systematic review of global prevalence of LBP presented it as a major musculoskeletal problem throughout the world (Hoy et al., 2012). Lumbar-spine disorders rank fifth among disease classes in the cost of hospital care and represent higher costs ensuing in absent from work and disability than any other category (Adel,

2011; Mahmoud, 2015). Low back pain is a musculoskeletal disease to cause difficulties in daily life if it lasts extended than three months. (Kim et al., 2017). It has been well-known as one of the most common motives for sick leave in the western world (Odole et al., 2010).

Low back pain (LBP) is one of the two most common types of disability upsetting individuals in Western countries (the other is mental illness), and the assessment of LBP-related disabilities signifies a significant challenge (Wang et al., 2012). Low back pain (LBP) is the number one most common cause of activity limitation, the second most frequent cause of doctor's visits and the third most common cause of surgical procedures in USA (Apfel et al., 2010).

Low back pain is progressively seen in patients in their 20s to 40s, especially due to the economic expansion of society and changing working environments (Cho et al., 2014). People of any age can suffer from low back pain (LBP) and studies show that 70-85% of people have experienced LBP (Theriault ,2018). The prevalence of LBP symptoms peaks between the ages of 40 and 69 is higher among females than males in all age groups and is more common in countries with high-income economies (Hoy et al., 2012).

In modern societies, lumbar radiculopathy and sciatica have developed an increasing problem. Lumbar radiculopathy may be triggered by a herniated disc, disk protrusion or sciatica. Irritation or compression of the sciatic nerve often fallouts in radicular pain along a precise dermatome and pseudo radicular pain (Benditz et al., 2016). The greatest common cause of sciatica is a herniated disk. The projected annual occurrence of sciatica in Western countries is 5 cases per 1000 adults (Mahmoud, 2015).

Lumbar radiculopathy is a disabling disorder producing low back pain that radiates into the lower limb along the sensory supply of the spinal nerve root (McGuire, 2018). The level of spinal nerve root contribution designates specific dermatomes affected (Das et al., 2018). Lumbar radiculopathy, commonly called "sciatica", mentions to symptoms of pain, numbness, tingling, paresthesia and/or muscle weakness that usually travel down one (or both) legs (Martinez Jr., 2018). This enlarged mechanical tension on the nerve root and peripheral nerves grounds irritation and is accountable for several of the symptoms that patients with lumbar radiculopathy complain of (McGuire, 2018). Low back–related leg pain can ascend from a lesion or disease affecting the peripheral nervous system (Basson et al., 2017).

Nerve irritation stands a very important concept that defines a wide-ranging scheme in the etiology of lumbar radiculopathy (Martinez Jr, 2018). Physiological variations occur with increased pressure on the neuronal structures leading to barrier in conduction, decrease in axonal flow, and vascular problems (Mahmoud, 2015). Lumbar disc herniation pays 60-80% of lifetime occurrence of low back pain in overall population. Lumbar radiculopathy has an occurrence of 23.09% in India. (Das et al., 2018).

Low back pain is a predominant disorder in modern society, with 80% of the population suffering from it at least once in their life (Cho et al., 2012). It is projected that over 70% of the adults have at least one occurrence of LBP in their lifetime (Lee et al., 2017). 60 % to 80% of adults will at some point in their lives experience low back pain, and 16% of adults in the United Kingdom (UK) consult their general practitioner every year (Gordon and Bloxham, 2016). According to comprehensive reviews and epidemiological reports, the prevalence of low back pain varies from 12% to 33%, the one-year prevalence ranges from 22% to 65%, (Lee et al., 20O6) and the lifetime prevalence ranges from 11% to 84%, disability rates 12% (Sundell et al., 2019). Although most patients with acute or persistent low back pain recover markedly within the first six weeks following therapy, pain and disability still endure after one year in some patients (Lee et al., 2017).

In Western Europe, back pain has been conveyed to affect up to 40% of adult population, lower rates in Japan 19.1% (McCarberg, 2010). LBP number is additional than 20% in Bangladesh and it consumes a great damaging effect on health, employment and daily activities of living (Rashid et al., 2012). In emerging countries, the 1-year prevalence of LBP among farmers was 72%. LBP prevalence is 56% in Thailand, and 64% in China (Wang et al., 2012) and in Nepal LBP prevalence is in the middle of 35% and 65%. (Sharma et al., 2019)

Some pervasiveness data have as of late been accounted for country Asian people group, for example, those in Bangladesh, China, India, The Philippines, Indonesia, and Pakistan, with announced commonness running from 4% to 35 % (Cho et al., 2012). The point pervasiveness of LBP is 28.5% found in an Asian nation (Tomita et al., 2010). Be that as it may, all around, the yearly pervasiveness of LBP has been appraised at 38%. When all is said in done, vast majority (90%) will improve over a three-month period, but closely 50% will experience recurring episode (Chan et al., 2019). Laterally these outlines, the identification of danger issues for LBP is essential in the loathing of

intermittent and perhaps nonstop LBP (Peng, 2013). In Australia about 20% of the adult population experiences LBP at any given time (Alsaadi et al., 2011) and approximately 70-85% of the population suffers LBP at some point of their lives in USA (Buselli et al., 2011). Thirty-one studies have reported the occurrence of back pain in Indian population among the various occupations that has been found to vary from 6.2% (in general population) to 92% (in construction workers) (Bindra et al., 2015).

As stated by US National Center for Health Statistics reports, 14% of new-fangled patients that visited a hospital for treatment were patients with low back pain, which represents 13 million people (Nee et al., 2012). About 3% of all patients discharged from hospitals have characteristic low back pain. The expenditure of treating low back pain is higher than $100 billion each year (Peng, 2013). The healthcare and social costs of LBP are growing extra rapidly. The healthcare charges increased 65% between 1997 and 2005 in USA for LBP in contrast with overall healthcare costs. Now it is over 70 billion dollars per year in USA (Buselli et al., 2011) and in Australia 1 billion per year. Most of these costs are linked with CLBP (Alsaadi et al., 2011). A systematic review by Gordon and Bloxham (2016) inspected that Back pain costs the National Health Service (NHS) £1.3 million daily and results in 12.5% of all work absence in the UK. Chronic LBP is the higher significant financial burden more than 10 billion (US dollars) per annum in the worldwide (Werneke et al., 2010).

Chronic low back pain can be classified as non-specific when the reason is unidentified and specific when the reason is known and major reasons of specific low back pain are herniation of nucleus pulposus, Ankylosing Spondylitis, Osteoporosis, Rheumatoid Arthritis, Fracture (Azevedo et al., 2015). The causal factors of low back pain are identified in 5 to 15% cases, while above 85% of patients shows nonspecific low back pain. (Lawand et al., 2015)

85% of back pain cases have an unknown cause, normally diagnosed after undergoing tests such as X-ray, MRI scan and blood tests (Gordon and Bloxhom, 2016). The main pathophysiological source of LBP is mechanical lumbar syndrome, naturally intensified by stationary loading of the spine (prolonged sitting or standing), by long-lever activities or levered postures (bending forward, rotation of the trunk, etc.) (Stankovic et al., 2012) and lifting, twisting, awkward movements and static postures (Peng, 2013). It contains: nonspecific pain, perhaps begun by macro instability or micro instability of the spine; followed by: intervertebral disc degeneration arthropathy of, facet joints and surrounding structures, spinal canal stenosis, spondylosis and spondylolisthesis. Less

than 1% could be due to non-mechanical syndromes: neurologic syndromes, systemic disorders and referred pain (Stankovic et al., 2012)

LBP naturally encompass the intervertebral discs. Persons with protruding discs or herniated nucleus pulposus (HNP) incline to have increased pain in the low back with radiating pain into the lower extremities (LE) with activities involving lumbar flexion (Sahar, 2011).

Reasons of LBP are variable, different exercise programs have been used to treat patients, including lumbar flexion, extension, isometric flexion, passive extension, and intensive dynamic back exercise regimens (Park et al., 2010). The treatment necessitates a multidisciplinary approach and it should be focused not only to reduce pain, but also to improve quality of life parameters (Stankovic et al., 2012)

Physiotherapy contains various type of stretching and strengthening exercises, manual therapies such as mobilization, manipulation, McKenzie therapy and electrotherapeutic modalities such as ice, heat, transcutaneous electrical nerve stimulation (TENS), ultrasound (Krishna, 2013). A diversity of dissimilar kinds of exercise have been discovered to treat LBP, including low-to-moderate intensity aerobic exercise, high intensity aerobic exercise, core stabilization and muscular strength exercises and flexibility programmes. (Gordon and Bloxham, 2016)

Facts of the normal cellular structure and biomechanical properties of peripheral nerves and the replies of nerves to physical stresses assist physiotherapist in making diagnoses and choices regarding interventions (Mahmoud, 2015). Traditional exercise therapy program for LBP principally emphases on pain relief but, neural mobilization should be observed as another form of manual therapy similar to joint mobilization (Kutty et al., 2014).

Neural mobilization aims to restore the mechanical and neurophysiological function of the nerve. (Basson et al., 2015). Neural tissue mobilization marks breach adhesions in the structures existing along the passage of the nerve at the mechanical boundary. (Das et al., 2018)

One of the prime causes of LBP is tightness of the muscles close to Lumbo-pelvic-hip complex for instance erector spine, multifidus, Quadratus lumborum, psoas, and hamstring. These native muscles are accountable for providing segmental stability and directly directing the lumbar segments during movement (Waqqash et al., 2014).

Stretching for lower back pain patient are intended progressively stretch the muscle groups, expected to be too short, especially the lumbar spinal muscle and the hip flexors

and extensors (Prentice, 2011). Stretching is the crucial section of both rehabilitation programmes and sport-related actions in order to reinstate finest muscle span (Mafra et al., 2017).

Several types of stretching exercises are used according to separate preference such as Ballistic, proprioceptive neuromuscular facilitation (PNF), static and dynamic stretching (Ray et al., 2017). Stretching is effective in improving pain and function ((Peng, 2013).

Stretching comprises the application of manual or mechanical force to elongate (lengthen) structures that have adaptively shortened and are hypo mobile (Mahajan et al., 2012). In practice, among many approaches of stretching, static stretching is offered as a safer and more effective method as it does not surpass the ordinary range of motion of joints (Kim et al., 2017). Static stretching involves stretching a muscle to a point of discomfort and holding the stretch for a length of time, followed by a return to normal resting muscle length. (Mahajan et al., 2012).

1.2 Rationale

Day by day the recurrence of low back pain is increasing in our country. Low back pain is not only a disabling condition but also has significant impact on the sufferer. Common predisposing factors for low back pain are poor physical fitness, lack of regular exercise, habitual is poor posture and sedentary life style. Most of the patients taking only medical treatment rather than physiotherapy. But Physiotherapy is the best treatment protocol for reducing the incidence of LBP and preventing complication associated with LBP.

Low back pain is a painful condition of lower back, which creates disturbance in functional activities. Literature suggests that pain and dysfunction is very common in low back pain which can interfere with the person's ability to function at work & recreation and imposes a financial cost on the community. So it is very important to manage the cases with low back pain. In Bangladesh, low back pain represents a challenge to the clinician, because considering the context of our country patients often struggle to follow the evidenced based treatment recommended for low back pain.

There are many physical therapy techniques exist for the treatment and rehabilitation of low back pain and some researches suggests that Neural Mobilization and Static Stretching are the important interventions for this condition which reduce the incidence of pain and improve functional status. The purpose of this study is to compare the effectiveness of Neural Mobilization and Static Stretching for the patient with radiating low back pain and also to determine which treatment is more effective than the other. There were some research articles published about physiotherapy intervention for patient with chronic low back pain but Neural Mobilization or Static Stretching for low back pain is not so focused among them and in Bangladesh, no research has been published yet to find out the efficacy of Neural Mobilization versus Static Stretching for the treatment of Radiating Low Back Pain. However, research helps to improve the knowledge of health professionals, as well as develops the profession. The results of the study may help to guide physiotherapists to give best treatment in patient with radiating low back pain, which will be beneficial for both the patient with low back pain and for developing the field of physiotherapy profession.

1.3 Hypothesis

1.3.1 Alternative Hypothesis

H_a: $\mu_1 - \mu_2 \neq 0$ or $\mu_1 \neq \mu_2$, where Group A & Group B mean difference is not equal or Group A is higher than Group B. That means alternative hypothesis is accepted and null hypothesis is rejected.

1.3.2 Null Hypothesis

H_o: $\mu_1 - \mu_2 = 0$ or $\mu_1 \geq \mu_2$, where Group A & Group B mean difference is equal or Group B is higher than Group A. That means null hypothesis is accepted and alternative hypothesis is rejected.

Where,

H_o= Null hypothesis

H_a =Alternative hypothesis

μ_1 =mean difference in initial assessment

μ_2 = mean difference in final assessment

1.4 Objectives of the study

General Objectives

- To identify the therapeutic effectiveness of Neural Mobilization and Static Stretching for the treatment of Radiating Low Back Pain and also to determine which treatment is more effective than the other.

Specific Objectives

- To explore socio-demographic (age, gender, educational status, occupation) characteristics and pain related information of patients with Radiating Low Back Pain.
- To ascertain the efficacy of Neural mobilization in reducing pain of the patients with radiating Low Back Pain.
- To identify the effectiveness of Neural mobilization in reducing disability and improving functional ability of the patient with radiating Low Back Pain.
- To analyze the efficacy of Static Stretching in reducing pain of the patients with radiating Low Back Pain.
- To identify the effectiveness of Static Stretching in reducing disability and improving functional ability of the patient with radiating Low Back Pain.
- To determine which treatment is more effective than the other.
- To formulate a recommendation on treatment guideline for LBP patients evaluating the result of the study.

1.5 Operational Definition

Pain

The word pain is derived from a Greek word 'Poine' which means "price paid", "penalty" or "punishment". The subject's conscious perception of modulated nociceptive impulses that generate an unpleasant sensory, emotional, distressing experience associated with actual or potential tissue damage or described in terms of such damage.

Low back pain

Low back pain (LBP) is the pain experienced in lumbosacral region caused by a variety of somatic (musculoskeletal) dysfunctions, in the absence of major identifiable pathology, typically diffuse and located in a region that includes the areas of back below the ribs and above the distal fold of buttocks.

Radiating Low back pain

Pain in the lower back which radiates down toward the back of the thigh into the leg with or without tingling, numbness, paresthesia, weakness caused by compression of nerve roots which exit the spine, levels are L1-S4.

Disability

Disabilities is an umbrella term, covering impairments, activity limitations, and participation restrictions. An impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations.

Neural Mobilization

Neural mobilization is a gentle movement technique used by the physiotherapists to move the nerves. It is an oscillatory stretching of nerve roots that works on stimulating mechanical receptors, micro lengthening, and improving neural circulation at root level to reduce the edema and hence reduce lumber pain and radicular symptoms

Static Stretching

Static Stretching is a type of stretching exercises in which elongation of muscle with application of low force and long duration usually 15-30 second and it has a relaxation,

elongation effect on muscle, decreasing pain and musculotendinous stiffness and it is a slow controlled movement with emphasis on postural awareness and body alignment.

Conventional physiotherapy

Physiotherapy interventions that are widely accepted and practiced by the mainstream medical community are called Conventional Physiotherapy. Physiotherapy that is widely accepted and used by most Physiotherapy professionals. It is different from medical treatment. Examples of conventional physiotherapy for LBP include Mobilization, Manipulation, Soft tissue technique, radiation therapy.

CHAPTER – II LITERATURE REVIEW

Musculoskeletal complaints are constantly menacing the quality of life by consuming the likely to limit daily activities, causing absence from work and ensuing in an alteration or suspension from occupation (Damgaard et al., 2013). Among those loss of days for musculoskeletal disorders, pain related to work is one of the shared musculoskeletal disorders affecting millions of employees all over the world transversely different works or sectors of services (Manusov, 2012).

Thus, pain is a subjective impression. In addition, pain stands a defense mechanism considered to guard the subject's injured portion from auxiliary damage (Wilde, et al., 2007). Again Pain may be well-defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage (International Association for the Study of Pain, 2012). By any measure, pain is pointedly a global health problem. Universally, it has been described that 1 in 5 adults hurt from pain (Goldberg and McGee, 2011).

The lumbar vertebral column consists of five vertebrae and in between two vertebrae there are intervertebral discs. The intervertebral discs show a vital role in the functioning of the spine (Srivastava et al., 2013). Each intervertebral disc consists of the nucleus pulposus which is a central but to some extent posterior mucoid substance embedded with reticular, collagenous fibers and surrounded by the annulus fibrosus that is a fibrocartilaginous lamina. The annulus fibrosus has three layers- the outermost, middle and innermost fibers. These fibers are decisively attached to the vertebral bodies. The motions of the symphyseal joints between vertebral bodies deliver mobility of the vertebral column and facet joints permit gliding movements (Kishner, 2012). And the motions 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 alignment of zygapophyseal facets from L1 to L4 limits lateral flexion and rotation and favors forward flexion and backward extension. The amount of flexion differs at each inter-space of the lumbar vertebrae, but most of the flexion takes place at the Lumbo-sacral joint. Lateral flexion and rotation are highest in the upper lumbar region. Little or no lateral flexion happens at the lumbosacral joint as a result of alignment of the facets (Srivastava et al., 2013). Another study (Sahar, 2011) stated that the vertebral

column has two types of movement. They are- physiological and accessory movements. Anterior flexion, extension, lateral flexion and rotation are the normal spinal physiological movements. Distraction and compression of the vertebral column are the accessory movements. Thus abnormal kinematics of the lumbar vertebrae plays an important role in LBP (Lee, 2006).

Lumber Spinal pain has been well-defined as pain invented as rising from anatomical extents of the region restricted laterally by the lateral border of the erector spine, superiorly by an imaginary transverse line through the T12 spinous process and inferiorly by a line through the S1 spinous process. Sacral spinal pain is drawn as pain professed within a region covering the sacrum, delimited laterally by imaginary vertical lines through the posterior superior and posterior inferior iliac spines, superiorly by a transverse line through the S1 spinous process and inferiorly by a transverse line through the posterior Sacrococcygial joints (Kilpikoski, 2010).

In line with the anatomical view, the term LBP denotes to pain in the lumbosacral area of the spine surrounding the distance from 1st lumber vertebra to 1st sacral vertebra. The most common site of LBP is in the 4th and 5th lumber segment (Kravitz & Andrews, 2011). Again Back pain (also known as dorsopathy) is pain sensed in the human back that may come from the muscles, nerves, bones, joints or other structures in the spine (Koes, 2006). LBP may be expressed as overall pain from the second lumbar vertebra to the sacroiliac joints, and means a common lifetime health disorder (Hanney et al., 2016). According to the IASP, neuropathic pain can be described as "pain caused by a lesion or disease of the somatosensory nervous system." Leg pain accompanying with back pain can be triggered by central sensitization, denervation, nerve sensitization or somatically referred pain (Basson et al., 2015). LBP with radiculopathy is a type of back pain which radiates into the lower extremity and follows the dermatomal pattern due to the irritability of the nerve roots at the lumbosacral spine. (Ali et al., 2015).

LBP is more accurately called lumbago or lumbosacral pain (Sikiru & Hanifa, 2010). Although it is not life threatening, it can cause a sense of being unwell and substantial level of disability due to pain. In general population, the 12-month occurrence of activity limiting pain has been described to vary from 1.7% to 11.5% (Tynes, et al., 2013). The pain may persistent or intermittent, stay in one place or refer or radiate to other areas. It may be a dull ache, or a sharp or piercing or burning sensation (Peng,

2013). LBP is a highly prevalent condition allied with work absenteeism, disability and large health care costs (Costa et al., 2012)

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.

Again low back pain is regarded as (a) acute pain i.e. pain durable not more than 6 weeks; (b) sub-acute pain i.e., pain that lasts for 6–12 weeks; and (c) chronic pain i.e., pain that perseveres for more than 12 weeks (Lee & Kang 2016). Almost 70% of all back pain resolves within 3 weeks (acute) and up to 90% pain resolve within 12 weeks. About 2%–7% of back pain becomes chronic which grounds 75%–85% of total worker absenteeism (Kuritzky & Samraj, 2012).

The pathophysiology of LBP is usually indeterminate. In fact, one of the defining features of this disorder is non-specific etiology (Freeman et al, 2005). LBP can originate from diseases, injuries or stresses on various anatomical structures of the lumber spine that receives innervation including bones, discs, muscles, tendons, fasciae, ligaments, joints, dura, nerves or the spinal cord of the lumber spine. A signal is registered as pain when it comes from the affected structure through nerve endings into the brain through the spinal cord. (Krishna, 2013; Bae et al., 2017).

There are several possible causes of CLBP that is categorized as mechanical and non-mechanical. Mechanical causes account 80-90% of CLBP. These include lumbar strain, herniated disks, Spondylosis, Spondylolisthesis, Spinal stenosis and fractures. Among these lumbar strain accounts for 65%-70% of LBP and usually occurs in people in their 40s. Non mechanical causes accounts only 1-2% of CLBP include Neoplasia, infection, inflammatory arthritis, tumor of the spine or pelvis, primary tumors of spinal cord and secondary tumors (Stoppler, 2013).

McKenzie (1995) declared that mechanical pain happens when the joint in the middle of two bones positioned in conflict. At what time adjacent ligaments and other soft tissues are over stretched the patient will primarily feel major discomfort but as the time passes pain will ultimately develop. Mechanical low back pain classified as in three

fairly simple groupings that are postural syndrome, dysfunction syndrome and derangement syndrome.

Postural syndrome is a mechanical distortion of postural origin causing pain of a firmly intermittent nature, which give the impression when the soft tissues neighboring the lumbar sections are set on prolonged stretch. A commonly seen poor sitting posture comprises a forward head, rounded shoulders, and a flexed low back.

Dysfunction Syndrome Progresses as an outcome of poor postural pattern, Spondylosis, trauma or derangement, the dysfunction syndrome is the disorder in which adaptive shortening and resultant loss of mobility grounds pain previously achievement of full normal end range movement. Pain appears during test movements at end range and eliminates as soon as the patient's soft tissues are off stretch.

Derangement syndrome, the situation in which the normal resting position of the articular sides of two head-to-head vertebrae is distressed as an effect of a change in the location of the fluid nucleus between these surfaces. The alteration in the position of the nucleus may also disturb annular material (The McKenzie Approach-Virtual Healthcare System, 2011).

A study done by Kallewaard and colleagues (2010) established that 40% of low back pain is owing to a discogenic source and the main source of discogenic back pain is a disc herniation. The reason of a herniated disc is typically forward bending with twisting that exerts a large volume of force on the lumbar vertebrae (Prentice, 2011). These discs are located flanked by the vertebrae (Simon et al., 2014). Discs are responsible for shock absorption and padding between the vertebral bodies. When this bulging happens it can protrude into the spinal canal triggering radicular pain into the back, buttocks, and leg and the most often pretentious area are the L4-L5 and the L5-S1 (Prentice, 2011).

The reason of LBP has not been evidently exposed yet, variations in the lumbar structure because of musculoskeletal injury and the biomechanical factors of surrounding tissues are measured to be the foremost reasons of low back pain. In addition, muscles around the spinal support such as the lumber muscles, the hip flexor muscles, and the hamstring muscle are testified to be muscles related with low back pain (Kim et al., 2014). Dysfunction of ventral and dorsal muscles of the trunk have been refined in low back pain and insufficiency of muscle function chiefs to flatten and exceeding load on the joints and ligaments of the spine (Lamba et al., 2013). Another study Martinez Jr. (2018) specified that Usually, Lumbar radiculopathy is the result of

irritation of the spinal nerve secondary to a number of pathologies including disk herniation, spinal stenosis, and foraminal stenosis.

Another key reason of low back pain that is sacroiliac (SI) joint dysfunction. A study brought into being that 13-48% of all low back pain was produced by the sacroiliac joint dysfunction Often times SI joint dysfunction will occur along with a lumbar discogenic pathology (Madani et al., 2013). The sacroiliac is the joint designed by the sacrum and the ilium. It is linked by numerous strong ligaments that permit a small volume of motion to take place (Prentice, 2015).

Several issues increase the risk of developing LBP. Among those important risk aspects of CLBP includes aging, occupations, gender, level of activity (physical fitness), posture, obesity, previous back injury, and positive family history. Anxiety, depression, stressful responsibility, job dissatisfaction, mental stress at work and substance abuse increases risk for developing CLBP (StopPain.org, 2013). Issues connected to lifestyle such as smoking, obesity, lack of physical exercise and short sleep hours also increases LBP. Working periods for working population below 8 hours are also risk population of LBP (Shiri et al, 2010; Tomita et al., 2010). There is a positive association between high BMI and both high intensity of LBP and disability (Park et al., 2010). Risk factors for its incidence and/or persistence include activities such as heavy lifting that load the spine mechanically tendency to somatize, low mood, psychosocial stressors in the workplace and adverse beliefs about the prognosis of back disorders (Coggon et al., 2019).

Symptoms of LBP are different from person to person depending on the underlying cause of the back pain (Sultana, 2012). Symptoms include- mild to severe pain in the lower back, pain radiating from the buttock to the foot, back stiffness, reduced range of motion, muscle weakness or tightness in the hip, thigh, leg or foot and sensory changes (numbness, prickling, burning or tingling) in the leg, foot or toes (Hills, 2012). Other symptoms comprise sleep interruptions, depression and inability to sit or stand (Dartmouth-Hitchcock, 2013). Bowel bladder incontinence, atrophy of the lower extremity muscles, inability to walk may also occur (Peng, 2013).

Diagnosis was observed as the initial tool for fruitful management of patient's problems (Guzman, et al., 2008). Assessments of LBP include the visual analogue scale and body charts or pain diagrams but they may be insufficient to differentiate the lumbar pain (Cart, 2010). Apfel et al (2010) specified that physical inspection of the lumber spine infrequently donates to general observation, palpation, active, passive, resisted

movements and special test for lumber spine. General observation examining posture, symmetry, muscle bulk and previous scars should be part of the observation.

A neurological inspection most normally emphasis on any upper (example: cord compression) or lower (nerve root) motor neuron connection and possible myotomal or dermatomal connection to restrict an anatomical level (Nee et al., 2012). Neurological examination comprises charge of muscle bulk, strength, tone, tendon reflexes and sensory examination. Straight leg raise (SLR) test is achieved to find out lumbar nerve root irritation (Karnath, 2003; Chou et al., 2007). Diagnosis encompasses of physical examination and study facility examination. The physical examination joins perception and estimations, palpation for delicacy and joint arrangement (Back Pain Health Center, 2010). Clinical examination purposes to elucidate whether there is mechanical impingement of a nerve root. An imprecise clinical diagnosis may lead to unnecessary imaging and healthcare expenditure, and additional concerns for patients. (Iversen et al., 2013).

Characteristically people are preserved symptomatically without exact determination of the underlying cause. Only in cases with worrisome signs is diagnostic imaging needed (Chou, 2007). X-rays, CT or MRI images are not obligatory in lower back pain except in the cases where red flags are present. If the pain is of a long duration, X-rays may upsurge patient satisfaction (Das et al., 2018). Red flags are Recent significant trauma, Milder trauma if age is greater than 50 years, Mysterious weight loss, Unsolved fever, Immune conquest, Previous or current cancer, Intravenous drug use, Osteoporosis, Chronic corticosteroid use, age greater than 70 years, focal neurological deficit, duration greater than 6 weeks (Chou, 2007). There are some special investigations such as X-rays, bone scans, MRI, CT scan, myelography, discography, electromyography (EMG), nerve conduction studies and evoked potential (EP) studies (Peng, 2013).

To provide an adequate therapy for LBP, it is necessary to establish the pain intensity and patient's functional status. Before deciding the exercise program to apply, it is important to check for any restrictions, pain occurrence during exercises and also investigate whether there are some limitations in activities of daily living (Stankovic, 2012). Understanding the cause of back pain is important in order to remove it from the patient's life and promising findings were reported following a multicomponent exercise programme. (Gordon and Bloxham, 2016)

A modern study found that the incidence of LBP has persisted steady over the years in Spain suggesting that a better consideration for proper management of this condition is needed. Controlling options for sciatica comprise analgesic medications, manipulation, surgical decompression, bed rest. Traditional treatment for LBP is principally intended at pain lessening, either by analgesics or by reducing compression on the nerve root. (Mahmoud, 2015). The most commonly recommended medications for low back pain are non-steroidal anti-inflammatory drugs (NSAIDs), skeletal muscle relaxants, and opioid analgesics. Benzodiazepines, systemic corticosteroids, antidepressant medications, and antiepileptic drugs are also in this list (Chou, 2007). Paracetamol, and NSAID were suggested as treatment options in all guidelines reviewed, whereas muscle relaxants, and a short course of opioids were indorsed in some but not all guidelines (Stockendahl et al., 2017). Some probable mechanisms of action of lumbar supports (braces or orthoses) are stated in the literature that may support their use in the treatment of low back pain. They are hypothetical 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). Surgery is designated only when conservative treatment fails. The most common operations are posterior lumbar interbody fusion (PLIF) and anterior lumbar disc replacement (Krishna, 2013). Non-pharmacological treatments are highlighted over pharmacological interpositions in the managing of low back pain (Maher et al., 2016). The guideline from the American College of Physicians and the American Pain Society approves manual therapy, exercise therapy, massage, acupuncture, yoga, cognitive behavioral therapy, and exhaustive interdisciplinary treatment (Chou et al., 2007). Maher et al. (2016) revised clinical practice strategies for non-surgical management of LBP with or without LR published between 2005 and 2014 and found that advice and education about self-management and assurance as well as advice for staying active, supervised exercise, and manual therapy were commonly mentioned for people presenting to health care professionals with these conditions.

Exercise therapy was well-defined as any platform in which, throughout the therapy periods, the participants were obligatory to perform frequent voluntary dynamic movements or static muscular contractions (in each item, either “whole-body” or “region-specific”; and either with or without external loading), where such exercises were planned in place of a management for low back pain (Koes et al 2006). Exercise has been broadly applied by physiotherapists in clinical settings to treat LBP. Therefore,

exercise may shield and recover mobility and function, which assist in maintaining the body functions of the elderly. (Ishak et al., 2016).

One of the most shared managements for LBP is physiotherapy. Physiotherapy appears to boost personal healing features such as constructive potentials of trust and self-assurance in the individual's capability to succeed problems, which endorse patient repossession (Hayden et al., 2012). Physiotherapeutic system comprises examination, treatment, advice and instructions for the purpose of connection with movement dysfunction, bodily error, physical illness, disability, curing and pain from trauma and disease. The physiotherapy provision is a new and developing field in most hospitals (Lamba et al., 2013). Physical therapist evaluates an individual's physical capacity to do a definite work or action and helps in emerging a safe arrival to work program or lessen symptoms (Lee et al., 2017).

Physical therapists employ an extensive series of intermediations in the super vision of LBD; yet, proof for the efficiency of these interventions is inadequate (Adel, 2011). The earlier systematic review described that active physical therapy (exercises) appeared not to be superior than inactive (bed rest) treatment and other traditional conducts have been encouraged in clinical texts and consequently published clinical trials. (Mahmoud, 2015). Therapeutic exercise is a mutual traditional intervention cast-off by clinicians to drop pain, recover disability, and reestablish muscular function (Brumitt et al., 2013). The suggested physiotherapy management for LBP includes a widespread choice of treatment policies, cognitive behavioral therapy, therapeutic exercise; functional training; manual therapy techniques, including mobilization and manipulation, electrotherapeutic modalities, mechanical modalities, and physical agents (Hayden et al., 2005). Manual therapy is also in effect in dipping pain (Moseley, 2002). Massage decreases pain, recovers function and relaxation. It converted in further effective when mutual with exercises, stretching and education (Buselli et al., 2011). Spinal manipulation diminishes pain, recovers efficient actions and coming back to work (Kallewaard et al., 2010). Exercise therapy contains Stretching, strengthening and core solidity trainings that diminish pain and progress functions (Moon et al., 2013). Electrotherapeutic modalities particularly hot packs, short wave diathermy, ultrasound, TENS are generally used to ease pain (Rashid et al., 2012). Motor control exercise develops neuromuscular regulator of trunk sections. Lumbar extension is also operative (Rittweger et al., 2002).

A package of strengthening, stretching, and aerobic exercises will recover fitness level (Peng, 2013). Engaging in physical activity in the bounds of pain supports recovery (Koes at al., 2006). Even with belongings of severe pain, some movement is chosen to lengthy sitting or lying down not including actions that would more strain the back (Chen et al., 2014).

Many physical therapy involvements have been castoff to treat low back pain owing to lumbar radiculopathy (Das et al., 2018). Latest study indicates that Neural mobilization (NM) is a slice of manual therapy that has been testified to be an actual intervention for certain complaint including low back pain, sciatica and Piriformis syndrome (Kutty et al., 2014). Adel (2011) specified that Neurodynamic practice has a pronounced part in super vision of radiculopathy and low back pain. Nerve mobilization (or neuromobilization) is a wide-ranging extent of mediation used to endorse best kinesis of peripheral nerves and the spinal cord by addressing neurodynamic function. Neuromobilization purposes to rebuild balance between irritated nervous tissues and adjacent perineural interfaces and thereby reestablish standard neurodynamics and substitute optimum physiological and mechanical function. (Martinez, 2018). Many theories have been hypothesized for neural mobilization methods, with physiological properties (exclusion of intraneural edema, central effects as lessening of dorsal horn and supraspinal sensitization, and mechanical properties in enhanced nerve excursion) (Mahmud, 2015). Butler (2000) identified that clinicians use neural mobilization for the treatment of nerve root and peripheral nerve linked symptoms in the low back and the lower extremity pain.

Neural mobilization of the nervous system, was designated by Maitland in 1985, refined by Butler in 1991, is an accumulation to assessment and treatment of neural pain conditions as well as lumber spinal syndromes (Butler, 2000). Neural mobilization technique frequently used clinically to return nerve movement and decline pain. Traditional exercise therapy program for lumber pain emphases on pain relief but neural mobilization observed as another procedure of manual therapy that bring back the mechanical function of compromised neural tissue. There are different lines of conveying NM, together with “sliding” and “tensioning” techniques (Kutty et al., 2014).

Sahar (2011) established that neural mobilization in handling of low back dysfunctions is operative in improving pain, dipping short term disability and endorsing centralism of symptoms sooner than lumbar mobilization treatment with exercise therapy. Patients

preserved with neural mobilization and lumbar stabilization exhibited healthier VAS scores and Straight Leg Test scores paralleled to patients cured with active range of motion exercises and lumbar stabilization. (Colakoviæ & Avdiæ, 2013)

Flexibility is the capability to move arms and legs over their full range of motion. Stretching will help progress your flexibility (Lee et al., 2017). According to Brukner and Khan (2007), detailed muscle tautness (i.e. erector spinae, psoas, iliotibial band, hip external rotators, hamstrings, rectus femoris and gastrocnemius) is frequently originated in relationship with low back pain (Chan et al., 2019). Hamstring tension is also allied with low back and lower extremity musculoskeletal disorders chief to biomechanical deviations of the pelvis and low back. More or less studies have publicized lessened iliopsoas muscle length in patients with LBP. Calf muscles are confidential as postural muscles, have a predisposition to shorten in response to physical stress or injury (Mafra et al., 2017).

Muscular stretching programs are planned to gradually stretch the muscle groups which are presumed to be too taut and upsurge the body biomechanics. (Chan et al., 2019). Static stretching is a type of stretching which is typically used for LBP with radiculopathy. Passive static stretching contains of a slow movement continued by a person for 10 to 15 sec (Mafra et al., 2017). Stretching exercise releases muscle tension, primes to recover blood circulation. Upsurge the movement in the trunk and legs by stretching progresses muscle strength, relieve low back pain, and help retrieval of usual movements (Kim et al., 2017). Research showed by Chen et al (2012) revealed a conclusion, whereby the stretching program encourages moderate to high level of LBP relief and development on exercise self-efficacy. Devi, Kumar, Babu, and Ayyappan (2014) conveyed that stretching specific muscle groups (lower back muscle, hamstring and tensor fasciae latae) clinically presented noteworthy outcome in refining pain midst community nurses with occupation associated chronic low back pain. However, some evidence occurs representing the equivalent worth of static and active stretching practices as well as the dominance of static stretching exercises (Yildirum et al., 2016).

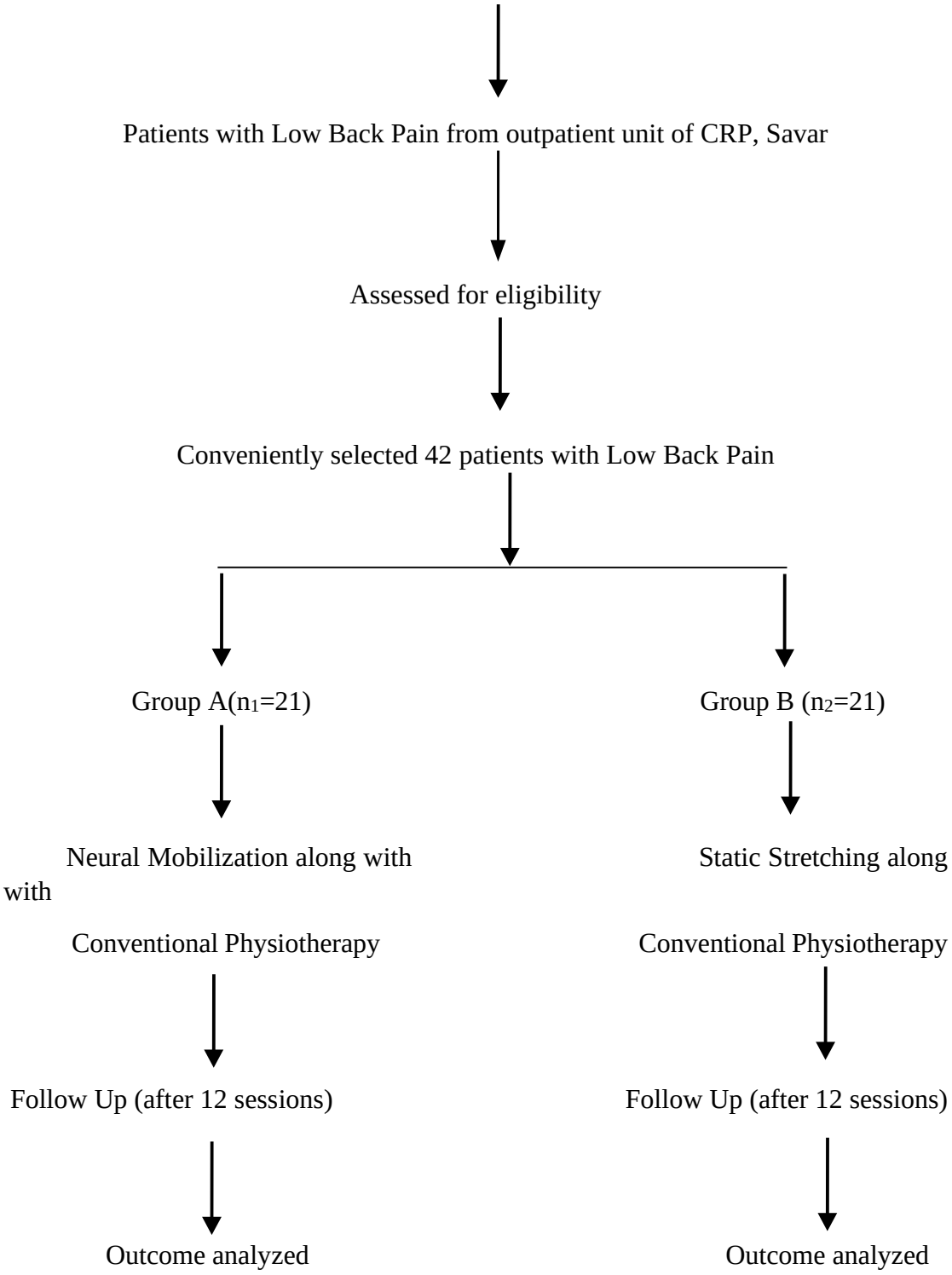
CHAPTER – III METHODOLOGY

3.1 Study design

The aim of this study was to find out the effectiveness of Neural Mobilization and Static Stretching for the treatment of radiating low back pain patients attended at musculoskeletal unit at CRP-Savar and also to determine which treatment is superior to the other. Experimental design of quantitative research which Clinical Trial Study design was chosen because the experimental study was the best way to find out the effectiveness of the study. The study was conducted with two different subject. Clinical trial design is a method of testing hypothesis by which cause and effect can be established. Both groups received a common treatment regimen. In this study, the Group A received Neural Mobilization along with conventional physiotherapy and Group B received Static Stretching along with conventional physiotherapy.

A pre-test (before intervention) and post-test (after intervention) was administered with each subject of both groups to compare the effects on pain and disability before and after the treatment. The design could be shown by flowchart -

Flowchart of the phases of Clinical trial



3.2 Study Site

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

3.3 Study Population

A population refers to the entire group of people or items that meet the criteria set by the researcher. The study population was the patients diagnosed with radiating Low Back Pain attended in the Musculo-skeletal Outpatient Unit of Physiotherapy Department at CRP, Savar.

3.4 Study Duration

From February, 2019 to August, 2019

3.5 Inclusion criteria

- Mechanical cause of Low Back Pain and its radiation to the lower limb (Das et al., 2018).
- Age group: 18-60 years (McKenzie, 1990).
- Both male and female were included.
- Those who were motivated and given consent to include in the study.

3.6 Exclusion Criteria

- Patients with clinical disorder where Neural Mobilization is contraindicated (Kutty et al., 2014).
- Acute disc prolapse patient, Diagnosis of secondary complications such as TB spine, severe osteoporosis, Paget's disease (Das et al., 2018).
- Spondylolysis or any defect or stress fracture in the pars interarticularis of the vertebral arch, Spinal fracture or dislocation in spinal column, Spinal tumors (both primary and metastatic tumor), Cauda-equina lesions, Cord signs & Syndrome, Transverse myelitis, all sorts of infection, Rheumatoid Arthritis, Ankylosing Spondylitis (Lee & Kim, 2017).

- Spinal surgery such as lumbar decompression surgery, lumbar fusion surgery, artificial disc replacement surgery, Pregnancy, Receiving steroid injection within previous 3 months, Mentally retarded patient (Adel,2011).
- Participants who were unwilling to participate or continue medication for low back pain.

3.7 Sample size

Researcher was taken 42 participants as sample. Obviously this is a small sample but still we believe they will be provided a representative picture of the study. Due to time limitation the researcher has to choose 42 participants to conduct this study; within the short time it could not be possible to conduct the study with a large number subjects.

3.8 Sampling Procedure

Simple random sampling technique was used for this study. Subjects, who meet the inclusion criteria were taken as sample in this study. 42 patients with radiating low back pain were selected from outpatient musculoskeletal unit of physiotherapy department of CRP, Savar and then 21 patients were allocated to Group A comprising of treatment approaches of Neural Mobilization with other Physiotherapy treatment and 21 patients were allocated to Group B comprising of treatment approaches of Static Stretching with other Physiotherapy treatment. group.

3.9 Method of data collection

To conduct this study, the researcher was collected data through using different types of data collection tools. The researcher was used 10 cm numeric pain rating scale Questionnaire for measuring pain and Oswestry Low Back Pain Disability Questionnaire was used for disability measurement.

3.9.1 Data Collection Tools

Data collection tools were data collection form, informed consent form, structured questionnaire, papers, pen and pencil.

3.9.2 Measurement tools

Numeric Pain Rating Scale (NPRS): McCaffery et al. (1999) used a numeric scale to rate the pain status experienced by patients. It is known as Numeric Pain Rating Scale. The scale is a 10cm long scale ranging from 0-10. Here a zero (0) means no pain, 1-3 indicates mild pain, 3-5 indicates that pain is in moderate state and 6-10 is worst possible pain feeling experienced by patients.

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

3.9.3 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 qualified physiotherapist. Eight sessions of treatment were provided for every subject. Forty-two subjects were chosen for data collection according to the inclusion criteria. The researcher divides all participants into two groups and coded A_1 (21) for Group A and B_1 (21) for Group B. Data was gathered through a pre-test, intervention and post-test and the data was collected by using a written questionnaire form which was formatted by the researcher. Pretest was performed before beginning the treatment and the intensity of pain were noted NPRS on questionnaire form. The same procedure was performed to take post-test at the end of eight session of treatment. Researcher gave the assessment form to each subject before starting treatment and after eight session of treatment and instructed to put mark on the line of NPRS according to their intensity of pain. The researcher collected the data from both group in front of the qualified physiotherapist in order to reduce the biasness. At the end of the study, specific test was performed for statistical analysis.

3.10 Treatment Regime

Physiotherapists who were expert in treatment of musculoskeletal patient were involved in treatment of patients. All the physiotherapists have the experience of more than two years in the aspect of musculoskeletal physiotherapy. Among them, three were male and one was female physiotherapist. Protocol for conventional physiotherapy was obtained from head of physiotherapy department, Centre for the rehabilitation of the paralyzed (CRP). For overall treatment protocol for both group, please see the Appendix.

3.11 Data analysis

To find out the efficacy of neural mobilization & Static Stretching for patient with radiating Low back pain data collected. In this study there were two different group where one was Group A that received Neural Mobilization and another group was Group B that received Static Stretching. There were demographic data that obtained by the questioner and ratio data that scored by NPRS (Numeric Pain Rating Scale) & Oswestry Disability Index(ODI) scale. The clinical outcome variables were analyzed by intention to treat.

3.11.1 Statistical test

Statistical analysis refers to the well-defined organization and interpretations of the data by systemic and mathematical procedure and rules (DePoy and Gitlin, 2015). Statistical analysis was performed using SPSS 20.00 to compute the descriptive statistics using pie chart, bar chart and also percentage. Between groups analysis of pain score calculated by Mann-Whitney U-test and within group pain score calculated by Wilcoxon-signed rank test. In addition, within group analysis of disability was carried by Paired t-test and between group disability was calculated by unpaired t-test.

Hypothesis test

Wilcoxon Test

Wilcoxon Test also known as Wilcoxon matched pair signed-rank test was performed for the analysis of the pain within group data. when there are two measures to be compared from the same cases and the data are normally distributed, then Wilcoxon test is applied.

Formula:

$$Z = \frac{T - \frac{N(N+1)}{4}}{\sqrt{\frac{N(N+1)(2N+1)}{24}}}$$

Here,

Z= Value of the Wilcoxon matched pair signed-rank test

T= Lowest value of positive and negative rank

N= Total number of the participant

Interpretation:

Calculated Z value is compared with the table Z value to find p value. If $p<0.05$ we reject the null hypothesis of equality of two group. If otherwise, we cannot reject the null hypothesis and accept it.

Calculation of Wilcoxon Test for general pain intensity within Group A-

$$Z = \frac{T - \frac{N(N+1)}{4}}{\sqrt{\frac{N(N+1)(2N+1)}{24}}}$$

$$= \frac{0 - \frac{21(21+1)}{4}}{\sqrt{\frac{21(21+1)(2\times 21+1)}{24}}}$$

$$= \frac{0 - 115.5}{\sqrt{\frac{19866}{24}}}$$

$$= \frac{-115.5}{28.77}$$

$$= -4.01$$

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

tables –

Table - 1: Within Group Wilcoxon Signed-Ranked Test for NPRS Group A (Neural Mobilization, Sample=21)

Variables	Wilcoxon Sign Rank Test (Z)	Significant level (P)
General pain intensity	-4.094	.000*
Severity of back pain today	-3.964	.000*
Severity of thigh pain today	-3.721	.000*
Severity of leg pain today	-3.665	.000*
Severity pain during rest	-4.008	.000*
Severity of pain during sitting	-3.942	.000*
Severity of pain during rising	-4.018	.000*
Severity of pain during standing	-3.867	.000*
Severity of pain during walking	-4.033	.000*
Severity of pain during activity	-3.830	.000*
Severity of pain during forward bending	-3.819	.000*
Severity pain during heavy weight lifting	-4.033	.000*
Severity of pain during sleeping	-3.540	.000*
Severity of pain during travelling	-3.740	-3.740

Table - 2: Within Group Wilcoxon Signed-Ranked Test for NPRS Group B (Static Stretching, Sample=21)

Variables	Wilcoxon Signed-Rank Test (Z)	Significant level (P)
General pain intensity	-4.053	.000*
Severity of back pain today	-3.879	.000*
Severity of thigh pain today	-3.810	.000*
Severity of leg pain today	-3.520	.000*
Severity of pain during rest	-3.805	.000*
Severity of pain during sitting	-3.931	.000*
Severity of pain during rising	-3.858	.000*
Severity of pain during standing	-3.968	.000*
Severity of pain during walking	-3.946	.000*
Severity of pain during activity	-3.860	.000*
Severity of pain during forward bending	-3.857	.000*
Severity of pain during heavy weight lifting	-4.046	.000*
Severity of pain during sleeping	-3.948	.000*
Severity of pain during travelling	-3.955	.000*

Mann Whitney U test

Mann-Whitney U test is a non-parametric test that is simply compares the result obtained from each group to see if they differ significantly.

Assumption

- All the observations from both groups are independent of each other.
- The responses are ordinal

Under the null hypothesis H_0, the distribution of both populations are equal.

Formula: test statistics as follows:

$$\boldsymbol{U = n_1 n_2 + \frac{n_x(n_x+1)}{2} - T_x}$$

Where,

$n1$ = The number of subjects in Group A

$n2$ = The number of subjects in control Group B

Tx=The larger rank total

nx = The number of subject in the group with large rank total

Mann Whitney U test analysis of post- test pain condition among

the participants (Between Group Analysis).

Interpretation:

The U value is compared to a critical value for U based on the sample sizes of both groups. For your U value to be significant at a particular probability level, it should be equal to or less than the critical value associated with n_1 and n_2 in the study.

Calculation of Mann Whitney U test for between general pain intensity-

$$U = n_1 n_2 + \frac{n_x(n_x + 1)}{2} - T_x$$

$$= 21 \times 21 + \frac{21(21 + 1)}{2} - 597$$

$$= 441 + \frac{462}{2} - 597$$

$$= 441 + 231 - 597$$

$$= 672 - 59$$
$$= 75$$

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

tables –

Table - 3: Analysis of pain score in NPRS (Between group analysis)

Variables	U	Mean rank		Sig. value (P)
		Group- A	Group-B	
General pain intensity	75	14.57	28.43	.000
Severity of back pain today	111.50	16.31	26.69	.005
Severity of thigh pain today	132	17.29	25.71	.024
Severity of leg pain today	97.50	15.64	27.36	.002
Severity pain during rest	156.50	18.45	24.55	.096
Severity of pain during sitting	129.50	17.17	25.83	.017
Severity of pain during rising	88	15.19	27.81	.001
Severity of pain during standing	104	15.95	27.05	.003
Severity of pain during walking	118.50	16.64	26.76	.009
Severity of pain during activity	182	19.67	23.33	.302
Severity of pain during forward bending	110	16.24	26.76	.004
Severity of pain during heavy weight lifting	97	15.62	27.38	.001
Severity of pain during sleeping	185.50	19.83	23.17	.385
Severity of pain during travelling	146	17.95	25.05	.053

Paired 't' test for within group ODI

Paired t-test was used to compare difference between means of paired variables.

Selection of test of hypothesis is mean difference under t distribution.

Assumption

- Paired variables
- Variables were quantitative
- Parent population of sample observation follows normal distribution.

Formula: test statistics t (paired) is following:

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

Where,

$\bar{d}$= mean of difference (d) between paired values,

SE ($\bar{d}$)= Standard Error of the mean difference

SD= standard deviation of the differences d and

n= number of paired observations

Level of Significant

In order to find out the significance of the study, the "p" value was calculated. The p values refer to the probability of the results for this 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.

Calculation of Paired 't' test within Group A-

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

$$= \frac{40.85714}{\frac{15.75210}{\sqrt{21}}}$$

$$= \frac{40.85714}{3.43739}$$

$$= 11.886$$

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

Table - 4: Oswestry Disability Index Paired T test within group:

	Group A		Group B	
Variable	t	Sig. level	t	Sig. level
ODI(%)	11.886	.000	12.457	.000

Unpaired 't' test for between group ODI

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

Assumption

Different and independent variables

Variables were quantitative

Normal distribution of the variables

Formula: test statistics t (unrelated) is follows:

$$t = \frac{\overline{x_1} - \overline{x_2}}{s\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Where,

$\overline{x_1}$ = Mean of the Group A,

$\overline{x_2}$ = Mean of the Group B,

n_1 = Number of participants in the Group A,

n_2 = Number of participants in the Group B,

S = Combined standard deviation of both groups

Calculation of Unpaired 't' test for between group

$$t = \frac{\overline{x_1} - \overline{x_2}}{s\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} = \frac{\overline{x_1} - \overline{x_2}}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$$= \frac{35.5714 - 40.0952}{\sqrt{\frac{335.857}{21} + \frac{92.991}{21}}}$$

$$= \frac{-4.5238}{\sqrt{\frac{428.848}{21}}}$$

$$= \frac{-4.5238}{\sqrt{20.421}}$$

$$= \frac{-4.5238}{4.519}$$

$$= \textbf{-1.001}$$

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

Table - 5: Oswestry Disability Index Unpaired T test between group:

Variable	t	df	Sig. level
ODI (%)	-1.001	40	0.323

3.12 Ethical consideration

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. Research proposal was submitted for approval to the administrative bodies of ethical committee of CRP. Again before beginning the data collection, researcher was obtained the permission from the concerned authorities ensuring the safety of the participants. In order to eliminate ethical claims, the participants were set free to receive treatment for other purposes as usual. Each participant was informed about the study before beginning and given written consent.

3.13 Informed Consent

The researcher obtained consent to participate from every subject. A signed informed consent form was received from each participant. The participants were informed that they have the right to meet with outdoor doctor if they think that the treatment is not enough to control the condition or if the condition become worsen. The participants were also informed that they were completely free to decline answering any question during the study and were free to withdraw their consent and terminate participation at any time. Withdrawal of participation from the study would not affect their treatment in the physiotherapy department and they would still get the same facilities. 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.

CHAPTER – IV RESULTS

For this study 42 patients with radiating Low Back Pain were taken as sample from Musculo-skeletal outpatient unit of Center for Rehabilitation of Paralyzed (CRP), Savar to explore the effectiveness of Neural Mobilization & Static Stretching for the treatment of Low Back Pain & to explore which one is superior than the other. In this study the results which were found have been shown in different bar diagrams, pie charts and columns.

4.1: Socio-Demographical variables

4.1.1. Age range(Years) of the participants

Among 42 participants, 28.60%(28.6% in Group A & 26.1% in Group B) belongs to age range 18-32 years, 50%(57.1% in Group A & 26.1% in Group B) were in between 33-47 years & 21.40%(14.3% in Group A & 26.1% in Group B) were in 48-62 age range.

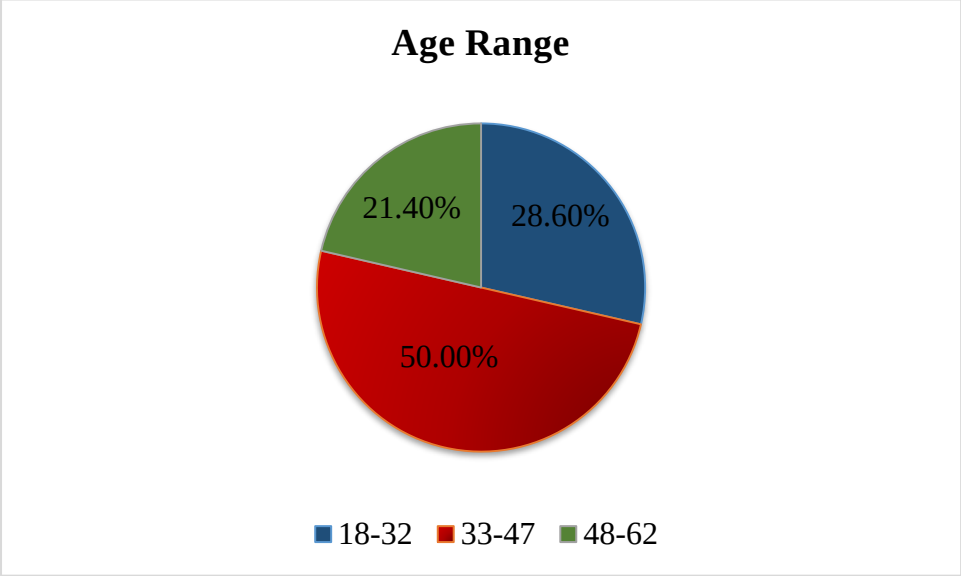


Figure-1: Age range(Years) of the participants

4.1.2 Gender of the participants

42 patients with Radiating Low Back Pain were included as sample of the study,71% Male (71% male in Group A & 29% in Group b) & 29% Female (71% male in Group A & 29% in Group B).

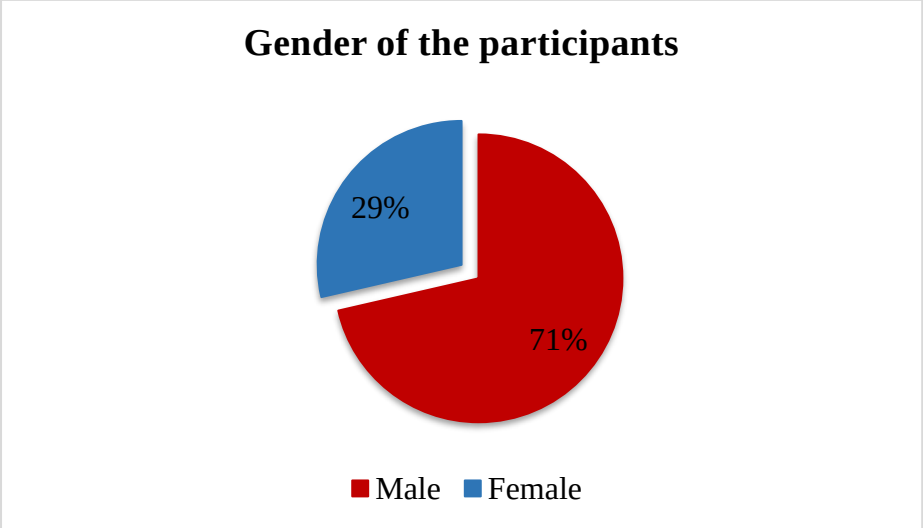


Figure-2: Gender of the participants

4.1.3 Educational Status of the participants

Among all the participants, 10% had no formal schooling, 14% had less than primary schooling, 21% were primary completed, 12% were S.S.C. completed, 9% were H.S.C. completed, 17% were Graduation completed, 17% were post-graduation completed.

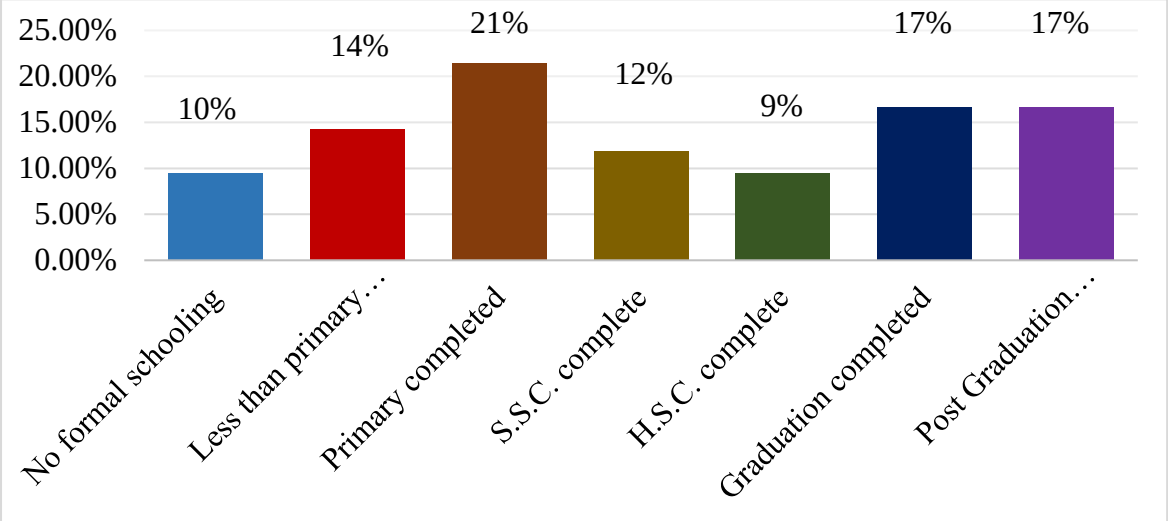


Figure-3: Educational Status of the participants

4.1.4 Occupation of the Participants

In this study, 10% were Farmer,3% were Day laborer,21% were Service holder, 7% were Driver, 5% were Businessman, 2% were Unemployed, 19% were Housewife, 2% were Teacher,10% were Student, 21% were involved in other occupation.

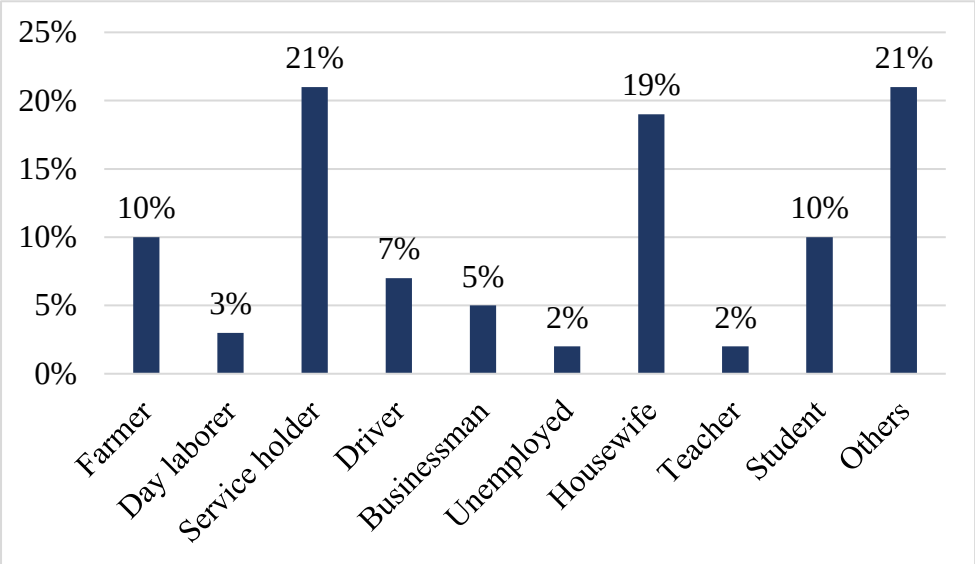


Figure-4: Occupation of the Participants

4.1.5 Marital status of the Participants

In this study, among all participants, 93% were Married & 7% were Unmarried.

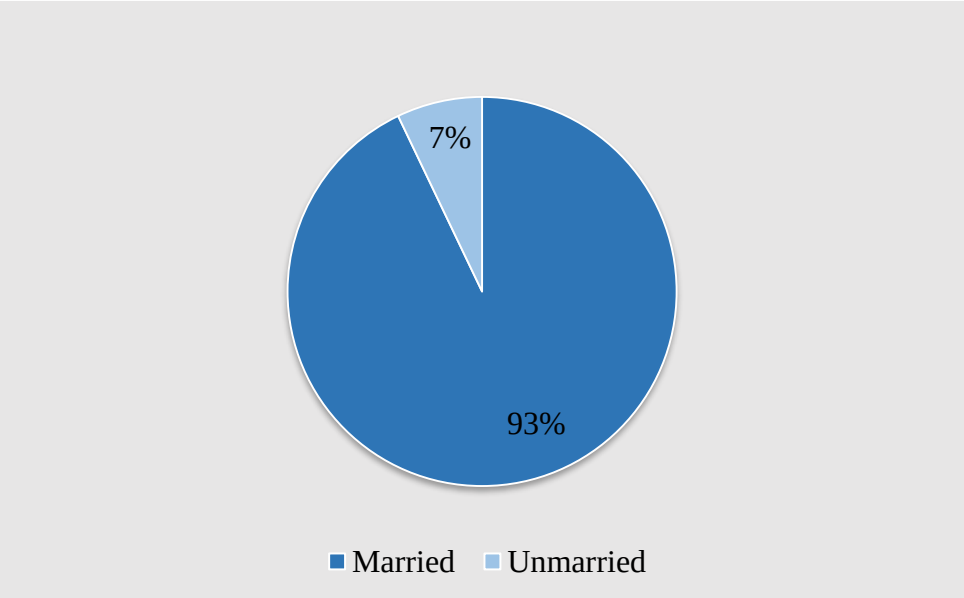


Figure-5: Marital status of the Participants

4.1.6 Family Type

The pie chart shows that, Majority 64% participants were from Extended family and remaining 36% were from Nuclear family.

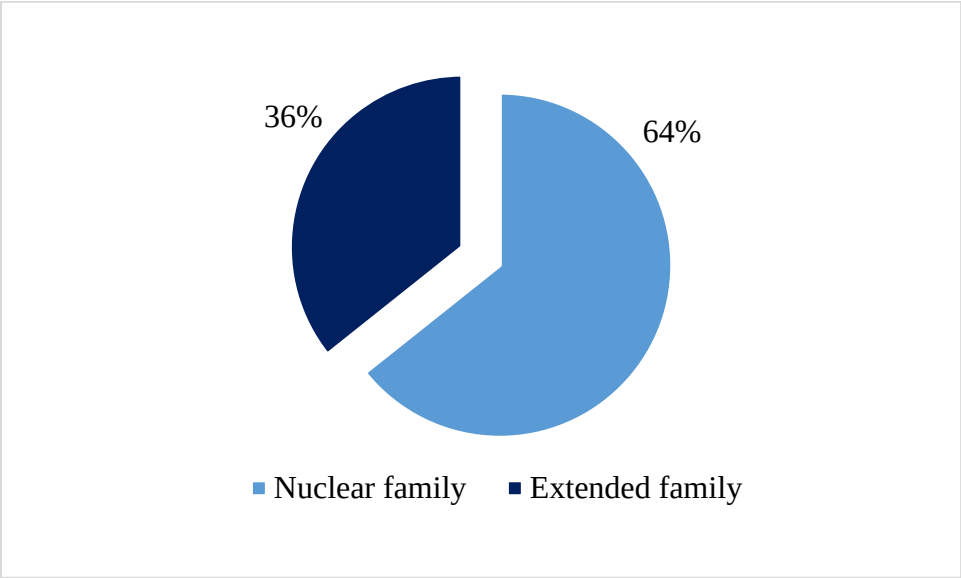


Figure-6: Family Type

4.1.7 Living place

Among 42 participants, 57% came from Urban Area & 43% were from Rural area.

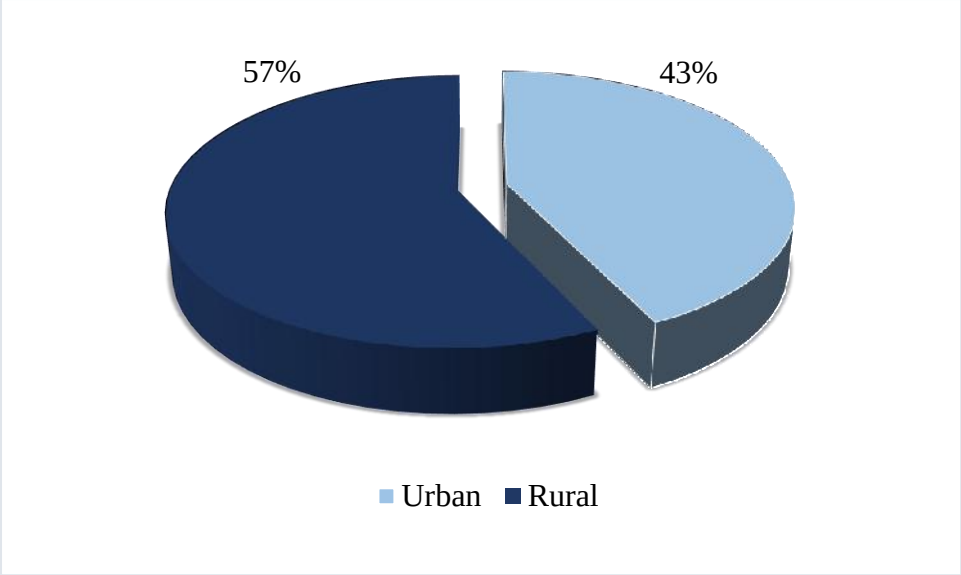


Figure-7: Living place

4.1.8 Religion

Among all the participants, 90% belongs to Islam & 17% were Hinduism.

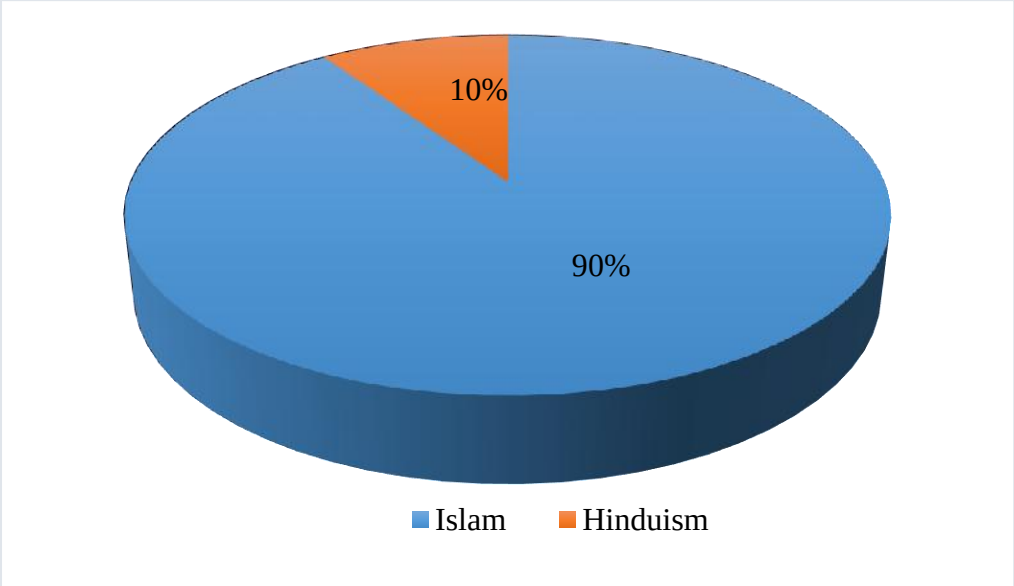


Figure-8: Religion

4.1.9 Smoking

Amon all the participants, 17% were smoker & 83% were non-smoker**.**

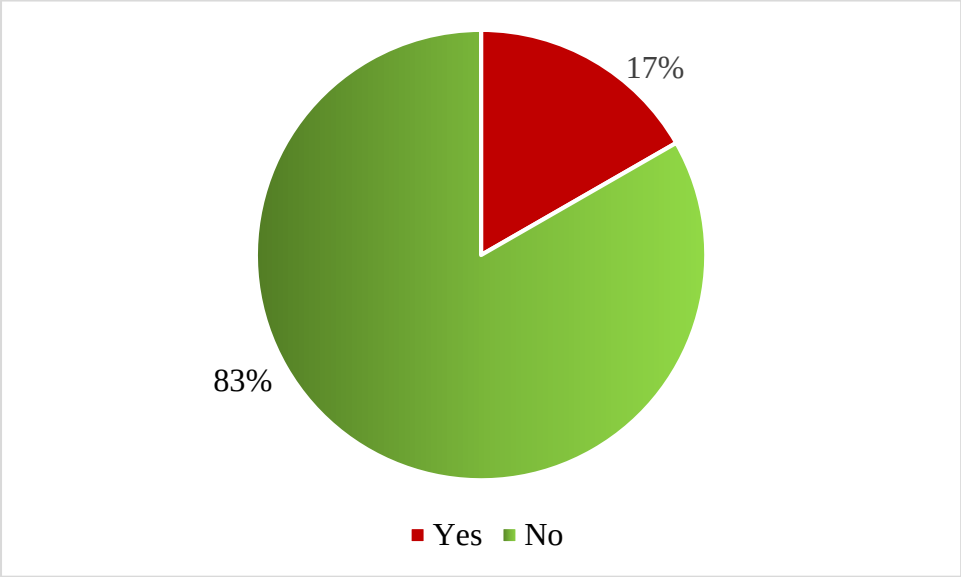


Figure-9: Smoking

4.2: Pain Related variables

4.2.1 Causes of LBP

In this study, 24% LBP occur due to Trauma, 19% due to bad posture, 21% due to heavy weight lifting & 36% were due to other causes.

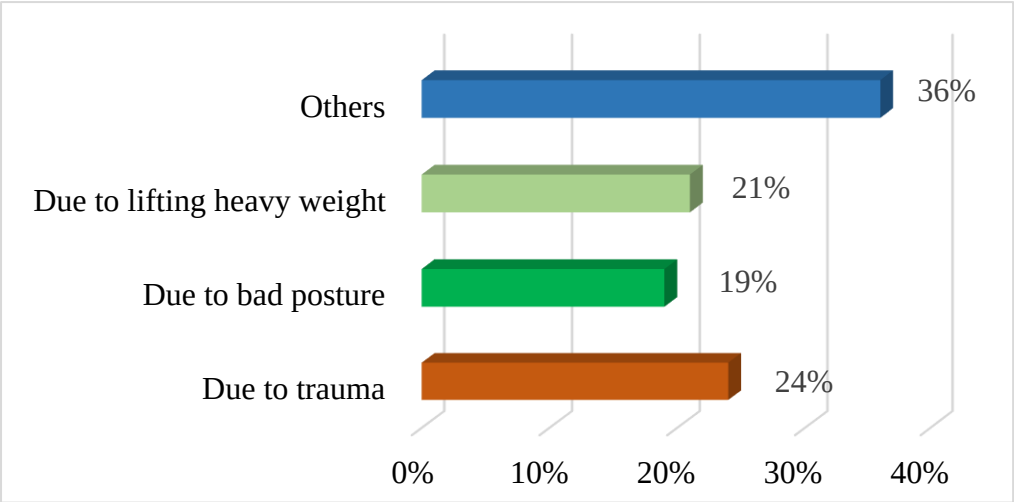


Figure-10: Causes of LBP

4.2.3 Pain Radiation to Thigh

Among 42 participants, 21 are in Group A & of them 86% having thigh pain and remaining 14% had no thigh pain. Again there is also 21 participants in Group B & of them 91% having thigh pain & 9% had no thigh pain.

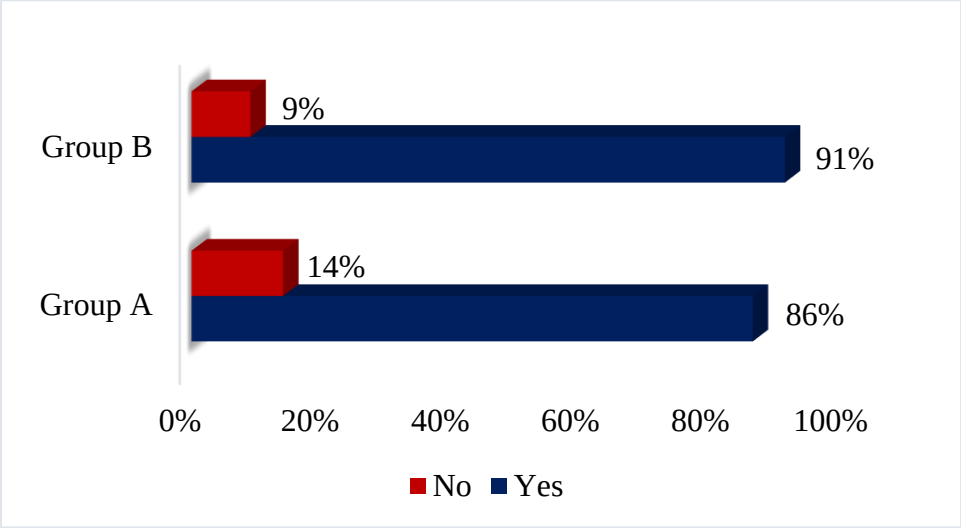


Figure-11: Pain Radiation to Thigh

4.2.4 Pain Radiation to Leg

Among 42 participants, 21 are in Group A & of them 81% having leg pain and remaining 14% had no leg pain. Again there is also 21 participants in Group B & of them 86% having leg pain & 14% had no leg pain. Among all participants, 83% had radiating leg pain & rest of 17% had no radiating leg pain.

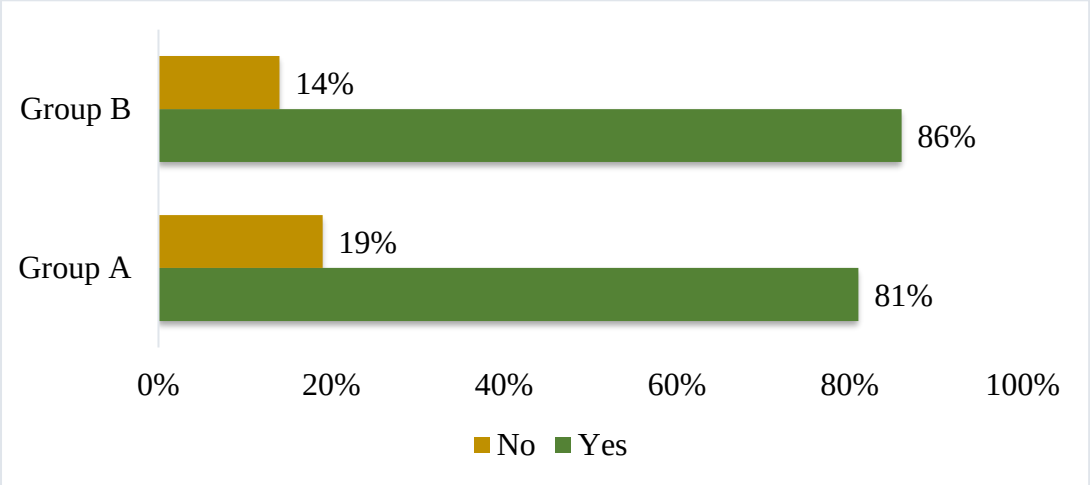


Figure-12: Pain Radiation to Leg

4.2.5 Weakness in Lower Limb

The pie chart shows that among the participants it was found that, 69% were getting less strength in lower limb & 31% were not getting less strength.

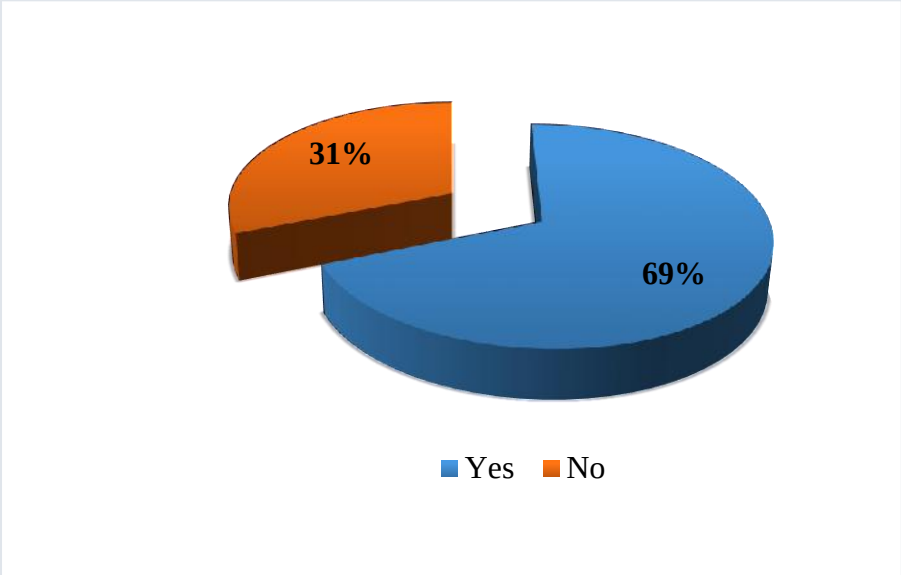


Figure-13: Weakness in Lower Limb

4.2.6 Numbness in Lower Limb

The pie chart shows that among the participants it was found that 69% had numbness & 31 % had no numbness in lower limb.

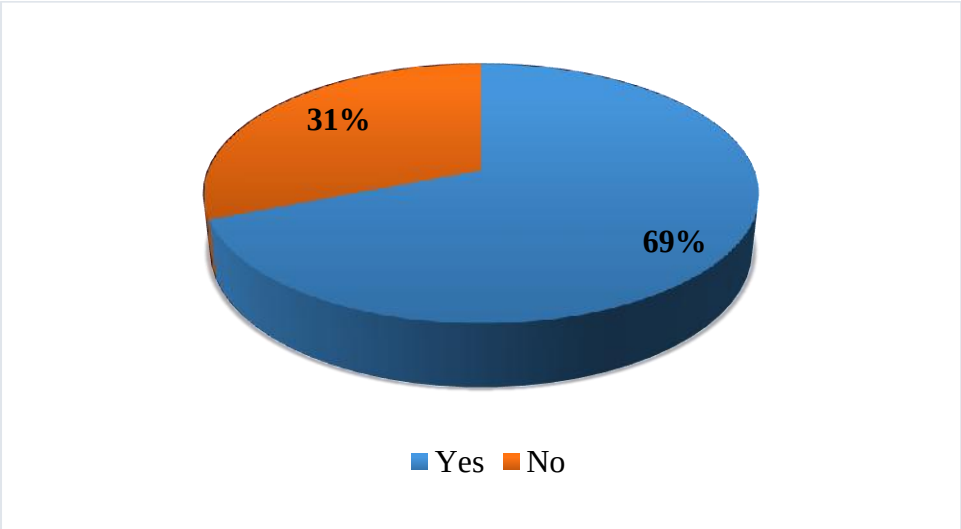


Figure-14: Numbness in Lower Limb

4.2.7 Postural Status

Among all participants, postural status of 55% were sitting, 19% were forward bending, 17% were standing & 9 % were walking.

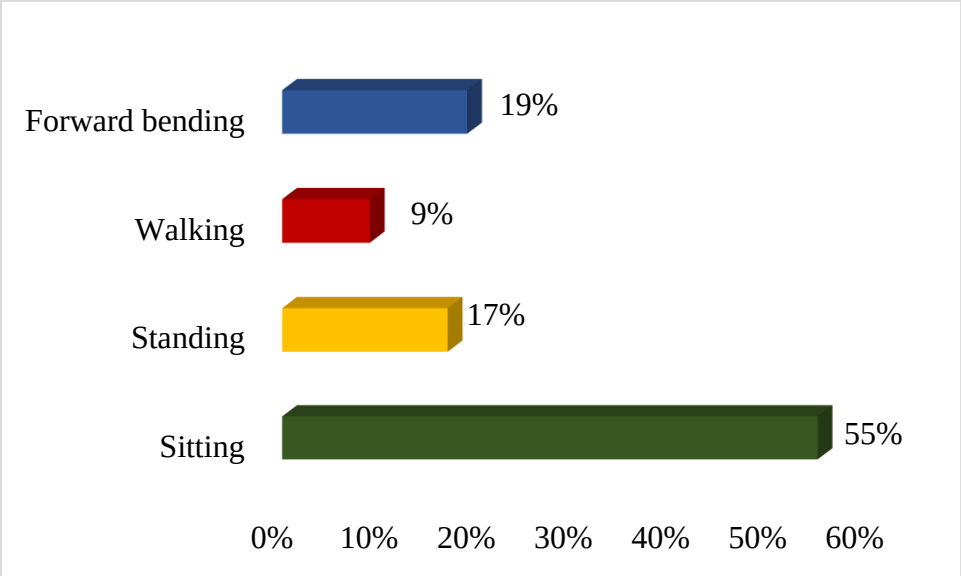


Figure-15: Postural Status

4.2.8 Frequency of taking treatment previously

The column shows that, 62% took medication, 19% took physiotherapy on other hospital & 19% took other classes of treatment**.**

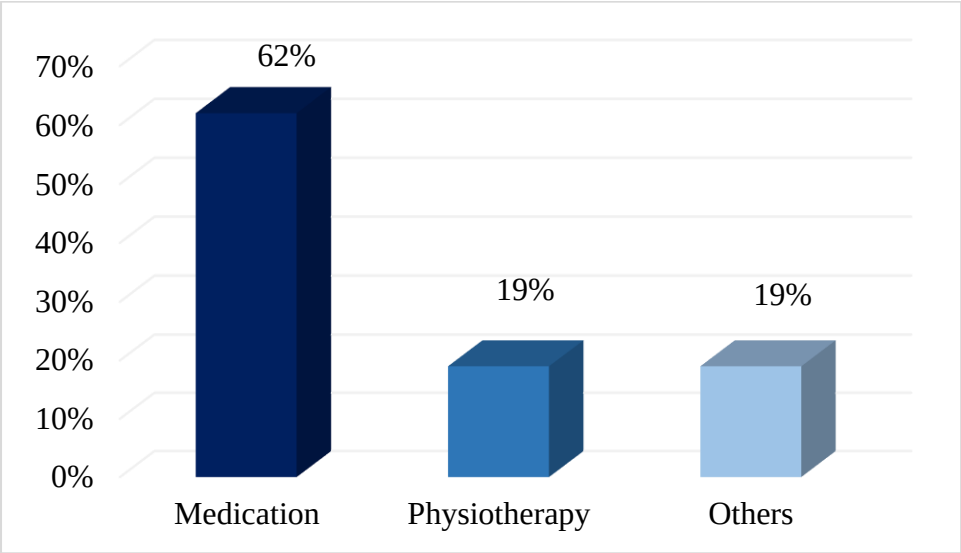


Figure-16: Frequency of taking treatment previously

4.2.9 Pain progression

After taking previous treatment 45% patients complained that their pain was not changing and 36% patients complained that their pain was worsening. Only 19% patients told that their pain was improving.

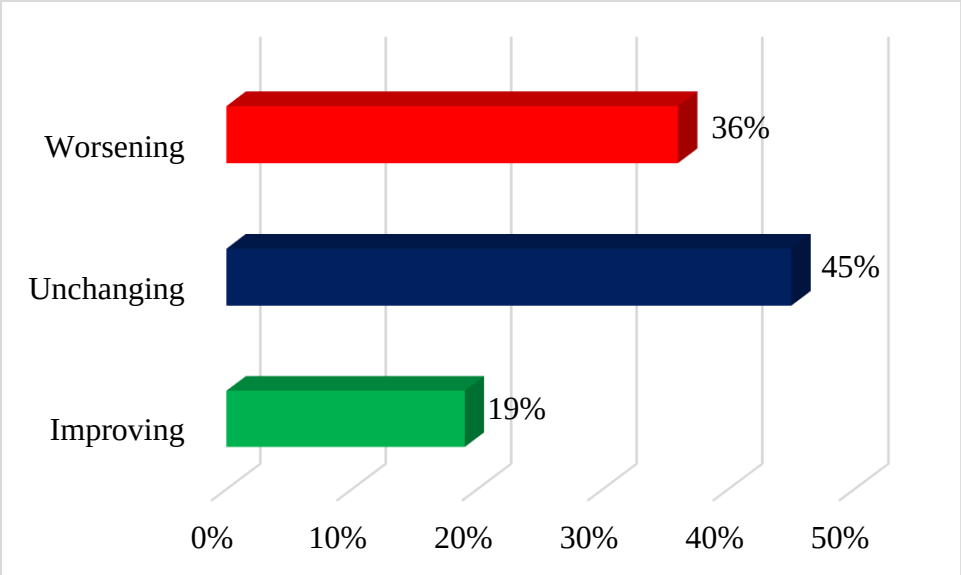


Figure-17: Pain progression

4.3: Within Group Wilcoxon Signed-Ranked Test for NPRS (Neural Mobilization)

Wilcoxon test has been determined to measure the changes in NPRS between pretest and posttest of Neural Mobilization group.

In Table-1. Wilcoxon test have a significant result according to statistical test revealing changes between posttest & pretest of Neural mobilization group in General pain intensity (Z= -4.094. P= 0.000), back pain intensity today (Z= -3.946. P= 0.000) thigh pain intensity (Z= -3.721. P= 0.000) leg pain intensity (Z= -3.665. P= 0.000) pain in rest (Z= -4.008. P= 0.000), pain intensity in sitting position (Z= -3.942. P= 0.000), pain intensity during rising (Z= -4.018. P= 0.000) pain intensity during standing (Z= -3.867. P= 0.000) pain intensity during walking (Z= -4.033. P= 0.000) pain intensity in activity (Z= -3.830. P= 0.000), forward bending pain intensity in activity (Z= -3.819. P= 0.000), pain intensity during heavy weight lifting (Z= -4.033. P= 0.000), pain intensity in sleeping (Z= -3.540. P= 0.000), pain intensity in travelling (Z= -3.740. P= 0.000). Calculated Z value of all variables are less than table value which is 52 at P value <0.05. All variables p value is <0.05 thus it is significant. This result shows that Neural Mobilization is effective for the participants of Group A.

4.4 Within Group Wilcoxon Signed-Ranked Test for NPRS (Static Stretching)

Wilcoxon test has been determined to measure the changes in NPRS between pretest and posttest of Static Stretching group.

In Table- 2, Wilcoxon test have a significant result according to statistical test revealing changes between pretest and posttest of Static Stretching group in general pain intensity (Z= -4.053. P= 0.000), back pain intensity today (Z= -3.879. P= 0.000), thigh pain intensity (Z= -3.810. P= 0.000), leg pain intensity (Z= -3.520. P= 0.000), pain in rest (Z= -3.805. P= 0.000), pain intensity in sitting position (Z= -3.931. P= 0.000), pain intensity during rising (Z= -3.858. P= 0.000), pain intensity during standing (Z= -3.968. P= 0.000), pain intensity during walking (Z= -3.946. P= 0.000), pain intensity in activity (Z= -3.860. P= 0.000), forward bending pain intensity in activity (Z= -3.857. P= 0.000), pain intensity during heavy weight lifting (Z= -4.046. P= 0.000), pain intensity in sleeping (Z= -3.948. P= 0.000), pain intensity in travelling (Z= -3.955. P= 0.000). All variables p value is <0.05 thus it is significant. This result shows that Static Stretching is effective for the participants of Group B.

4.5 Mann Whitney U for between group NPRS

Mann Whitney U test is done as a statistical test for Numeric Pain Rating Scale score & it shows a significant result for this study revealing changes between Neural Mobilization & Static Stretching group.

Table -3 General pain intensity P=.000, back pain today P=.005, thigh pain P=.024, leg pain P=.002, pain during sitting P=.017, pain during rising P=.001, pain during standing P.003), pain during walking P=.009, pain during forward bending P=.004, pain during heavy weight lifting P=.001, these ten variable results are significant as the P values are <0.05.

On the other hand, pain during rest P= .096, pain during activity P= .302, pain during sleeping P= .385, pain during travelling P= .053, these four variable results are not significant as the P value of this variable >0.05.

In this test results, for 10 variables p value is significant so the alternative hypothesis is accepted and null hypothesis is rejected and for 4 variables p value is not significant thus the alternative hypothesis is rejected and null hypothesis is accepted. For 8 variable U value accept the hypothesis and for 6 variable u score reject the alternative hypothesis. This means that Neural mobilization is more effective than Static Stretching on reducing pain of the participants.

Again Table-3, showed that calculated value of U are 75 for general pain intensity, 111.50 for back pain today, 97.50 for leg pain, 88 for pain during rising, 104 for pain during standing, 118.50 for pain during walking, 110 for pain during forward bending, 97 for pain during heavy weight lifting which are less than the table value of U which is 127 at 0.05. So the null hypothesis is rejected and Alternative hypothesis is accepted for these 8 variables. Again, calculated value of U is 132 for thigh pain, 156.50 for pain during rest, 129.50 for pain during sitting, 182 for pain during activity, 185.50 for pain during sleeping, 146 for pain during travelling which are greater than the table value of U which is 127 at 0.05. So the null hypothesis is accepted and alternative hypothesis is rejected for these 6 variables. As Neural mobilization is effective for 8 variable and Static stretching is effective for 6 variable Group A (Neural mobilization) is more effective than Group B (Static stretching).

4.6 Interpretation of paired ‘t’ test within group for ODI

From the table-4, Group A calculated ‘t’ value is 11.886 and P value is 0.000 which significant for within group A pre-posttest measurement and Group B ‘t’ value is 12.457 and P value is 0.000 which significant for within group B pre-posttest measurement.

4.7 Interpretation of unpaired ‘t’ test between group for ODI

From the table-5, By measuring t value through between group unpaired t test, the calculated ‘t’ value is -1.001 and p value is 0.323 which is >0.05 so the null hypothesis is accepted and alternative hypothesis is rejected. Neural Mobilization (Group A) is not more effective than the Static Stretching (Group B) on reducing disability of radiating low back pain participants.

CHAPTER V DISCUSSION

The study was indicated a process that could be continuing to establish the result. Here the aim of this study could be achieved if the researcher could show effective support. The purpose of this study was to evaluate the effectiveness of the Neural Mobilization & Static Stretching for radiating low back pain % identify the superiority among treatment. In this experimental study 42 patients were enrolled and 21 patients were group A who receive Neural Mobilization & conventional physiotherapy. The rest of 21 patients were group B who received Static Stretching &conventional physiotherapy. Each group attended for 12 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 (NPRS) for pain intensity and Oswestry Disability Index (ODI) for measuring disability

The researcher found that- Among 42 participants, 28.60%(28.6% in Group A & 26.1% in Group B) belongs to age range 18-32 years, 50%(57.1% in Group A & 26.1% in Group B) were in between 33-47 years & 21.40%(14.3% in Group A & 26.1% in Group B) were in 48-62 age range.

42 patients with Radiating Low Back Pain were included as sample of the study,71% Male (71% male in Group A & 29% in Group b) & 29% Female (71% male in Group A & 29% in Group b).

Among all the participants, 10% had no formal schooling, 14% had less than primary schooling, 21% were primary completed, 12% were S.S.C. completed, 9% were H.S.C. completed, 17% were Graduation completed, 17% were post-graduation completed. In this study, 10% were Farmer,3% were Day laborer,21% were Service holder, 7% were Driver, 5% were Businessman, 2% were Unemployed, 19% were Housewife, 2% were Teacher,10% were Student, 21% were involved in other occupation. Among all the participants, 17% were smoker & 83% were non-smoker.

Colakoviæ & Avdiæ in 2013 in their study found 45% Male and 55% male. Among them, In Experimental Group 18.33% were Male and 31.66%% were Female, and in Control Group 26.66% were Male and 23.33% were Female.

In this study, 24% LBP occur due to Trauma, 19% due to bad posture, 21% due to heavy weight lifting & 36% were due to other causes. Among 42 participants, 21 are in Group A & of them 86% having thigh pain and remaining 14% had no thigh pain. Again

there is also 21 participants in Group B & of them 91% having thigh pain & 9% had no thigh pain. Among 42 participants, 21 are in Group A & of them 81% having leg pain and remaining 14% had no leg pain. Again there is also 21 participants in Group B & of them 86% having leg pain & 14% had no leg pain. Among all participants, 83% had radiating leg pain & rest of 17% had no radiating leg pain.

Mann Whitney U test is done as a statistical test for Numeric Pain Rating Scale score & it shows a significant result for this study revealing changes between Neural Mobilization & Static Stretching group. General pain intensity P=.000, back pain today P=.005, thigh pain P=.024, leg pain P=.002, pain during sitting P=.017, pain during rising P=.001, pain during standing P.003), pain during walking P=.009, pain during forward bending P=.004, pain during heavy weight lifting P=.001, these ten variable results are significant as the P values are <0.05.On the other hand, pain during rest P= .096, pain during activity P= .302, pain during sleeping P= .385, pain during travelling P= .053, these four variable results are not significant as the P value of this variable >0.05. In this test results, for 10 variables p value is significant so the alternative hypothesis is accepted and null hypothesis is rejected and for 4 variables p value is not significant thus the alternative hypothesis is rejected and null hypothesis is accepted. For 8 variable U value accept the hypothesis and for 6 variable U score reject the alternative hypothesis. This means that Neural mobilization is more effective than Static Stretching on reducing pain of the participants.

Kumar (2013) had a study on effectiveness of Neural Mobilization for the treatment of Low Back Pain with 30 patients. In his study he 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 25.74 and 8.27.

A paper by Lee & Kim (2017) reveal that, Pain level and the disorder index of lower back pain were significantly alleviated after the intervention in both groups. Pressure threshold and angles of knee extension were significantly increased after the intervention in both groups. Comparing the two groups, the alleviation of pain was more significant in the nerve mobilization group. Patients with radicular lower back pain showed significant differences in pain level, pressure threshold, knee extension angle, and disorder index of lower back pain for both the hamstring stretching group and nerve mobilization group after the treatment. Hamstring stretching and nerve mobilization can be usefully applied for the therapy of patients with radicular lower back pain.

In paired ‘t’ test within group for ODI, Group A calculated ‘t’ value is 11.886 and P value is 0.000 which significant for within group A pre-posttest measurement and Group B ‘t’ value is 12.457 and P value is 0.000 which significant for within group B pre-posttest measurement.

In, unpaired ‘t’ test between group for ODI, by measuring t value through between group unpaired t test, the calculated ‘t’ value is -1.001 and p value is 0.323 which is >0.05 so the null hypothesis is accepted and alternative hypothesis is rejected. Neural Mobilization (Group A) is not more effective than the Static Stretching (Group B) on reducing disability of radiating low back pain participants.

A study Das et al. (2018), All the3 groups showed significant difference (P -0.000 < 0.05) at 2, 4, 6 weeks of NPRS, MOLBPQ and SLR. The mean difference and paired t-test values of experimental group 2 was more when compared to experimental group 1 and control group at the end of 6 weeks. All the three groups showed improvement in pain, functional disability and straight leg raise (SLR). SMWLM as an adjunct to neural mobilization and conventional therapy showed significantly better outcomes.

Summary of the study conducted by Chan et al (2019) reveal that, both core stability exercise and stretching are effective in improving thoracolumbar ROM, pain-level, functional disability among chronic low back pain patients.

A paper conducted by Bae et al (2017) Twenty-three subjects were recruited according to the selection criteria. The subjects were randomly assigned to static stretching group (control, n=12), and a static stretching using a load group (experimental, n=11). all groups measured visual analogue scale (VAS), stand and reach test, and the Oswestry disability index (ODI). In the present results, found that the experimental group showed significant differences in VAS, stand and reach test, and the ODI (P<0.05) in before and after the intervention. Therefore, static stretching using a load can be actively utilized for low back pain patients.

Ray et al (2017) conducted a study in which Twelve LBP patients are divided into two groups namely a group with static stretching and a group with dynamic one. The treatments were performed for 4 weeks, 3 days/weeks. The static and dynamic stretching were performed three times in every session with rest interval of 1 minute in between them. Goniometer was used to measure the spine ROM on the second and fourth weeks. Results show that 4-week static and dynamic stretching increases spine flexion, extension and spine lateral movements. Furthermore, dynamic stretching

treatment gave more optimum effects than static stretching to increase spine ROM. The findings suggest that 2 and 4 weeks stretching treatment can increase spine ROM on LBP.

A study by Adel (2011), revealed that: there was a significant difference between both groups on pain ($p = 0.006$), functional disabilities improvement (0.001), location of symptoms ($p = 0.083$) and sciatic nerve root compression ($p = 0.035$). It is concluded that Neural Mobilization may be beneficial in the management of patients with LBD.

Limitations of the Study

The study was conducted with 42 patients of 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.

There was given neural mobilization of sciatic nerve with branch of tibial and peroneal nerve. The researcher did not diagnose specific nerve root involvement and did not mobilize specific nerve root. Static Stretching of affected muscle also not specified at all.

It is limited by the fact daily activities of the subject were not monitored which could have influenced. Researcher only explored the effect of Neural Mobilization & Static Stretching 12 sessions of treatments, so the long term effect 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, non-random sampling is used in this method.

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.

CHAPTER- VI CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The result of the study has identified that the effectiveness of Neural Mobilization & Static Stretching & both are effective but Neural Mobilization shows more significant result for radiating Low Back Pain patients which was a Quantitative clinical trial study. The result indicates 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 Neural Mobilization in conjunction with conventional physiotherapy & Static Stretching in conjunction with conventional Physiotherapy. as an intervention for radiating low back pain.

6.2 Recommendation

In this study, the researcher provided 12 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 Neural Mobilization group with the conventional physiotherapy with static stretching and assessing effects and efficacy of these treatments also to identify the changes in ROM of lumbosacral spine. 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.

The researcher did not diagnose specific nerve root involvement and did not mobilize specific nerve root. It is recommended to do further study with diagnosis of specific nerve root involvement and mobilization of specific nerve.

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.

The researcher did non-random sampling in both group rather than random selection. That's why researcher recommended to do further study with enough time and by maintaining random selection to make the study more valid.

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APPENDIX

Verbal Consent Form

Assalamuaalaikum\ Namashker,

I am Sumaiya Islam, 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 Neural Mobilization versus Static Stretching for the treatment of Radiating Low Back Pain Patients**". Through this study I will find the effectiveness of Neural mobilization and Static stretching for the treatment of radiating low back pain. If I can complete the study successfully, the patients may get the benefits of improved musculoskeletal outdoor physiotherapy service. To implement my research project, I need to collect data from the persons with Radiating Low Back Pain. Therefore, you could be one of my valuable subjects for the 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 me and/or Mohammad Anwar Hossain, Associate Professor, Physiotherapy, BHPI, Senior Consultant & Head of the Department of Physiotherapy, CRP, Savar, Dhaka. 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……

Pre-test Questionnaire

Code no:

Title: Effectiveness of Neural Mobilization versus Static Stretching for the treatment of Radiating Low Back Pain.

Part 1 : Personal Details		
SL no.	**Questions**	**Responses**
1.1	Name of respondent	
1.2	Address	<u>Present Address:</u> Village: Post office: Thana: District:
		<u>Permanent Address:</u> Village: Post office: Thana: District:
1.3	Contact No.	Respondent's Contact No:
		Dependent's Contact No:
1.4	Date of interview	DD/MM/YY:

Code no: **Title: Effectiveness of Neural Mobilization versus Static Stretching for the treatment of Radiating Low Back Pain.**		
Part 2: Socio-demographic Information		
2.1	Age	_____ Years
2.2	Gender	1. Male 2. Female
2.3	Educational status	1. No formal schooling 2. Less than primary school 3. Primary completed 4. SSC completed 5. HSC completed 6. Graduation completed 7. Masters completed 8. Others (specify)……..

2.4	Occupation	1. Farmer 2. Day laborer 3. Service holder 4. Garment's worker 5. Driver 6. Rickshaw puller 7. Businessman 8. Unemployed 9. Housewife 10. Teacher 11. Student 12. Others (specify)……
2.5	Marital status	1. Married 2. Unmarried 3. Widowed 4. Widower 5. Divorced
2.6	Family type	1. Nuclear family 2. Extended family
2.7	Number of Family Member	

2.8	Living place	1. Urban 2. Rural
2.9	Religion	1. Islam 2. Hinduism 3. Christian 4. Buddhist 5. Other (specify)…….
2.10	Smoking	1. Yes 2. No
2.11	Family income per month	……Taka

Part 3: Pain Related Information

3.1 Do you have any Low Back Pain?

1. Yes
2. No

3.2 What do you think about the cause of your pain?

1. Due to trauma
2. Due to lifting heavy weight
3. Due to bad posture
4. Others …….

3.3How long have you been suffering from low back pain?

Years…… Months……. Weeks…….

3.4 In which side of your back pain is more?

1. Right
2. Left
3. Middle
4. Both

3.5 Do you have any radiating pain on your thigh?

1. Yes
2. No

3.6 Do you have any radiating pain on your leg?

1. Yes
2. No

3.7 Do you feel weakness in thigh\leg?

1. Yes
2. No

3.8 Do you feel numbness in thigh\leg?

1. Yes
2. No

3.9 Postural Status at work?

1. Sitting 3. Walking

2. Standing 4. Bending

3.10 Previous episode of Low Back Pain?

1. (0) 2. (6-10) 2. (1-5) 4. (11+)

3.11 Check the following-

1. You have fever due to back pain

2. You have sleep disturbance due to back pain

3. You are losing weight

4. You are gaining weight

3.12 When you feel worse pain?

1. At morning 2. At evening 3. As the day progresses 4. All day

3.13 What treatment options you have tried before for this condition?

1. Medication.

2. Surgery

3. Physiotherapy.

4. Others……

3.14 Is the problem

1. Improving
2. Worsening
3. Staying the same

Part 4: Pain Status Related Questionnaire - NPRS (McCaffery & Beebe)

This questionnaire is designed for Radiating Low Back Pain patients. McCaffery & Beebe (1993) suggested a numeric scale to rate the pain status experienced by patients. It is known as Numeric Pain Rating Scale (NPRS). The scale is 10cm long scale ranging from (0-10).

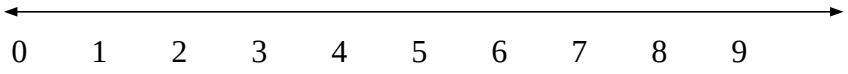
This section of questionnaire will be filled by patient using black or blue colored ball pen. If the patient struggles to understand the meaning of a question, physiotherapist is requested to clear the meaning of certain portions.

For Example:

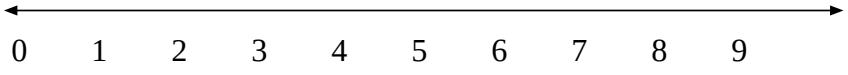
If your back pain is between 7 and 9 then circle like below:

Here Zero (0) means No Pain, (1-3) means Mild Pain, (4-6) means Moderate Pain, (7-10) means Severe Pain.

4.1 How severe is your general pain intensity?



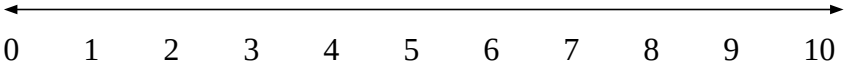
4.2 How severe is your back pain today?



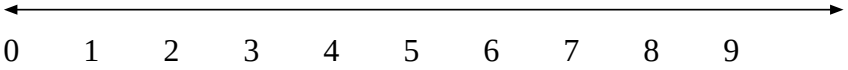
4.3 How severe is your thigh pain today?

4.4 How severe is your leg pain today?

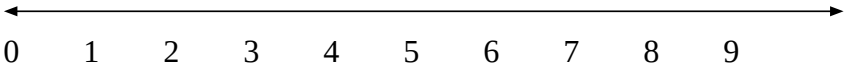
4.5 How severe is your pain during resting position?



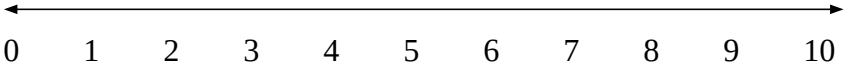
4.6 How severe is your pain during sitting?



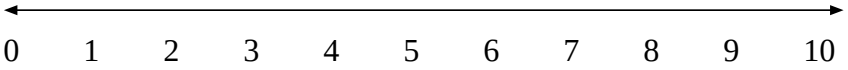
4.7 How severe is your pain during rising?



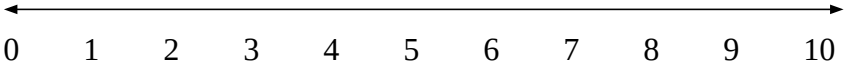
4.8 How severe is your pain during standing?



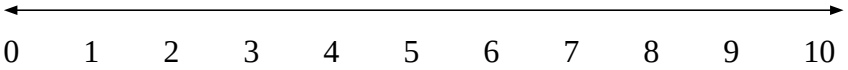
4.9 How severe is your pain during walking?



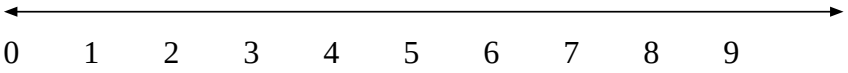
4.10 How severe is your pain during activity?



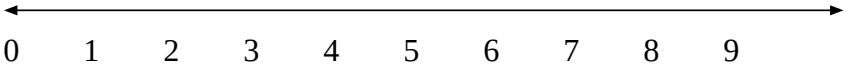
4.11 How severe is your pain during forward bending?



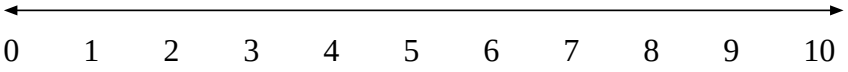
4.12 How severe is your pain during heavy weight lifting?



4.13 How severe is your pain during sleeping?



4.14 How severe is your pain during travelling?



Part 5: 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**.

We realize you may consider that two or more statements in any one section relate to you, but please just mark the box that most closely describes your problem.

5.1 – Pain intensity

☐ 0 I have no pain at the moment

☐ 1 The pain is very mild at the moment

☐ 2 The pain is moderate at the moment

☐ 3 The pain is fairly severe at the moment

☐ 4 The pain is very severe at the moment

☐ 5 The pain is the worst imaginable at the moment

5.2 – Personal care (washing, dressing etc.)

☐ 0 I can look after myself normally without causing extra pain

☐ 1 I can look after myself normally but it causes extra pain

☐ 2 It is painful to look after myself and I am slow and careful

☐ 3 I need some help but manage most of my personal care

☐ 4 I need help every day in most aspects of self-care

☐ 5 I do not get dressed, I wash with difficulty and stay in bed

5.3– Lifting

0 I can lift heavy weights without extra pain

1 I can lift heavy weights but it gives extra pain

2 Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently placed e.g. on a table

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

4 I can lift very light weights

5 I cannot lift or carry anything at all

5.4 – Walking*

0 Pain does not prevent me walking any distance

1 Pain prevents me from walking more than 1 miles

2 Pain prevents me from walking more than half mile

3 Pain prevents me from walking more than 100 gauge

4 I can only walk using a stick or crutches

5 I am in bed most of the time

5.5 – Sitting

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

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

2 Pain prevents me sitting more than one hour

3 Pain prevents me from sitting more than 30 minutes

4 Pain prevents me from sitting more than 10 minutes

5 Pain prevents me from sitting at all

5.6 –Standing

0 I can stand as long as I want without extra pain

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

2 Pain prevents me from standing for more than 1 hour

3 Pain prevents me from standing for more than 30 minutes

4 Pain prevents me from standing for more than 10 minutes

5 Pain prevents me from standing at all

5.7 – Sleeping

0 My sleep is never disturbed by pain

1 My sleep is occasionally disturbed by pain

2 Because of pain I have less than 6 hours sleep

3 Because of pain I have less than 4 hours sleep

4 Because of pain I have less than 2 hours sleep

5 Pain prevents me from sleeping at all

5.8 – Sex life (if applicable)

0 My sex life is normal and causes no extra pain

1 My sex life is normal but causes some extra pain

2 My sex life is nearly normal but is very painful

3 My sex life is severely restricted by pain

4 My sex life is nearly absent because of pain

5 Pain prevents any sex life at all

5.9 – Social life

0 My social life is normal and gives me no extra pain

1 My social life is normal but increases the degree of pain

2 Pain has no significant effect on my social life apart from limiting my more energetic interests e.g., sport

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

4 Pain has restricted my social life to my home

5 I have no social life because of pain

5.10 – Travelling

0 I can travel anywhere without pain

1 I can travel anywhere but it gives me extra pain

2 Pain is bad but I manage journeys over two hours

3 Pain restricts me to journeys of less than one hour

4 Pain restricts me to short necessary journeys under 30 minutes

5 Pain prevents me from travelling except to receive treatment

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

Scoring:
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 ten 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): 5 points or 10 %points.

Post-test Questionnaire

Part 1: Pain Status Related Questionnaire - NPRS (McCaffery & Beebe)

This questionnaire is designed for Radiating Low Back Pain patients. McCaffery & Beebe (1993) suggested a numeric scale to rate the pain status experienced by patients. It is known as Numeric Pain Rating Scale (NPRS). The scale is 10cm long scale ranging from (0-10).

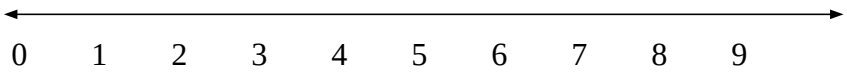
This section of questionnaire will be filled by patient using black or blue colored ball pen. If the patient struggles to understand the meaning of a question, physiotherapist is requested to clear the meaning of certain portions.

For Example:

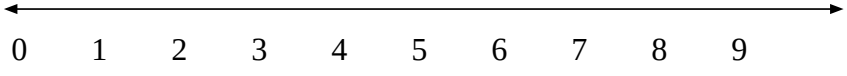
If your back pain is between 7 and 9 then circle like below:

Here Zero (0) means No Pain, (1-3) means Mild Pain, (4-6) means Moderate Pain, (7-10) means Severe Pain.

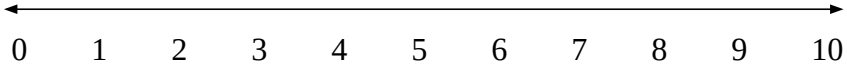
1.1 How severe is your general pain intensity?



1.2 How severe is your back pain today?



1.3 How severe is your thigh pain today?



1.4 How severe is your leg pain today?

0 1 2 3 4 5 6 7 8 9

10

1.5 How severe is your pain during resting position?

0 1 2 3 4 5 6 7 8 9 10

1.6 How severe is your pain during sitting?

0 1 2 3 4 5 6 7 8 9

10

1.7 How severe is your pain during rising?

0 1 2 3 4 5 6 7 8 9

10

1.8 How severe is your pain during standing?

0 1 2 3 4 5 6 7 8 9 10

1.9 How severe is your pain during walking?

0 1 2 3 4 5 6 7 8 9 10

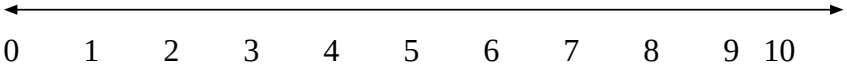
1.10 How severe is your pain during activity?

0 1 2 3 4 5 6 7 8 9 10

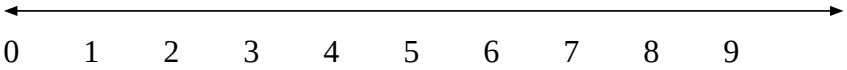
1.11 How severe is your pain during forward bending?

0 1 2 3 4 5 6 7 8 9 10

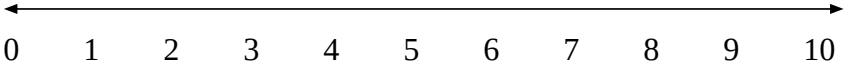
1.12 How severe is your pain during heavy weight lifting?



1.13 How severe is your pain during sleeping?



1.14 How severe is your pain during travelling?



Part 2: 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**.

We realize you may consider that two or more statements in any one section relate to you, but please just mark the box that most closely describes your problem.

2.1 – Pain intensity

☐ 0 I have no pain at the moment

☐ 1 The pain is very mild at the moment

☐ 2 The pain is moderate at the moment

☐ 3 The pain is fairly severe at the moment

☐ 4 The pain is very severe at the moment

☐ 5 The pain is the worst imaginable at the moment

2.2 – Personal care (washing, dressing etc.)

☐ 0 I can look after myself normally without causing extra pain

☐ 1 I can look after myself normally but it causes extra pain

☐ 2 It is painful to look after myself and I am slow and careful

☐ 3 I need some help but manage most of my personal care

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☐ 5 I do not get dressed, I wash with difficulty and stay in bed

2.3– Lifting

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1 Pain prevents me from walking more than 1 miles

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2.6 –Standing

0 I can stand as long as I want without extra pain

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5 Pain prevents me from standing at all

2.7 – Sleeping

0 My sleep is never disturbed by pain

1 My sleep is occasionally disturbed by pain

2 Because of pain I have less than 6 hours sleep

3 Because of pain I have less than 4 hours sleep

4 Because of pain I have less than 2 hours sleep

5 Pain prevents me from sleeping at all

2.8 – Sex life (if applicable)

0 My sex life is normal and causes no extra pain

1 My sex life is normal but causes some extra pain

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3 My sex life is severely restricted by pain

4 My sex life is nearly absent because of pain

5 Pain prevents any sex life at all

2.9 – Social life

0 My social life is normal and gives me no extra pain

1 My social life is normal but increases the degree of pain

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4 Pain has restricted my social life to my home

5 I have no social life because of pain

2.10 – Travelling

0 I can travel anywhere without pain

1 I can travel anywhere but it gives me extra pain

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

সম্মতিপত্র

আসসালামু আলাইকুম / নমস্কার,
আমি সুমাইয়া ইসলাম, ৪র্থ বর্ষ, ঢাকা বিশ্ববিদ্যালয়ের চিকিৎসা অনুষদের অধীনে বাংলাদেশ হেলথ প্রফেশন ইন্সটিটিউট (বিএইচপিআই) এর বিএসসি ইন ফিজিওথেরাপি বিভাগের একজন শিক্ষার্থী। অধ্যয়নের অংশ হিসেবে আমাকে একটি গবেষণা সম্পাদনা করতে হবে এবং এটা আমার প্রাতিষ্ঠানিক কাজের একটি অংশ। নিম্নোক্ত তথ্যাদি পাঠ করার পর অংশগ্রহণকারীদের গবেষণায় অংশগ্রহণের জন্য অনুরোধ করা হল।

আমার গবেষণার শিরোনাম **"কোমর ব্যথার রোগীদের ক্ষেত্রে নিউরাল মোবিলাইজেশন বনাম স্ট্যাটিক স্ট্রেচিং এর কার্যকারিতা"**। এই গবেষণার মাধ্যমে আমি কোমড় ব্যথার জন্য নিউরাল মোবিলাইজেশন এবং স্ট্যাটিক স্ট্রেচিং এর কার্যকারিতা খুঁজে বের করার চেস্টা করব। যদি আমার গবেষণাটি সফলভাবে সম্পূর্ণ করতে পারি তবে যেসব রোগীরা কোমড় ব্যথায় ভুগছেন তারা উপকৃত হবেন এবং এটি হবে একটি পরীক্ষামূলক প্রমাণ।

আমার গবেষণা প্রকল্প বাস্তবায়নের জন্য রোগীদের কাছ থেকে তথ্য সংগ্রহের প্রয়োজন। আমার গবেষণায় অংশগ্রহণে আপনার কোন বিপদ বা ক্ষতি হবে না। আপনি যেকোন সময় নিজেকে এ গবেষণা থেকে প্রত্যাহার করতে পারেন। এই গবেষণার প্রাপ্ত তথ্য সম্পূর্ণভাবে গোপনীয় থাকবে এবং অংশগ্রহণকারীর ব্যক্তিগত তথ্য অনুমতি ব্যতিরেকে অন্য কোথাও প্রকাশ করা হবে না।

এই গবেষণা সম্পর্কে আপনার যদি কোনো জিজ্ঞাসা থাকে তবে আপনি অনুগ্রহপূর্বক যোগাযোগ করতে পারেন গবেষক সুমাইয়া ইসলাম অথবা মোহাম্মদ আনোয়ার হোসেন, সহযোগী অধ্যাপক এবং বিভাগীয় প্রধাণ, ফিজিওথেরাপি বিভাগ, সি আর পি, সাভার, ঢাকা-১৩৪৩ এর সাথে।

শুরু করার পূর্বে আপনার কোন প্রশ্ন আছে কি?

আমি কি শুরু করতে পারি? ☐ হ্যাঁ ☐ না

অংশগ্রহণকারীর স্বাক্ষর এবং তারিখ .....

গবেষকের স্বাক্ষর এবং তারিখ .....

স্বাক্ষীর স্বাক্ষর এবং তারিখ .....

চিকিৎসা পূর্ববর্তী প্রশ্নাবলী

কোড নং:

শিরোনাম: কোমর ব্যথার রোগীদের ক্ষেত্রে নিউরাল মোবিলাইজেশন বনাম স্ট্যাটিক স্ট্রেচিং এর কার্যকারিতা।

অধ্যায় ১: ব্যক্তিগত বিবরণ		
ক্রমিক নং	**প্রশ্ন সমূহ**	**উত্তর**
১.১	অংশগ্রহণকারীর নাম	
১.২	ঠিকানা	<u>বর্তমান ঠিকানা:</u> গ্রাম: পোস্ট অফিস: থানা: জেলা:
		<u>স্থায়ী ঠিকানা:</u> গ্রাম: পোস্ট অফিস: থানা: জেলা:
১.৩	.ফোন নম্বর	অংশগ্রহণকারীর ফোন নম্বর:
		নির্ভরশীল ব্যক্তির ফোন নম্বর:
১.৪	সাক্ষাৎ এর তারিখ	দিন/মাস/বছর:

কোড নং: **শিরোনাম: কোমর ব্যথার রোগীদের ক্ষেত্রে নিউরাল মোবিলাইজেশন বনাম স্ট্যাটিক স্ট্রেচিং এর কার্যকারিতা।**		
অধ্যায় ২: আর্থ – সামাজিক ও জনসংখ্যাতাত্ত্বিক তথ্য		
২.১	বয়স	_____ বছর
২.২	লিঙ্গ	১- পুরুষ ২- মহিলা
২.৩	শিক্ষাগত যোগ্যতা	১- কখনো স্কুলে যায়নি ২- প্রাথমিক শিক্ষা শেষ করেনি ৩- প্রাথমিক ৪- মাধ্যমিক ৫- উচ্চ মাধ্যমিক ৬- স্নাতক ৭- স্নাতকোত্তর ৮- অন্যান্য .....

২.৪	পেশা	১- কৃষক ২- দিনমজুর ৩- চাকুরীজীবী ৪- গার্মেন্টস কর্মী ৫- গাড়ি চালক ৬- রিক্সা চালক ৭- ব্যবসায়ী ৮- কাজে অনিয়োজিত ৯- গৃহিণী ১০- শিক্ষক ১১- ছাত্র ১২- অন্যান্য.....
২.৫	বৈবাহিক অবস্থা	১- বিবাহিত ২- অবিবাহিত ৩- বিধবা ৩- বিপত্নীক ৪- তালাকপ্রাপ্ত
২.৬	পরিবারের ধরণ	১- একক পরিবার ২- যৌথ পরিবার

২.৭	পরিবারের সদস্যসংখ্যা	
২.৮	আবাসিক এলাকা	১- নগরস্থ ২- গ্রামীণ
২.৯	ধর্ম	১- ইসলাম ২- হিন্দু ৩- খ্রিষ্টান ৪- বৌদ্ধ ৫- অন্যান্য.....
২.১০	ধূমপান	১- হ্যাঁ ২- না
২.১১	পরিবারের মাসিক আয়	.....টাকা

অধ্যায় ৩: ব্যথা সম্পর্কিত তথ্যবলী

৩.১ আপনি কি কোমর ব্যথায় ভুগছেন?

১- হ্যাঁ

২- না

৩.২ আপনার ব্যথা কি কারণে হয়েছে বলে আপনি মনে করেন?

১- কোন আঘাতের ফলে

২- শরীরের সঠীক অবস্থান না রাখার জন্য

৩- কোন ভারি বস্তু তুলতে গিয়ে

৪- অন্যান্য.....

৩.৩ আপনি কতদিন যাবত কোমর ব্যথায় ভুগছেন?

বছর..... মাস ..... সপ্তাহ.....

৩.৪ আপনার কোমর ব্যথা কোন পাশে বেশি?

১- ডান ৩- মাঝখানে

২- বামে ৪- উভয় পাশে সমান

৩.৫ আপনার কী উরুতে কোন ব্যথা আছে?

১- হ্যাঁ

২- না

৩.৬ আপনার উরুর ব্যথা কোন পাশে বেশি?

১- ডান ২- বাম ৩- উভয়

৩.৭ আপনার কি পায়ে কোন ব্যথা আছে?

১- হ্যাঁ

২- না

৩.৮ আপনার পায়ের ব্যথা কোন পাশে বেশি?

১- ডান ২- বাম ৩- উভয়

৩.৯ আপনি কি উরুতে\পায়ে দুর্বলতা অনুভব করেন?

১- হ্যাঁ

২- না

৩.১০ আপনি কি উরুতে\পায়ে অসাড়তা অনুভব করেন ?

১- হ্যাঁ

২- না

৩.১১ কর্মস্থলের অঙ্গবিন্যাস গত অবস্থান কি?

১- বসে থাকা ৩- হাঁটা

২- দাঁড়িয়ে থাকা ৪- কোমর সামনে ঝুকান

৩.১২ কোমর ব্যথার ঘটনাপ্রবাহ সংখ্যা?

১- ০ ৩- (৬-১০)

২- (১-৫) ৪- (১১+)

৩.১৩ নিম্নোক্ত চেক করুন-

১- কোমর ব্যথার কারনে জ্বর আসে

২- কোমর ব্যথার কারনে ঘুমের সমস্যা হয়

৩- ওজোন কমছে

৪- ওজন বাড়ছে

৩.১৪ আপনার ব্যথা কখন তীব্র হয়?

১- সকালে

২- সন্ধ্যায়

৩- দিন বাড়ার সাথে সাথে

৪- সারাদিন

৩.১৫ আপনি পূর্বে কি ধরনের চিকিৎসা নিয়েছেন এই সমস্যার জন্য ?

১- ঔষধ

২- অস্ত্রোপাচার

৩- ফিজিওথেরাপি

৪- অন্যান্য.....

৩.১৬ সমস্যাটি কি

১- উন্নতির দিকে

২- অপরিবর্তিত

৩- অবনতির দিকে

অধ্যায় ৪: ব্যথার অবস্থা সম্পর্কিত প্রশ্নাবলী NPRS (McCaffery & Beebe)

এই প্রশ্নাবলী কোমর রোগীদের জন্য পরিকল্পনা করা হয়েছে। McCaffery & Beebe, (১৯৯৩) রোগীদের ব্যথার অভিজ্ঞতা ব্যাখ্যা করার জন্য নিওমারিক পেইন রেটিং স্কেল ব্যবহার করেন। এটা সংখ্যা সূচক ব্যথা নির্ধারক স্কেল হিসাবে পরিচিত। এই স্কেলটি ১০ সেন্টিমিটার দীর্ঘ স্কেল যার পরিসর (০-১০)।

প্রশ্নাবলীর এই অংশে একটি নীল বা কাল ব্ল কলম ব্যভার কর রোগীর দ্বারা পূরণ করা হবে। রোগী কোন প্রশ্নের মানে না বুঝতে পারলে, ফিজিওথেরাপিস্টকে নির্দিষ্ট অংশের অর্থ পরিষ্কার করতে অনুরোধ করা হল।

উদাহরণ সরূপ:

যদি আপনার ব্যথা ৭ থেকে ৯ এর মধ্যে হয় তাহলে পূরণ করবেন-

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

এখানে শূন্য (০) মানে কোন ব্যথা নেই, (১-৩) মানে হালকা ব্যথা, (৪-৬) মানে সহনীয় ব্যথা এবং (৭-১০) মানে তীব্র ব্যথা।

৪.১ সাধারণত আপনার ব্যথার তীব্রতা কতোটুকু?

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

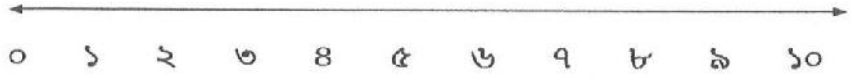
৪.২ আজকে আপনার কোমর ব্যথার তীব্রতা কতোটুকু ?

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

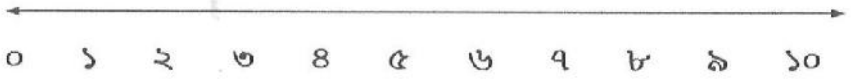
৪.৩ আজকে আপনার উরুর ব্যথার তীব্রতা কতোটুকু ?

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

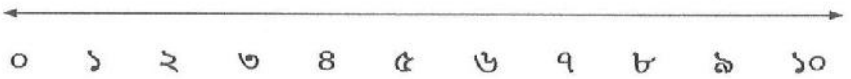
৪.৪ আজকে আপনার পায়ের ব্যথার তীব্রতা কতোটুকু?



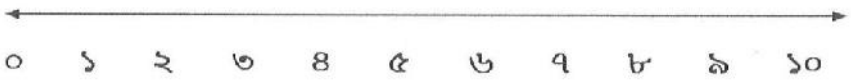
৪.৫ বিশ্রামরত অবস্থায় আপনার ব্যথার তীব্রতা কতোটুকু?



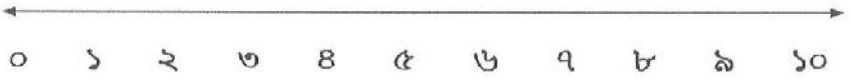
৪.৬ বসে থাকা অবস্থায় আপনার ব্যথার তীব্রতা কতোটুকু?



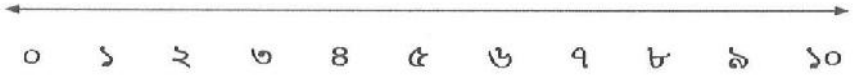
৪.৭ উঠার সময় আপনার ব্যথার তীব্রতা কতোটুকু?



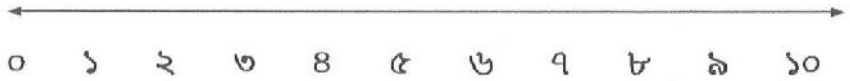
৪.৮ দাঁড়িয়ে থাকা অবস্থায় আপনার ব্যথার তীব্রতা কতোটুকু ?



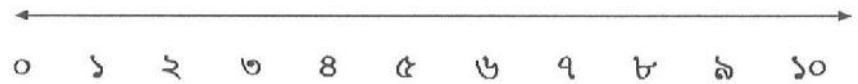
৪.৯ হাঁটা অবস্থায় আপনার ব্যথার তীব্রতা কতোটুকু?



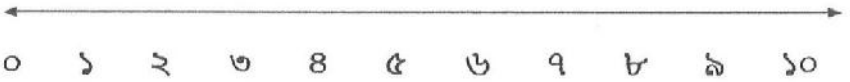
৪.১০ কাজকর্মে থাকা অবস্থায় আপনার ব্যথার তীব্রতা কতোটুকু?



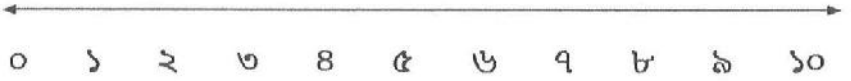
৪.১১ সামনে ঝুকার সময় আপনার ব্যথার তীব্রতা কতোটুকু ?



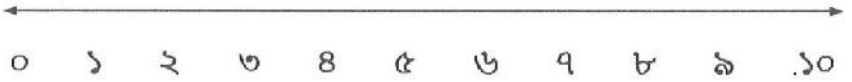
৪.১২ ভারী বস্তু উত্তোলনের সময় আপনার ব্যথার তীব্রতা কতোটুকু ?



৪.১৩ ঘুমের মাঝে আপনার ব্যথার তীব্রতা কতোটুকু?



৪.১৪ ভ্রমণে থাকা অবস্থায় আপনার ব্যথার তীব্রতা কতোটুকু ?



অধ্যায় ৫: অসওয়েসট্রি কোমর ব্যথার অক্ষমতা সূচক প্রশ্নাবলী

এই প্রশ্নপত্রটি আপনার কোমড় ব্যথা এবং পায়ের ব্যথা আপনার দৈনন্দিন জীবনকে কতখানি প্রভাবিত করে তার সম্বন্ধে আমাদের ধারনা দিবে।

আপনি দয়া করে নীচের প্রতিটি বিভাগ হতে যেকোন একটি উক্তি গোল দাগ দিয়ে চিহ্নিত করুন যেটি আপনার বর্তমান অবস্থাকে সবচেয়ে ভালভাবে ব্যখ্যা করে।

৫.১ - ব্যথার তীব্রতা

০ আমার এই মুহূর্তে কোন ব্যথা নেই

১ এই মুহূর্তে ব্যথা খুবই হালকা

২ এই মুহূর্তে ব্যথা সহনীয় আছে

৩ এই মুহূর্তে ব্যথা মাঝামাঝি

৪ এই মুহূর্তে ব্যথা খুব তীব্র

৫ এই মুহূর্তে ব্যথা সবচেয়ে খারাপ

৫.২ - ব্যক্তিগত যত্ন (কাপড় পরা ও ধোয়া ইত্যাদি)

০ আমি সাধারণত অতিরিক্ত ব্যথা ছাড়া নিজের দেখাশোনা করতে পারি

১ আমি সাধারণত নিজের দেখাশোনা করতে পারি, কিন্তু ব্যথা হয়

২ ব্যথার কারনে নিজের দেখাশোনা করার জন্য আমি সতর্কতা অবলম্বন করছি

৩ আমি নিজের যত্ন নিতে পারি কিন্তু আমার কিছুটা সাহায্যের প্রয়োজন হয়,

৪ আমার নিজের যত্নের প্রায় সব ক্ষেত্রে প্রতিদিন সাহায্যের প্রয়োজন হয়.

৫ আমার পোশাক পরিধানে ও ধোয়ার কাজে অসুবিধা হয় এবং আমি বিছানায় পড়ে থাকি.

৫.৩ - উত্তোলন (গৃহপালিত প্রাণি, মুদি, বই, সরঞ্জাম ইত্যাদি)

০ আমি অতিরিক্ত ব্যথা ছাড়া ভারী ওজন উত্তোলন করতে পারি

১ আমি ভারী ওজন উত্তোলন করতে পারি, কিন্তু এটা আমাকে অতিরিক্ত ব্যথা দেয়.

২ ব্যথার কারনে আমি মেঝে থেকে ভারি ওজন উত্তোলন করতে পারি না, কিন্তু সুবিধামত (যেমন একটি টেবিলের উপর থেকে) স্থান হলে, আমি উত্তোলন করতে পারি.

৩ ব্যথা ভারী ওজন উত্তোলন থেকে আমাকে বাধা দেয়, কিন্তু আমি হাল্কা থেকে মাঝারি ওজন তারা সুবিধামত স্থানে উত্তোলন করতে পারি।

৪ আমি শুধুমাত্র খুব হালকা ওজন উত্তোলন করতে পারি।

৫ আমি কিছু বহন বা উত্তোলন করতে পারি না।

৫.৪ - ঘুমানো

০ ব্যথার কারনে আমার ঘুমের কোন সমস্যা হয় না।

১ ব্যথার কারনে মাঝে মাঝে আমার ঘুমের সমস্যা হয়

২ ব্যথার কারণে আমার ছয় ঘন্টার কম ঘুম হয়।

৩ ব্যথার কারণে আমার চার ঘন্টার কম ঘুম হয়।

৪ ব্যথার কারণে আমার দুই ঘন্টার কম ঘুম হয়।

৫ ব্যথার কারণে আমি ঘুমাতে পারি না।

৫.৫ - বসা

০ আমি পছন্দ মত যে কোন চেয়ারে যতক্ষণ খুশি বসে থাকতে পারি.

১ আমি যতক্ষণ চাই আমার প্রিয় চেয়ারে বসে থাকতে পারি.

২ ব্যথার কারনে আমি এক ঘণ্টার বেশি বসে থাকতে পারি না

৩ ব্যথার কারনে আমি আধ ঘণ্টার বেশি বসে থাকতে পারি না

৪ ব্যথার কারনে আমি ১০ মিনিটের বেশি বসে থাকতে পারি না

৫ ব্যথার কারনে আমি একেবারেই বসে থাকতে পারি না

৫.৬ - দাঁড়ানো

০ আমি অতিরিক্ত ব্যথা ছাড়া যতক্ষন খুশি দাড়িয়ে থাকতে প্যরি।

১ আমি যতক্ষন খুশি দাড়িয়ে থাকতে প্যরি, কিন্তু এটা আমাকে অতিরিক্ত ব্যথা দেয়।

২ ব্যথ্যর কারণে এক ঘণ্টা অধিক সময় দাঁড়িয়ে থাকা যায় না।

৩ ব্যথ্যর কারণে আধ ঘণ্টা অধিক সময় দাঁড়িয়ে থাকা যায় না।

৪ ব্যথ্যর কারণে ১০ মিনিটের অধিক সময় দাঁড়িয়ে থাকা যায় না।

৫ ব্যথার কারণে আমি একেবারেই দাঁড়িয়ে থাকতে পারিনা।

৫.৭ - হাঁটা

০ হাঁটার সময় আমার কোন বাথা হয় না।

১ ব্যথা এক মাইল এর বেশী হাঁটার ক্ষেত্রে আমাকে বাধা দেয়.

২ ব্যথা আধ মাইল এর বেশি হাঁটার ক্ষেত্রে আমাকে বাধা দেয়.

৩ ব্যথা ১০০ গজ এর বেশি হাঁটার ক্ষেত্রে আমাকে বাধা দেয়.

৪ আমি শুধুমাত্র একটি লাঠি বা ক্রাচ ব্যবহার করে হাঁটতে পারি

৫ আমি অধিকাংশ সময় বিছানায় থাকি

৫.৮ - যৌন জীবন (প্রযোজ্য হলে)

০ আমার যৌন জীবন স্বাভাবিক এবং কোন অতিরিক্ত ব্যথা হয়না

১ আমার যৌন জীবন স্বাভাবিক কিন্তু কিছুটা ব্যথা হয়

২ আমার যৌন জীবন প্রায় স্বাভাবিক কিন্তু অনেক ব্যথা হয়

৩ আমার যৌন জীবন ব্যথা দ্বারা গুরুতরভাবে বাধাগ্রস্থ

৪ আমার যৌন জীবন ব্যথার কারনে প্রায় অনুপস্থিত

৫ ব্যথার কারনে আমার যৌন জীবন পুরোপুরিভাবে বাধাগ্রস্থ

৫.৯ - সামাজিক জীবন

০ আমার সামাজিক জীবন স্বাভাবিক এবং এতে কোন অতিরিক্ত ব্যথা হয় না।

১ আমার সামাজিক জীবন স্বাভাবিক, কিন্তু ব্যথা বৃদ্ধি পায়।

২ ব্যথা আমার সামাজিক জীবনের উপর উল্লেখযোগ্য প্রভাব ফেলতে পাড়েনি (যেমন ক্রীড়া, ইত্যাদি).

৩ ব্যথা কারণে আমার সামাজিক জীবন সীমাবদ্ধ হয়েছে এবং আমি প্রায়ই বাইরে যেতে পারি না।

৪ ব্যথা আমার বাড়িতে আমার সামাজিক জীবন সীমিত করেছে।

৫ ব্যথার কারণ আমার কোন সামাজিক জীবন নেই।

৫.১০ - ভ্রমণ

০ আমি ব্যথা ছাড়া যে কোন জায়গায় ভ্রমণ করতে পারি।

১ আমি কোথাও ভ্রমণ করতে পারি, কিন্তু এটা অতিরিক্ত ব্যথা দেয়.

২ আমি দুই ঘন্টার উপর যাতায়াতের পরিচালনা করতে পারি, কিন্তু এটা ব্যথাকে খারাপ করে

৩ ব্যথা কারণে আমার যাতায়াত সীমিত এবং তা এক ঘণ্টার কম।

৪ ব্যথা কারণে আমার যাতায়াত সীমিত এবং তা ৩০ মিনিটের কম।

৫ ব্যথা আমার চিকিৎসা গ্রহণ ছাড়া অন্য সকল ভ্রমণে আমাকে বাধা দেয়।

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

Scoring:
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 ten 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): 5 points or 10 %points.

চিকিৎসা পরবর্তী প্রশ্নাবলী

কোড নং:

শিরোনাম: কোমর ব্যথার রোগীদের ক্ষেত্রে নিউরাল মোবিলাইজেশন বনাম স্ট্যাটিক স্ট্রেচিং এর কার্যকারিতা।

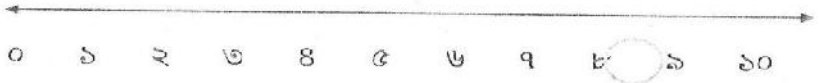
অধ্যায় ১: ব্যথার অবস্থা সম্পর্কিত প্রশ্নাবলী NPRS (McCaffery & Beebe)

এই প্রশ্নাবলী কোমর রোগীদের জন্য পরিকল্পনা করা হয়েছে। McCaffery & Beebe, (১৯৯৩) রোগীদের ব্যথার অভিজ্ঞতা ব্যাখ্যা করার জন্য নিওমারিক পেইন রেটিং স্কেল ব্যবহার করেন। এটা সংখ্যা সূচক ব্যথা নির্ধারক স্কেল হিসাবে পরিচিত। এই স্কেলটি ১০ সেন্টিমিটার দীর্ঘ স্কেল যার পরিসর (০-১০)।

প্রশ্নাবলীর এই অংশে একটি নীল বা কাল বল কলম ব্যভার কর রোগীর দ্বারা পূরণ করা হবে। রোগী কোন প্রশ্নের মানে না বুঝতে পারলে, ফিজিওথেরাপিস্টকে নির্দিষ্ট অংশের অর্থ পরিষ্কার করতে অনুরোধ করা হল।

উদাহরণ সরূপ:

যদি আপনার ব্যথা ৭ থেকে ৯ এর মধ্যে হয় তাহলে পূরণ করবেন-



০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

এখানে শূন্য (০) মানে কোন ব্যথা নেই, (১-৩) মানে হালকা ব্যথা, (৪-৬) মানে সহনীয় ব্যথা এবং (৭-১০) মানে তীব্র ব্যথা।

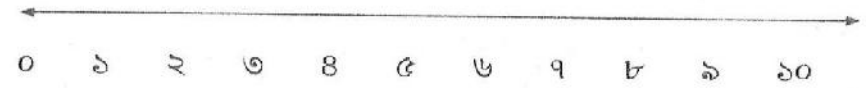
১.১ সাধারণত আপনার ব্যথার তীব্রতা কতোটুকু?

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

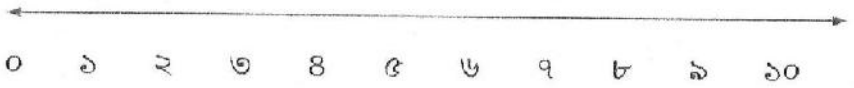
১.২ আজকে আপনার কোমর ব্যথার তীব্রতা কতোটুকু ?

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

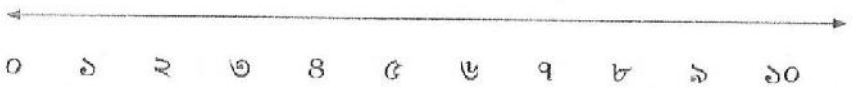
১.৩ আজকে আপনার উরুর ব্যথার তীব্রতা কতোটুকু ?



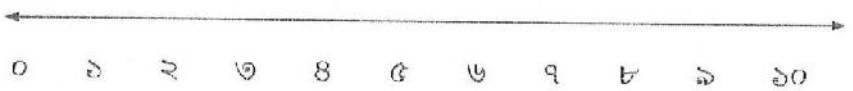
১.৪ আজকে আপনার পা-এর ব্যথার তীব্রতা কতোটুকু?



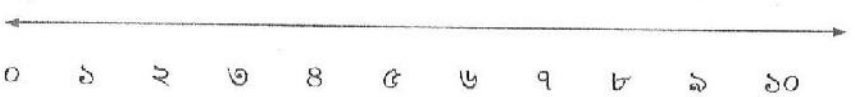
১.৫ বিশ্রাম এর সময় আপনার ব্যথার তীব্রতা কতোটুকু?



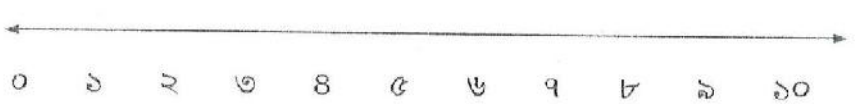
১.৬ বসে থাকা অবস্থায় আপনার ব্যথার তীব্রতা কতোটুকু?



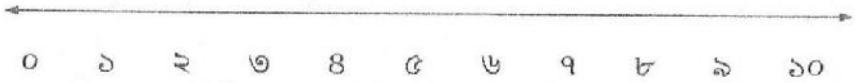
১.৭ উঠার সময় আপনার ব্যথার তীব্রতা কতোটুকু?



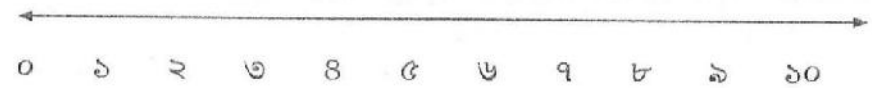
১.৮ দাঁড়িয়ে থাকা অবস্থায় আপনার ব্যথার তীব্রতা কতোটুকু ?



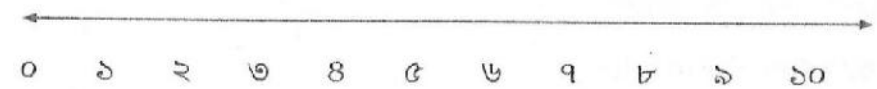
১.৯ হাঁটা অবস্থায় আপনার ব্যথার তীব্রতা কতোটুকু?



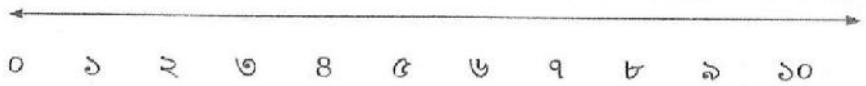
১.১০ কাজকর্মে থাকা অবস্থায় আপনার ব্যথার তীব্রতা কতোটুকু?



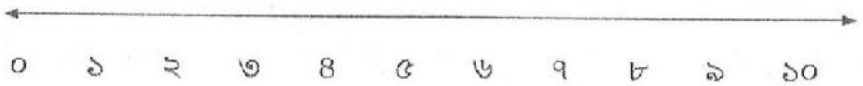
১.১১ সামনে ঝুকার সময় আপনার ব্যথার তীব্রতা কতোটুকু ?



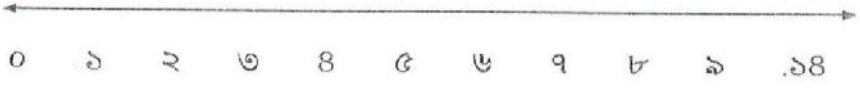
১.১২ ভারী বস্তু উত্তোলনের সময় আপনার ব্যথার তীব্রতা কতোটুকু ?



১.১৩ ঘুমের মাঝে আপনার ব্যথার তীব্রতা কতোটুকু?



১.১৪ ভ্রমণে থাকা অবস্থায় আপনার ব্যথার তীব্রতা কতোটুকু ?



অধ্যায় ২: অসওয়েসট্রি কোমর ব্যথার অক্ষমতা সূচক প্রশ্নাবলী

এই প্রশ্নপত্রটি আপনার কোমড় ব্যথা এবং পায়ের ব্যথা আপনার দৈনন্দিন জীবনকে কতখানি প্রভাবিত করে তার সম্বন্ধে আমাদের ধারনা দিবে।

আপনি দয়া করে নীচের প্রতিটি বিভাগ হতে যেকোন একটি উক্তি গোল দাগ দিয়ে চিহ্নিত করুন যেটি আপনার বর্তমান অবস্থাকে সবচেয়ে ভালভাবে ব্যখ্যা করে।

২.১ - ব্যথার তীব্রতা

০ আমার এই মুহূর্তে কোন ব্যথা নেই

১ এই মুহূর্তে ব্যথা খুবই হালকা

২ এই মুহূর্তে ব্যথা সহনীয় আছে

৩ এই মুহূর্তে ব্যথা মাঝামাঝি

৪ এই মুহূর্তে ব্যথা খুব তীব্র

৫ এই মুহূর্তে ব্যথা সবচেয়ে খারাপ

২.২ - ব্যক্তিগত যত্ন (কাপড় পরা ও ধোয়া ইত্যাদি)

০ আমি সাধারণত অতিরিক্ত ব্যথা ছাড়া নিজের দেখাশোনা করতে পারি

১ আমি সাধারণত নিজের দেখাশোনা করতে পারি, কিন্তু ব্যথা হয়

২ ব্যথার কারনে নিজের দেখাশোনা করার জন্য আমি সতর্কতা অবলম্বন করছি

৩ আমি নিজের যত্ন নিতে পারি কিন্তু আমার কিছুটা সাহায্যের প্রয়োজন হয়,

৪ আমার নিজের যত্নের প্রায় সব ক্ষেত্রে প্রতিদিন সাহায্যের প্রয়োজন হয়.

৫ আমার পোশাক পরিধানে ও ধোয়ার কাজে অসুবিধা হয় এবং আমি বিছানায় পড়ে থাকি.

২.৩ - উত্তোলন (গৃহপালিত প্রাণি, মুদি, বই, সরঞ্জাম ইত্যাদি)

০ আমি অতিরিক্ত ব্যথা ছাড়া ভারী ওজন উত্তোলন করতে পারি

১ আমি ভারী ওজন উত্তোলন করতে পারি, কিন্তু এটা আমাকে অতিরিক্ত ব্যথা দেয়.

২ ব্যথার কারনে আমি মেঝে থেকে ভারি ওজন উত্তোলন করতে পারি না, কিন্তু সুবিধামত (যেমন একটি টেবিলের উপর থেকে) স্থান হলে, আমি উত্তোলন করতে পারি.

৩ ব্যথা ভারী ওজন উত্তোলন থেকে আমাকে বাধা দেয়, কিন্তু আমি হাল্কা থেকে মাঝারি ওজন তারা সুবিধামত স্থানে উত্তোলন করতে পারি।

৪ আমি শুধুমাত্র খুব হালকা ওজন উত্তোলন করতে পারি।

৫ আমি কিছু বহন বা উত্তোলন করতে পারি না।

২.৪ - ঘুমানো

০ ব্যথার কারনে আমার ঘুমের কোন সমস্যা হয় না।

১ ব্যথার কারনে মাঝে মাঝে আমার ঘুমের সমস্যা হয়

২ ব্যথার কারণে আমার ছয় ঘন্টার কম ঘুম হয়।

৩ ব্যথার কারণে আমার চার ঘন্টার কম ঘুম হয়।

৪ ব্যথার কারণে আমার দুই ঘন্টার কম ঘুম হয়।

৫ ব্যথার কারণে আমি ঘুমাতে পারি না।

২.৫ - বসা

০ আমি পছন্দ মত যে কোন চেয়ারে যতক্ষণ খুশি বসে থাকতে পারি.

১ আমি যতক্ষণ চাই আমার প্রিয় চেয়ারে বসে থাকতে পারি.

২ ব্যথার কারনে আমি এক ঘণ্টার বেশি বসে থাকতে পারি না

৩ ব্যথার কারনে আমি আধ ঘণ্টার বেশি বসে থাকতে পারি না

৪ ব্যথার কারনে আমি ১০ মিনিটের বেশি বসে থাকতে পারি না

৫ ব্যথার কারনে আমি একেবারেই বসে থাকতে পারি না

২.৬ - দাঁড়ানো

০ আমি অতিরিক্ত ব্যথা ছাড়া যতক্ষন খুশি দাড়িয়ে থাকতে পারি।

১ আমি যতক্ষন খুশি দাড়িয়ে থাকতে পারি, কিন্তু এটা আমাকে অতিরিক্ত ব্যথা দেয়।

২ ব্যথার কারণে এক ঘণ্টা অধিক সময় দাঁড়িয়ে থাকা যায় না।

৩ ব্যথার কারণে আধ ঘণ্টা অধিক সময় দাঁড়িয়ে থাকা যায় না।

৪ ব্যথার কারণে ১০ মিনিটের অধিক সময় দাঁড়িয়ে থাকা যায় না।

৫ ব্যথার কারণে আমি একেবারেই দাঁড়িয়ে থাকতে পারিনা।

২.৭ - হাঁটা

০ হাঁটার সময় আমার কোন বাধা হয় না।

১ ব্যথা এক মাইল এর বেশী হাঁটার ক্ষেত্রে আমাকে বাধা দেয়.

২ ব্যথা আধ মাইল এর বেশি হাঁটার ক্ষেত্রে আমাকে বাধা দেয়.

৩ ব্যথা ১০০ গজ এর বেশি হাঁটার ক্ষেত্রে আমাকে বাধা দেয়.

৪ আমি শুধুমাত্র একটি লাঠি বা ক্রাচ ব্যবহার করে হাঁটতে পারি

৫ আমি অধিকাংশ সময় বিছানায় থাকি

২.৮ - যৌন জীবন (প্রযোজ্য হলে)

০ আমার যৌন জীবন স্বাভাবিক এবং কোন অতিরিক্ত ব্যথা হয়না

১ আমার যৌন জীবন স্বাভাবিক কিন্তু কিছুটা ব্যথা হয়

২ আমার যৌন জীবন প্রায় স্বাভাবিক কিন্তু অনেক ব্যথা হয়

৩ আমার যৌন জীবন ব্যথা দ্বারা গুরুতরভাবে বাধাগ্রস্থ

৪ আমার যৌন জীবন ব্যথার কারনে প্রায় অনুপস্থিত

৫ ব্যথার কারনে আমার যৌন জীবন পুরোপুরিভাবে বাধাগ্রস্থ

২.৯ - সামাজিক জীবন

০ আমার সামাজিক জীবন স্বাভাবিক এবং এতে কোন অতিরিক্ত ব্যথা হয় না।

১ আমার সামাজিক জীবন স্বাভাবিক, কিন্তু ব্যথা বৃদ্ধি পায়।

২ ব্যথা আমার সামাজিক জীবনের উপর উল্লেখযোগ্য প্রভাব ফেলতে পাড়েনি (যেমন ক্রীড়া, ইত্যাদি).

৩ ব্যথা কারণে আমার সামাজিক জীবন সীমাবদ্ধ হয়েছে এবং আমি প্রায়ই বাইরে যেতে পারি না।

৪ ব্যথা আমার বাড়িতে আমার সামাজিক জীবন সীমিত করেছে।

৫ ব্যথার কারণ আমার কোন সামাজিক জীবন নেই।

২.১০ - ভ্রমণ

০ আমি ব্যথা ছাড়া যে কোন জায়গায় ভ্রমণ করতে পারি।

১ আমি কোথাও ভ্রমণ করতে পারি, কিন্তু এটা অতিরিক্ত ব্যথা দেয়.

২ আমি দুই ঘন্টার উপর যাতায়াতের পরিচালনা করতে পারি, কিন্তু এটা ব্যথাকে খারাপ করে

৩ ব্যথা কারণে আমার যাতায়াত সীমিত এবং তা এক ঘণ্টার কম।

৪ ব্যথা কারণে আমার যাতায়াত সীমিত এবং তা ৩০ মিনিটের কম।

৫ ব্যথা আমার চিকিৎসা গ্রহণ ছাড়া অন্য সকল ভ্রমণে আমাকে বাধা দেয়।

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

Scoring:
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 ten 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): 5 points or 10 %points.

Permission letter

16th April, 2019

The Head of Department

Department of Physiotherapy,

Bangladesh Health Professions Institute (BHPI)

CRP, Chapain, Savar, Dhaka-1343.

Through: The Head of the Department, Department of Physiotherapy, BHPI.

Subject: Seeking permission to collect data to conduct 4th year physiotherapy research project.

Dear Sir,

With due respect and humble submission to state that I am Sumaiya Islam, student of 4th Professional B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). The ethical committee has approved the research project entitled on "**Effectiveness of Neural Mobilization versus Static Stretching for the treatment of Radiating Low Back Pain"** under the supervision of Mohammad Anwar Hossain, Associate Professor & Head of the Physiotherapy Department, CRP, Savar, Dhaka-1343, Bangladesh. Conducting this research project is partial fulfillment of the requirement for the degree of B.Sc. in physiotherapy. I want to collect necessary data for the research project from the patients attending at Musculoskeletal unit, department of Physiotherapy, CRP, Savar. Therefore I need to obtain your kind written permission to initiate data collection from the targeted patients. I would like to assure ethical principle would be followed as per guidelines of my institution/department.

May I, therefore pray and hope that you would be kind enough to grant my application & permit me to collect required data to accomplish the research objectives.

Yours obediently,

Sumaiya Islam

Sumaiya Islam

4th professional B.Sc. in Physiotherapy

Roll No.: 28, Session: 2014-15

Bangladesh Health Professions Institute (BHPI)

(An academic Institute of CRP)

CRP, Chapain, Savar, Dhaka-1343.

Forwarded & recommended

16.04.19

Prof. Md. Obaidul Haque
Head, Department of Physiotherapy
BHPI, CRP, Savar, Dhaka-1343

Approved

Please contact with Farjana Sharmin Rumana, DPD Incharge, PTD, CRP.

Rumana 17.04.19
FARJANA SHARMIN
Junior Consultant and DPD Incharge
Physiotherapy Department
CRP, Savar, Dhaka

21/04/19
Mohammad Anwar Hossain
Associate Professor & Head
Physiotherapy Dept., CRP
Chapain, Savar, Dhaka-1343

বাংলাদেশ হেল্‌থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
BANGLADESH HEALTH PROFESSIONS INSTITUTE (BHPI)
(The Academic Institute of CRP)
CRP-Chapain, Savar, Dhaka-1343. Tel: 02-7745464-5, 7741404

Ref: CRP-BHPI/IRB/09/19/1334

Date: 18/09/2019

To
Sumaiya Islam
B.Sc. in Physiotherapy
Session: 2014-15, Student ID:112140259
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal **"Effectiveness of Neural Mobilization versus Static Stretching for the treatment of Radiating Low Back Pain Patients"** by ethics committee.

Dear Sumaiya Islam,
Congratulations.
The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above mentioned dissertation, with yourself, as the Principal investigator. The Following documents have been reviewed and approved:

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

The study involves use of a questionnaire to explore the most effective treatment between neural mobilization and static stretching for radiating low back pain patients that may take 15 to 20 minutes to answer the question and there is no likelihood of any harm to the participants. Data collectors will receive informed consents from all participants. Any data collected will be kept confidential. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 10.00 AM on 11th August, 2018 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
Assistant Professor, Dept. of Rehabilitation Science
Member Secretary, Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

TREATMENT PROTOCOL

Group A Treatment protocol

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

Group A was given neural mobilization according to nerve involvement. Every patient of experimental group was given the sciatic nerve mobilization with the branch of tibial and peroneal nerve. Nerve mobilization techniques were performed with the patient in supine. The subjects remain relaxed and comfortable on the bed with feet uncrossed and arms at the side. The trunk and hips were in a neutral position**.**

Neural Mobilization Procedure

Nerve Mobilization	Tibial Nerve	Peroneal Nerve
Hip	Flexion with adduction and internal rotation	Flexion with adduction and internal rotation
Knee	Extension	Extension
Ankle	Dorsiflexion with eversion	Planter flexion with inversion

Group B treatment protocol

Treatment option	**Duration/Repetition**
Static stretching	5 repetition (15 second hold in each repetition)
McKenzie Approach (Directional Preference)	10 repetition in each session
Lumbar Mobilization (Maitland Mobilization)	5 minutes in each session
Soft tissue technique	3 minutes in each session
IRR	10 minutes in each session

Static stretching includes stretching of:

Erector spine

Quadratus lumborum

Psoas major

Iliotibial band

Quadriceps

Gluteus

Hamstring

Calf muscle

Static Stretching will be given according to muscle involvement and number of muscle for stretching should be 3 in each session.