Faculty of Medicine

University of Dhaka

THE EFFECTIVENESS OF SEGMENTAL STABILIZATION EXERCISE WITH CONVENTIONAL THERAPY AND ONLY CONVENTIONAL THERAPY FOR CHRONIC LOW BACK PAIN PATIENTS.

By

Minara Akter

Master Science in Physiotherapy

Session: 2016-2017

Registration no: 2563

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Submitted in Partial Fulfillment of the Requirements for the Degree of

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We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for acceptance of this thesis entitled, **"The effectiveness of segmental stabilization exercise with conventional therapy and only conventional therapy for chronic low back pain patients"** submitted by Minara Akter, for the partial fulfillment of the requirements for the degree of Master of Science in Physiotherapy.

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Declaration Form

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

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

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

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- I confirm that the electronic copy is identical to the bound copy of the Thesis.

- In case of dissemination the finding of this project for future publication, research supervisor will highly concern and it will be duly acknowledged as undergraduate thesis.

Signature:……

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Date: .....

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Table of Contents

List of table

List of Figures

Lists of abbreviations

ASIPP	American Society of Interventional Pain Physicians
BHPI	Bangladesh Health Professions Institute
CRP	Centre for the Rehabilitation of the Paralysed
CLBP	Chronic Low Back Pain
IRB	Institutional Review Board
MMT	Manual Muscle Testing
ODI	Oswestry Disability Index
PENS	Percutaneous Electrical Nerve Stimulation
PSEQ	Pain Self-Efficacy Questionnaire
PGIC	Patient Global Impression of Change
RMDQ	Roland–Morris Disability Questionnaire
TrA	Transverse Abdominis muscle
VAS	Visual Analogue Scale

Abstract

Background*:** Pain and disability persisting for more than 3 months called chronic low back pain (CLBP), and it's a major health problem with enormous economic and social costs. Generally, incidents of back pain most commonly occur in between ages 25 and 50 years and chronic low back pain over 70%-80% of adult population, the maximum prevalence being around the age of 55-65 years, with a 5-10% incidence at adult age. ***Objectives*:** To identify whether segmental stabilization exercise with conventional therapy program or only conventional therapy program is more effective for the treatment of chronic low back pain patients. ***Methodology*:** It was Randomized control Trail (RCT). 30 patients with chronic low back pain were randomly assigned into two groups from outdoor musculo-skeletal unit, CRP. Among them 15 patients were assigned into experimental group received segmental stabilization exercises with conventional therapy and another 15 into control group received only conventional therapy. Total treatment sessions were twelve comprising of 3 sessions per week for 4 weeks. Double blinding procedure was used during data collection. ***Outcome measurement tools*:** Dallas Pain Quessnaire with Visual analogue Scale was used to measure pain, manual muscle testing to measure muscle strength and ODI to measure low back disability. ***Analysis of data: Between group analysis of muscle strength and back disability was calculated by Mann – Whitney U test and Pain (continuous data) by unpaired t test. Within group analysis of muscle strength and back disability was calculated by Wilcoxon test and pain (continuous data) by paired t test and test was done using SPSS version 16. ***Results*:** The main findings of this study is in case of pain intensity in different functional position in experimental group all variables come highly significant but in control group all the variables come significant except hurt

when walking, and change work place come non-significant. So, we concluded that segmental stabilization exercise with conventional therapy is effective reducing pain in different functional position. In case of muscle strength within group comparison of flexor and extensor muscle strength come significant improvement in both experimental and control group but in experimental group come highly significant changes. In between group experimental and control mean difference is same that means in case of between group null hypotheses is accepted. In case of ODI quessnaire both experimental and control group come significant improvement but in experimental group come highly significant. The result of the study find out that segmental stabilization exercise with conventional therapy is more effective than only conventional therapy and the duration was total 4 weeks 12 sessions for chronic low back pain. ***Conclusion:*** This research showed that segmental stabilization exercises combined with conventional therapy was more effective than only conventional therapy for patients with chronic low back pain.

Key words: Chronic low back pain,Segmental stabilization exercise and Conventional therapy.

CHAPTER-l INTRODUCTION

1.1 Background

LBP has been referred as a 20th century disaster (Sparkes, 2005) and now days it become a universal problem. Chronic low back pain (CLBP) is one of the major public health problems, with high economic and social costs, loss of job and disability in the world wide (Suka and Katsumi, 2008).Most common and uncomfortable sensation in the lumber and buttock region originating from neurons near or around the spinal canal that are injured or irritated by one or more pathologic processes that is low back pain (Ahmed, et al., 2010). Definition of LBP is difficult, but it refers to a symptom complex in which pain is localized to the lumbar spine or referred to the leg or foot. LBP affect the area between the lower rib case and gluteal folds and often radiates to the thighs (Van Tulder, et al., 2006).Lumber backache is one of the most common causes of chronic disability and in the majority of cases of the back ache is associated with some abnormality in the intervertebral discs at the lowest two levels of the spine (Shakoor , et al ., 2007).

LBP may cause a decrease in the quality of life of individuals, as well as deterioration in physical activity. Generally, incidents of back pain most commonly occur in between ages 25 and 50 years (Charoenchai, et al., 2006) and chronic low back pain occur over 70%-80% of adult population, and the maximum prevalence being around the age of 55-65 years (Sirbu, 2015) In the United States disabling low back pain episodes increased 26% from 1974 to 1978, while the population increased only 7%. LBP is also very costly: in the U.S. total incremental direct health care costs attributable to low back pain were estimated at $26.3 billion in 1998 (Chou, et al.,

2007). It is also considered the second leading cause of office visits to primary care physicians in USA (Licciardone, 2008).

In a Chinese study claimed that the 1-year prevalence of LBP was 64% (Barrero, et al., 2006). Another research in UK shows that 85% people suffered with low back pain in every year (Janet, et al., 2009).There are 5 and 10%people developed chronic low back pain in their full life(Liao, et al., 2009). In every year low back pain normally affects around one third of the adult population in UK. So, about 20% (1 in 15 of the population) patient will consult with GP for their back pain. In the UK every year 2.6 million people were take advice about back pain related information from their GP (Macfarlane, et al., 2006). Low back pain (CLBP) is that between 5.0% and 10.0% of cases will develop chronic which is responsible for high treatment costs, sick leave, and individual suffering. Approximately, for the adult population attack of chronic back pain include; 11% for disabling back pain in the last three months, 23% for low back pain lasting more than three months and, 18% for at least moderately troublesome pain in the previous month (Meucci, et al., 2015).

The World Health Organization reports low back pain is a leading cause of disability worldwide (Kendall, et al., 2015).Low back pain is a widespread health problem in developed countries, with lifetime and one year prevalence rate of 60 – 80 % and becomes a chronic in 5 – 10 % of the patients (Shnayderman and Katz, 2012).At present low back pain is one of the most common diseases in industrialized modern societies. In Korea, the frequency of low back pain is gradually on the rise, and 60 to 80 % of people experience low back pain at some time in their life. Low back pain occurs most frequently in those in their 30 to 50 years in both men and women, and it occurs most in women aged 40 or older (Hicks, et al., 2005).According to duration chronic low back pain is three months or longer (Jeong , et al ., 2015).The prevalence

of chronic, impairing LBP has risen significantly in North Carolina, with continuing high levels of disability and health care use. A substantial portion of the rise in LBP care costs over the past 2 decades may be related to this rising prevalence. Low back pain (LBP) is the second most common cause of disability in US adults1 and a common reason for lost work days. An estimated 149 million days of work per year are lost because of LBP. The condition is also costly, with total costs estimated to be between $100 and $200 billion annually, two-thirds of which are due to decreased wages and productivity (Katz, 2006).

According to the American Society of Interventional Pain Physicians (ASIPP), chronic pain is a pain that persists 6 months after an injury and beyond the usual course of an acute disease or a reasonable time for a comparable injury to heal, that is associated with chronic pathologic processes that cause continuous or intermittent pain for months or years, that may continue in the presence or absence of demonstrable pathologies; may not be amenable to routine pain control methods; and healing may never occur (Manchikanti, et al ., 2009).

The main patho physiological cause of CLBP is mechanical lumbar syndrome, typically aggravated by static loading of the spine (prolonged sitting or standing), by long-lever activities or levered postures (bending forward, rotation of the trunk, etc). It includes: nonspecific pain, probably caused by macro instability or micro instability of the spine with or without radiographic hyper mobility or evidence of subluxation (Deyo and Weinstein,2012); followed by: intervertebral disc degeneration arthropathy of, facet joints and surrounding structures, spinal canal stenosis, spondylolisis and spondylolisthesis. Less than 1% could be due to nontechnical syndromes: neurologic syndromes, systemic disorders and referred pain.

More than 80% of the population will experience an episode of LBP at some time during their lives. For most, the clinical course is benign, with 95% of those afflicted recovering within a few months of onset (Tulder and Bbombardier, 2010). Some, however, will not recover and will develop chronic LBP (ie, pain that lasts for 3 months or longer). Recurrences of LBP are also common, with the percentage of subsequent LBP episodes ranging from 20% to 44% within 1 year for working populations to lifetime recurrences of up to 85% (Kendall , et al . , 2015).

Besides pain and functional disability, CLBP is characterized by psychological and socio-economic aspects. Therefore, the treatment requires a multidisciplinary approach and it should be directed not only to reduce pain, but also to improve quality of life parameters (Brox , 2005).The use of health care services for chronic LBP has increased substantially over the past 2 decades. Multiple studies shows that using national and insurance claims data have identified greater use of spinal injections surgery, and upload medications—treatments most likely to be used by individuals with chronic LBP. Several studies also show that medication prescription and visits to physicians, physical therapists, and chiropractors is increasing day by day. Because individuals with chronic LBP are more likely to seek care and to use more health care services, relative to individuals with acute LBP, increases in health care use are likely driven more by chronic than acute cases (Barrero, et al., 2006).There are various number of treatment techniques ranging from spinal manipulations, mobilization, advice, general exercises and specifically tailored exercises (Liddle, et al., 2009).In recent years, multiple studies have explore the evidence for treating chronic low back pain; options include spinal manipulation therapy, behavioral therapy, exercise therapy, transcutaneous electrical nerve stimulation, interferential currents, low-level laser therapy, and yoga (Chou, et al.,2007). Others therapies such as include massage,

acupuncture, and superficial heat therapy , e.g., thermal heat wraps, hot water bottles, heated packs filled with grain, hot towels, and electric heating pads , (Kizhakkeveettil, et al., 2014).

According to patients pain intensity and functional status provide an adequate therapy for CLBP. It is important to check for any restrictions in mobility and pain occurrence during the execution of several selected basic exercises and also to investigate whether there are some limitations in activities of daily living before deciding what exercise program to apply (Brox , et al., 2005). Positive effect of exercise therapy on pain and functionality in patients with CLBP had been proven by clinical practice and numerous studies. Recently, there has been a focus on exercises that aim to maintain improve lumbar spine stability. Although no formal definition of lumbar stabilization exercises exists, the approach is aimed at improving the neuromuscular control, strength, and endurance of the muscles that are central to maintaining the dynamic spinal and trunk stability. Several groups of muscles particularly targeted the transverses abdominis and lumbar multifidus, but also other paraspinal, abdominal, diaphragmatic, and pelvic muscles (Standaert, Weinstein and Rumpettes,2008).Unsubstantiated suggestions that stabilization training may be useful in reducing pain and disability for all patients with nonspecific LBP (Urquhart and Hodges, 2005).

Traditional exercise programs for CLBP include strengthening and stretching of the large superficial back and abdominal muscles, without stabilization exercises and formation of the protective lumbar muscle corset. The lack of such programs is the

inability to activate deepest layers of the back muscles, as well as inadequate pelvis immobilization, which can lead to injury during exercise (Stankovic, et al., 2012).

1.2. Justification of the study

Low back pain is one of the leading causes of disability and has a major socioeconomic impact. Despite a large amount of research in the field, there remains uncertainty about the best treatment approach for chronic low back pain. The majority of the cost associated with LBP is generated by a small percentage of patients whose condition proceeds to chronicity. There is evidence that the prevalence and costs of chronic low back pain are rising. The weakness and lack of motor control of deep trunk muscles, such as the lumbar multifidus (LM) and transverses abdominis (TrA) muscles are the major cause of chronic low back pain ((Franca , et al., 2010).

Exercises are frequently used by physical therapists for the treatment of low back pain. Specific exercises that activate abdominal and/ or back extensor muscles are advocated to reduce pain and disability. Stabilization exercises have been designed in order to enhance the neuromuscular control system and correct the dysfunction. Exercises are ineffective for acute low back pain or as effective as other treatments, but are effective for chronic low back pain or more effective than other treatments.

This is reinforced by the result of studies which support the view that conventional physiotherapy (such as manual therapy, massage, electro physical agents) is not adequate to provide satisfactory long term outcome for patients with chronic low back pain.

In the past decade there has been a shift towards core stability training or segmental stabilization training. Whilst traditional exercises generally work to increase the "global" strength of the larger muscles responsible for movement, the "core stability "approach aims to improve the dynamic stability role of the "local" muscles (Schembri,et al.,2014).In a systematic review of May, and Johnson(2008) find out that for chronic low back pain patients in specific stabilization exercise have some role but not effective than other active intervention. Others study of (Franca , et al ., 2010) find out that in comparison between segmental stabilization and strengthening exercise improvement of all variables was superior in the segmental stabilization exercise group opposed to the strengthening group. For acute, sub-acute and chronic low back pain, segmental stabilizing exercises are more effective than treatment by general practitioner but they are not more effective than other physiotherapy interventions (Rackwitz,et al.,2006). This study helps to develop evidence based practice for chronic low back pain. Also helps to find out the effectiveness of segmental stabilization exercises for chronic low back pain.

Physiotherapy managers and the professional body have the role to play in the development of the skills through the provision of resources and training. However individual physiotherapists have a responsibility to provide the best treatment for their patients through reflective consideration of all available evidence. The patient who suffers from chronic low back pain will benefit from my research project. It also helps the physiotherapist to improvement the quality of treatment.

1.3. Operational definition:

Segmental stabilization exercises: Lumbar stabilization exercises or segmental stabilization exercises aimed at improving the neuromuscular control, strength, and endurance of the muscles that are central to maintaining the dynamic spinal and trunk stability. Several groups of muscles particularly targeted the transverses abdominis and lumbar multifidus, but also other paraspinal, abdominal, diaphragmatic, and pelvic muscles (Standaert, et al., 2008).

Conventional therapy: Treatment that is widely accepted and used by most healthcare professionals. It is different from alternative or complementary therapies, which are not as widely used. Such as manual therapy, massage, electro physical agents.

Chronic low back pain: Low back pain sustaining of more than 3 months duration.

Low back pain: Definition of LBP is difficult, but it refers to a symptom complex in which pain is localized to the lumbar spine or referred to the leg or foot.

1.4. Objective

1.4.1. General objectives

To identify whether segmental stabilization exercise with conventional therapy program or only conventional therapy program is more effective for the treatment of chronic low back pain patients.

1.4.2. Specific Objectives

- To compare the effectiveness of segmental stabilization exercise with conventional therapy and only conventional therapy for chronic low back pain patients.
- To determine the disability level due to chronic low back pain in within and between group comparisons.
- To explore socio- demographic (age, gender, occupation, educational status) characteristics of patients with chronic low back pain.
- To evaluate the outcome of pain in different functional position after receiving treatment in between and within group.
- To determine the effectiveness of segmental stabilization exercises combined with conventional physiotherapy in within and between groups among patients with chronic low back pain at lumber muscle strength.

1.5. Hypothesis:

1.5.1. Null hypothesis

$\mathbf{H_0}$:$\mu_{1-}\ \mu_2 = 0$ or $\mu_1 = \mu_2$, where the experimental group and control group mean difference are same.

1.5.2 Alternative hypothesis

$\mathbf{H_a}$: $\mu_{1-}\ \mu_2 \neq 0$ or $\mu_1 < \mu_2$, where the experimental group and control group mean difference are not same.

CHAPTER –II LITERATURE REVIEW

Low back pain is defined as pain and discomfort, localized below the costal margin and above the inferior gluteal folds, with or without leg pain (Van Tulder, et al., 2006).Pain and disability persisting for more than 3 months defined or called chronic low back pain (CLBP), and it's a major health problem with enormous economic and social costs (Jeong , et al ., 2015).

Causes of the low back pain there are three groups of clinical classification entities. First one consists of conditions and systemic diseases which can cause pain including - tumors, infections, fractures, caudaequina syndrome, ankylosing spondylitis, intestinal metastases and tumors which irradiate pain to the low back region. The second groups includes the conditions which have the symptoms of reticular compression– pain radiating from lumbo – sacral spinal region to one or both legs, accompanied by neurological disorders. The third group do not consist of an unspecific lumbar pain which is neither accompanied by symptoms of nerve root compression nor is it a consequence of some other illness (Stankovic, et al., 2008).

Risk factors for chronic low back pain are poorly understood. The most frequently reported are heavy physical work, frequent bending, twisting, lifting, pulling and pushing, repetitive work, static postures and vibrations. Psychosocial risk factors include stress, distress, anxiety, depression, cognitive dysfunction, pain behavior, job dissatisfaction, and mental stress at work (VanTulder, et al., 2006).

The intervertebral disc is crucial to the function of the spine. The discs sit between the contiguous vertebrae and act as a shock absorber, helping enhance fluidity and strength of spinal motion, and dispersion of axial and torsional forces. The intervertebral disc is made of a collage nous exterior annulus fibrosus and a gelatinous interior nucleus pulpous (Simon, et al., 2014). The NP is 85% aqueous and is composed of collagen type II and few chondrocyte-like cells. It has a high proteoglycan and water content and serves to resist axial compression. The annulus fibrosis consists of 15–50 concentric lamellae that are attached to the cartilaginous endplate of each vertebra and is composed of type I collagen and a few fibroblasts, giving it a high tensile force (. Huang,et al., 2014). A decrease in nutrients and oxygen supply to the disc due to loss of end plate permeability makes it difficult for the disc to maintain its matrix and cell turnover (although minimal), which leads to degeneration and cellular apoptosis(Kepler, et al., 2013). With maturation, proteoglycans and aggrecan molecules are degraded, resulting in loss of glycosaminoglycans and decreased osmotic pressure (Raj. 2008). This affects the load-bearing function of the disc, resulting in loss of disc height and bulging of nuclear contents posteriorly through the thinning or torn annulus and the relatively weak posterior longitudinal ligament. The loss of hydration and desiccation can lead to increased stress concentrations on the endplate and the annulus, which have been associated with discogenic pain. (Johnson, et al., 2005). Collagen type II fibers become more denatured due to disrupted enzyme activity (Aggrecan molecules, which have been shown to inhibit neural in growth, also degrade in degenerating discs, leading to neural in growth that also contributes to chronic pain (Freemont , et al ., 2011).

Most patients suffering from CLBP experience pain in the lower area of the back (lumbar and sacroiliac regions) and mobility impairment. Pain can also radiate in the lower extremities, or generalized pain can be present. Patients with CLBP can also experience movement and coordination impairments. This could affect the control of voluntary movements of the patient. It can be challenging for the patient to maintain the neutral position, mal alignment of the body can occur. It can also be found difficult to maintain a standing, sitting or a lying position, especially in case of radiating pain to the lower extremities. Carrying things in the arms or bending can also provoke complaints. Daily activities, such as cleaning, sports and other recreational occupations can become a big task for people with CLBP. On the occasion of generalized pain, sensory experiences of the patient can also become altered; fear-avoidance beliefs, pain catastrophizing and depressive thoughts can appear (Anthony, et al., 2012).

Chronic lower back pain is difficult to diagnose on one hand, but on the other hand the definition is very simple. In fact, if the back pain continues to be present for 3 months or more, we can consider it "chronic lower back pain". Generally, patients are diagnosed based on their history. The specific diagnosis is then formulated based on the examination and clinical outcomes. Questionnaires can be used, as well as a body pain diagram, on which the patient locates his pain and pain distribution (Southerst, et al.,2013).General medical knowledge suggests that MRI is superior to plain radiography because it shows soft tissue and can detect more concerning abnormalities, such as infections, cancer, and metastatic tumors (Chou, et al., 2007). CT is better for showing bony abnormalities, but these rarely correlate with a patient's LBP, and CT subjects' patients to levels of radiation that can increase cancer risks. Plain radiography is not generally recommended as it cannot show intervertebral discs

or evaluate the degree of spinal stenosis as accurately as MRI (FDA, 2016). Initial evaluation of chronic low back pain depends on the following categories - (1) non-specific low back pain; (2) back pain associated with radiculopathy or spinal stenosis; (3) back pain referred from a non-spinal source; or (4) back pain associated with another specific spinal cause (Chou, et al., 2008). Magnetic resonance imaging (MRI) or computed tomography (CT) may establish the diagnosis of the patient who have back pain associated with radiculopathy, Spinal stenosis, or another specific spinal cause (Lastand Hulbert, 2010). For the chronic low back pain patient the physical examination should include the straight leg raise and a focused neuromuscular examination. A positive straight leg raise test (pain with the leg fully extended at the knee and flexed at the hip between 30 and 70 degrees) can suggest lumbar disc herniation, with ipsilateral pain being more sensitive (i.e. better at ruling out disc herniation if negative) and contra lateral pain being more specific Chronic low back pain . Which nerve root involved can find out by testing deep tendon reflexes, strength, and sensation (Devillé,et al., 2000).

A non-invasive and non-pharmacological treatment approach, is the first-line management of LBP including patient education, advice to stay active, exercise therapy and manual therapy (Wong, et al., 2017).That means exercise and intensive multidisciplinary pain treatment programmed are effective for chronic low back pain is supported by strong evidence. Some evidence supports the effectiveness of (cognitive) behavior therapy, analgesics, antidepressants, non-steroidal anti-inflammatory drugs, and back schools and spinal manipulation (Koe, et al .,2010). No evidence supports using other interventions (for example, steroid injections, lumbar supports, and traction). For most effective treatments, the effects are usually only small and short term. Unfortunately, many commonly used interventions lack

sufficient evidence for clinically relevant long term effect and therapeutic interventions has now been incorporated in clinical guidelines (Van Tulder and Koes, 2006).In recent years, multiple studies have explore the evidence for treating chronic low back pain; options include spinal manipulation therapy, behavioral therapy, exercise therapy, transcutaneous electrical nerve stimulation, interferential currents, low-level laser therapy, and yoga (Chou,et al.,2007). Others therapies such as include massage, acupuncture, and superficial heat therapy , e.g., thermal heat wraps, hot water bottles, heated packs filled with grain, hot towels, and electric heating pads , (Kizhakkeveettil, et al. , 2014). Manual modalities such as physiotherapy, massage, chiropractic, occupational, and osteopathic therapies, including spinal manipulation and mobilization, are often used together and alone to treat chronic non-specific low back pain (Furlan, et al., 2010).

For chronic LBP Medication is the most frequently used intervention. The most commonly prescribed medications include non-steroidal anti-inflammatory drugs (NSAIDs), opioids, and antidepressants. NSAIDs are the most frequently prescribed medications worldwide and are frequently recommended as an option in chronic LBP treatment. Many other types of medications are used, however, including Tylenol, skeletal muscle relaxants, benzodiazepines, systemic corticosteroids, and antiseptics (White, et al., 2011).

Some evidence from a Cochrane review shows that exercise is effective at slightly reducing pain and improving physical function in patients with non-specific chronic low back pain (Hayden, et al., 2005).Benefits of exercise includes to improve back

strength, flexibility, range of motion and fitness and to provide an acute improvement in mood and protection from depression (Hoffman and Hoffman, 2007).

Chronic low back pain exercise therapy, focusing on strengthening and stabilizing the core muscle groups of the abdomen and back, appears to produce small improvements in pain and functioning (van Tulder, et al., 2007).For chronic low back pain Various exercise intervention programs, such as muscle strengthening, flexibility, and aerobic fitness training, have been found to be beneficial (Gordon and Bloxham, 2016).For the people with chronic LBP walking is a simple method to increase activity and commonly health practitioners advise people with chronic LBP to increase their daily physical activity in the form of awaking exercise program (Liddle, et al.,2009).(Hurley, et al., 2015; McDonough ,et al., 2013; O'Connor, et al., 2015) found that Walking exercise has been found to be effective in the management of pain and disability and has led to greater exercise adherence than supervised exercise programs in patients with chronic LBP .A study of Searle, et al.(2015) find out that exercise has a beneficial effect on chronic low back pain when compared with other treatments . For chronic low back pain Exercise therapy is effective in improving function and reducing pain (Hayden, et al., 2005).

For chronic low back pain treatment use manual modalities such as physiotherapy, massage, chiropractic, occupational, and osteopathic therapies, including spinal manipulation and mobilization, are often used together and alone (Furlan, et al., 2010).

Manual therapies such as spinal manipulation and mobilization for treating back pain focusing on several systematic review study (Schroeder, et al., 2013).In earlier research find out that there is little or no evidence that spinal manipulative therapy was superior to other standard treatments for chronic low back pain (Assendelft, et al.,2003). But recent systematic reviews suggest that spinal manipulation and mobilization are "viable" options for pain treatment (Furlan, et al., 2013) and the effectiveness of manipulation and mobilization may vary depending on the duration of symptoms, how the intervention is administered (eg, whether there is additional exercise or general practitioner care, at what dosages, and follow-up periods), the comparator, and types of outcomes reported. The overall evidence suggests that manipulation and mobilization are effective treatment and modalities compared with other therapies (Deyo, et al., 2014).

Conflicting evidence supports the use of TENS as treatment of chronic back pain. RCT shave shown a small short-term effect on pain in two studies, but not in a third (Francis, et al., 2006). Multiple study in recent year find out that effectiveness of transcutaneous electrical nerve stimulation, interferential currents, low-level laser therapy, for chronic low back pain (Chou ,et al.,2007).A reviews study find out that insufficient quality evidence for recommending for or against the use of high-voltage galvanic therapy, interferential therapy, iontophoresis, percutaneous electrical nerve stimulation (PENS), microcurrent electrical stimulation, and sympathetic electrotherapy for treating chronic low back pain (Williams ,2010).The treatment of chronic low back pain Therapeutic ultrasound is frequently used by physiotherapists and it is one of the most widely used electro-physical agents in clinical practice. Therapeutic ultrasound has a small effect on improving low-back function in the short term, but this benefit is unlikely to be clinically important. Evidence from

comparisons between other treatments and therapeutic ultrasound for chronic LBP were indeterminate and generally of low quality (Ebadi, et al., 2014).

Evidence suggests that exercise adherence in patients with chronic LBP decreases rapidly over time and up to 70% of patients with chronic low back pain do not engage in prescribed home exercise because they are not aware to their prescribed exercise regimen would lead to health benefits (Beinart, et al., 2013).For find out better prognosis or improvement patients with chronic low back pain required advice to stay active plus specific advice about relevant exercise and/or functional activities to encourage active self-management (Liddle, et al.,2007).

The chronic has a significant impact on the quality of life of those affected. A well-developed and responsive outcome measure provides beneficial information to determine real change and evidence of treatment effectiveness (Haywood, 2006). In clinical practice, outcome measures are increasingly used as screening instruments, but there is little evidence to suggest that their use substantially changes patient management (Greenhalgh, et al., 2005). The common outcome measurement tools used for chronic low back pain are - Roland–Morris disability questionnaire (RMDQ), Oswestry disability index (ODI) version 2, Numerical rating scale (NRS), Pain self-efficacy questionnaire (PSEQ), Patient-specific functional scale (PSFS), Patient global impression of change (PGIC).

CHAPTER – III METHODOLOGY

3.1. Study design

It was Randomized controlled Trial (RCT) because the experimental study is the best way to find out the effectiveness of the study. The researcher has conducted the study with experimental group and control group. This is an experiment between different subject designs. Double blinding (participants and assessor blinding), random sampling were used to two different groups of subjects.

3.2. Study area

.

This study conducted in musculoskeletal Physiotherapy unit of the Centre for the Rehabilitation of the Paralyzed (CRP), Savar, Dhaka. Because these patient CRP from all over the Bangladesh from all economic groups for comprehensive rehabilitation, so we may assume that this study will reflect the entire population.

3.3. Study population

Study was conducted among adult of both sexes (25 to 60 years) from the CRP outdoor department.

3.4. Study period

Approximately 10 months (August 2017 to June 2018) were required for completion of the study.

3.5. Method of Sample selection

Computer generated simple random sampling technique was used of this study.30 patients with chronic low back pain who met the inclusion criteria selected conveniently from outpatient musculoskeletal unit of physiotherapy department at CRP, Savar, Dhaka. All the participants had an equal probability of assignment to any group and then patients was randomly assigned to experimental group comprising of 15 patients treatment approaches of segmental stabilization exercise with conventional therapy and 15 patients to the control group was treated with only conventional physiotherapy techniques. The study was a double blinded (participants and assessor blinding), technique. After completion of sampling technique, the researcher randomly assigned the participants into experimental and control group, because it improves internal validity of the thesis. The participants were assigned into experimental and control group by using computer generated random number from 1 to 30. An initial randomization was done by computer to identify the participants of experimental and control group and the first participants came out in the experimental group. The samples was given numerical number E1, E2, E3 etc for the experimental group and C1, C2, C3 etc for control group. The random numbers of samples in the experimental group was 1, 2 ,3 ,9 ,10 ,12 ,14 ,15 ,16 ,17 ,18 ,20, 24 ,28 ,30 and control group 4, 5, 6, 7 ,8, 11, 13, 19, 21, 22, 23, 25, 26, 27, 29. Finally, the sample size was 30 in number consisting of 15 participants in the control group and 15 in the control group.

3.6. Inclusion criteria

Patient suffering from low back pain at least 3 months: Chronic low back pain patients were included in this thesis. By definition, participants who

suffered from low back pain for more than 12 weeks or 3 months were included (Jeong , et al ., 2015)**.**

Male and female both were included: Low back pain occurs most frequently in both men and women, and it occurs most in women aged 40 or older (Hicks, et al., 2005).

Age range from 25 to 60 years - This age group patients were usually affected bychronic low back pain (Charoenchai, et al., 2006).

Willingness to participant:that means those who were motivated and given consent to include in the study. because they provided written consent form and might be helpful or might not leave treatment during the study (Franca, et al. (2014).

3.7. Exclusion criteria

Previous history of heart disease : Excluded the patients who are suffer from cardiopulmonary diseases (Karnati and Reddy, 2015).

Bowel and bladder dysfunction: Excluded the participants who have bowel and bladder dysfunction (Amit, et al., 2013) **.**

Serious pathological diseases: Patients who were suffering fromserious pathologicaldisease e.g. tumours,tuberculosis and spine infection (Ojoawo, et al.,2017).

Osteoporosis and rheumatologic disorders: Excluded the participants who have osteoporosis and rheumatologic disorder (Uddin and Ahmed , 2013).

Low back surgery: Exclude the patients who have history of previous low back surgery(Barradas, et al ., 2015).

Flow chart

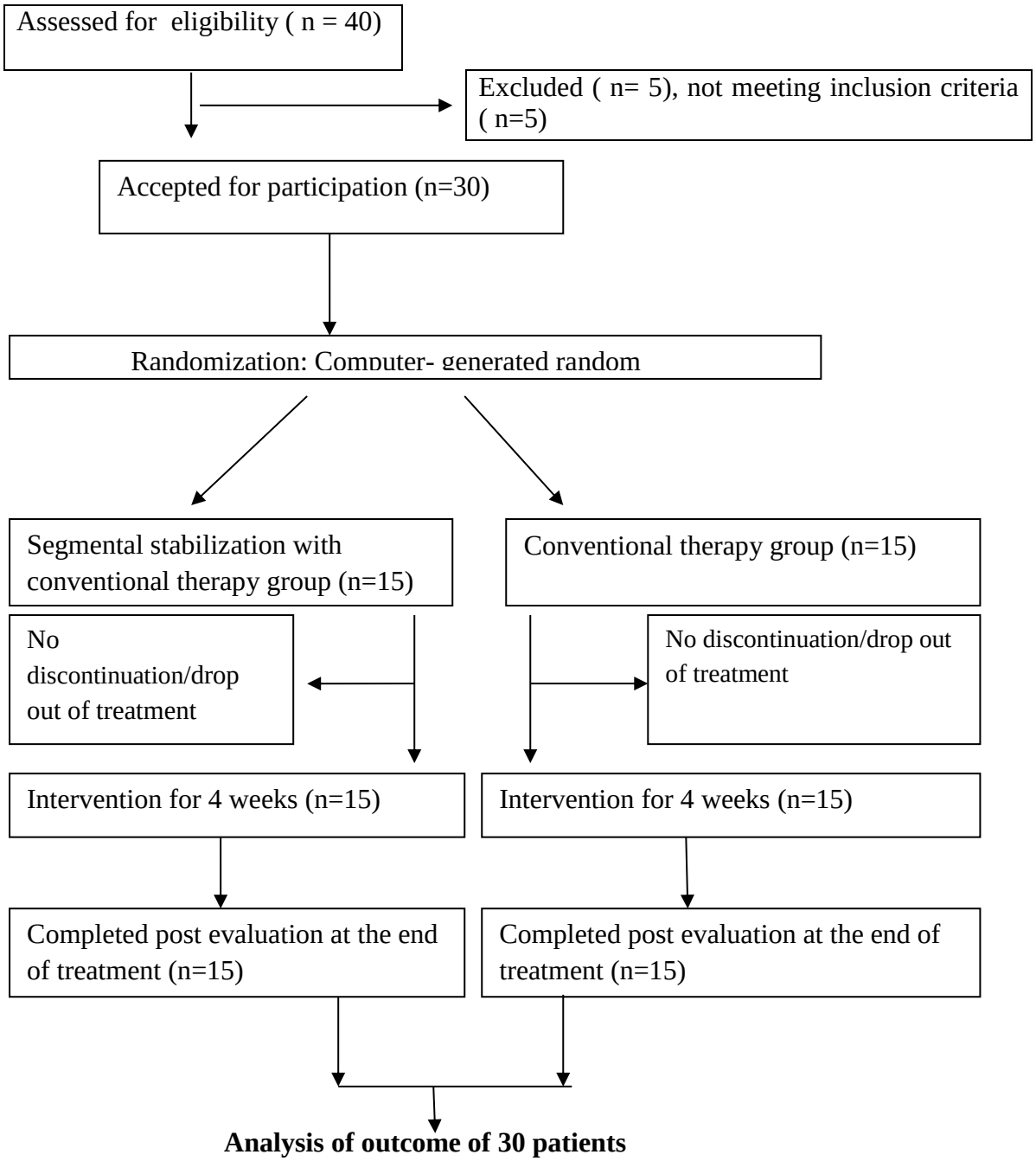

Figure .3.1: Flow-chart of the phases of Randomized Controlled Trial

3.8. Sample size: It was approximately 30 and in following way

Both male and female between 25 -60 years of age

Group A= 15

Group B = 15

3.9. Method of data collection

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

3.10. Measurement tools

To conduct this study, the researcher collected data through using different types of data collection tools.

- The researcher has used Dallas pain scale by using Visual Analogue Scale (VAS) for pain measurement in different working position and also activities,
- Manual muscle testing technique by using OXFORD muscle grade scale to assess the muscle strength of lumbar spine.
- Oswestry Low Back Pain Disability Questionnaire was used for disability measurement,
- Structural questionnaire was used for socio-demographic indicators.

3.10.1. Dallas pain questionnaire (DPQ)

The DPQ was a 15-item instrument to assess pain and intensity, in different working position like general pain intensity, pain intensity at night, pain interference with lifestyles, back stiffness, interference with walking, hurts when walking, standing still, twisting activity, sitting in a upright hard chair, sitting in a soft arm chair, lying in bed, pain limit normal life style, interfere in work and change of workplace. Personal care, lifting and each item was scored with a Visual Analog Scale (VAS). Researcher used 14 quessnaire except how good are the pain killers for your pain? Scale extremities are labeled with specific words (e.g. ‘no pain in left/all the time severe pain in right). For every specific question, the patient marks the Point on the scale which represents his/her condition. Then the researcher use scale to measure the exact point of pain intensity.

3.10.2. Oswestry disability index

ODI was developed by Fairbank and Pynsent, 2000and the researcher to assess the impact of patient's low back pain on the activities of daily living. It includes 10 sections to describe the pain and its impact on the activities of daily living such as pain intensity, personal care, walking, lifting, sitting, standing, sleeping, sex life, social life and traveling.

Scoring system: Each section will be scored from zero to five with higher values indicating more severe impact on activities of daily living then all points in all sections were summed up and plug it into the following formula in order to calculate level of disability. Level of disability = Total point / 50 X 100 = % ranging as from 0% to 20% (minimal disability), From 21% to 40% (moderate disability), From 41%

to 60% (sever disability), From 61% to 80% (crippled) and From 81% to 100% these patients are either bed bounds or exaggerating their symptoms.

3.11. Data collection procedure

The researcher collect data through a close ended structural questionnaire, face to face interviews and assessing the patient, initial recording, treatment and final recording. After computer generated randomization the patient access by a qualified physiotherapist in that time accessor collect pretest data. Pre-test was performed before beginning the treatment and the intensity of pain was noted with visual analogue scale, muscle strength was measured by manual muscle testing (MMT) and disability by Oswestry Disability Questionnaire. Before starting treatment session every qualified physiotherapist give training about treatment protocol. Total 12 sessions of treatment provided for each participant. Then after competition of 12 session's treatment take post test data. Both pre and post test data was collected by using a written questionnaire form (Appendix-D) which was formulated by the researcher. Questionnaires used both English and Bengal for easy understanding of the participants.

3.12. Intervention

At first collect the list of qualified musculoskeletal physiotherapist from CRP musculoskeletal department then randomization of physiotherapist by computer generated randomization. Total6 qualified physiotherapists among them 3 male and 3 female. Protocol of conventional physiotherapy was obtained from head of physiotherapy department, Centre for the rehabilitation of the paralyzed (CRP)

(Appendix-E). The researchers arranged special training about the segmental stabilization exercise protocol with type of exercise, dose and treatment duration. The experimental group receives segmental stabilization exercises with conventional therapy and doses uses for treatment each treatment session near about 30 minutes. Total 4 weeks, 3 sessions per weeks and 12 sessions total and 15 repetition and each exercise hold for 3 to 5 seconds. Control group receive only conventional therapy.

3.13. Data analysis

Data was analyzed by using SPSS version 16.00 to compute the descriptive statistics using pie chart, bar chart, and percentage. Between group analysis of muscle strength and back disability will be calculated by Mann – Whitney U test and Pain (continuous data) by unpaired *t* test. Within group analysis of muscle strength and back disability will be calculated by Wilcoxon test and pain (continuous data) by paired *t* test.

The researcher had calculated the variables mean, mean difference, standard deviations,

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

Estimated predictor

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

Hypothesis Test

Paired t test

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

Selection of test of hypothesis is mean difference under t distribution

Assumption

Paired variables

Variables were quantitative

Parent population of sample observation follows normal distribution.

Null and alternative hypothesis

Ho: $\mu_1 - \mu_2 = 0$ or $\mu_1 = \mu_2$; where the experimental group and control group initial and final mean difference are same.

Ha: $\mu_1 - \mu_2 \neq o$, $\mu_1 > \mu_2$; where the experimental group and control group initial and final mean difference are not same.

Here,

Ho= Null hypothesis

Ha= Alternative hypothesis

μ_1= Mean difference in initial assessment

μ_2= Mean difference in final assessment

Formula: test statistic is follows:

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

Where,

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

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

SD= standard deviation of the differences *d* and

n= number of paired observations.

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

$$t = \frac{\bar{d}}{SE\,(\bar{d})} = \frac{\bar{d}}{\frac{SD}{\sqrt{n}}} = \frac{4.9}{\frac{2.385}{\sqrt{15}}} = \frac{4.9}{0.6159} = 7.835$$

3.13.1. Level of Significant

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

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

Table: 3.1. Dallas Pain Questionnaire (Initial and final assessment-Paired t-test)

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		Experimental group			Control group	
SL No.	Variables	t	P value	df	t	P value
Pair-1	Pain intensity	16.584	.000*	14	7.835	0.000*
Pair-2	Pain intensity at Night	14.229	.000*	14	5.232	0.000*
Pair-3	Interfere with Lifestyle	12.156	.000*	14	3.77	0.002
Pair-4	Back stiffness	10.510	.000*	14	9.076	0.000*
Pair-5	Interfere with Walking	8.660	.000*	14	6.555	0.000*
Pair-6	Hurt when walking	8.318	.000*	14	1.312	0.211
Pair- 7	Keep standing still	12.867	.000*	14	4.406	0.001
Pair-8	Keep twisting	9.604	.000*	14	5.307	0.000*
Pair-9	Sit in a upright hard chair	13.602	.000*	14	7.086	0.000*
Pair-10	Sit in a soft arm Chair	14.230	.000*	14	0.011	0.000*
Pair-11	Lying in a bed	7.424	.000*	14	10.486	0.000*
Pair-12	Normal lifestyle	11.566	.000*	14	4.302	0.000*
Pair 13	Interfere with work	14.258	.000*	14	3.097	0.000*
Pair-14	Change work place	5.102	.000*	14	1.061	0.307

Note: * indicate highly significant value.

Unrelated t test

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

Assumption

Different and independent variables

Variables were quantitative

Normal distribution of the variables

Formula: test statistic t is follows

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

Where,

$\bar{x}_1$= Mean of the Experimental Group,

$\bar{x}_2$= Mean of the Control Group,

n_1= Number of participants in the Experimental Group,

n_2= Number of participants in the Control Group

S = Combined standard deviation of both groups

Calculation unrelated t value for general pain intensity:

$$\text{Where, } S = \sqrt{\frac{\sum(\bar{x}_E - x_1)^2 + \sum(\bar{x}_C - x_2)^2}{n_1 + n_2 - 2}} = \sqrt{\frac{49.382 + 10.782}{15+15-2}} = \sqrt{\frac{60.164}{28}} = \sqrt{2.148} = 1.465$$

Here,

$\bar{x}_E$= Mean of the experimental Group

$\bar{x}_C$= Mean of the control group

x_1= Individual value of the experimental group

x_2= Individual value of the control group

n_1= Number of participants in the Experimental Group

n_2= Number of participants in the Control Group

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}} = \frac{3.33-2.73}{1.465\sqrt{\frac{1}{15}+\frac{1}{15}}} = \frac{0.60}{1.465 \times \sqrt{0.133}} = \frac{0.60}{0.1948} = 3.355$$

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

Table: 3.2. Between groups unpaired t test or independent t test

	Independent t test		
Variables	t	P value	df
Pain intensity	3.355	0.002	28
Pain intensity at Night	1.199	0.241	28
Interfere with Lifestyle	3.729	0.001	28
Back stiffness	3.196	0.003	28
Interfere with Walking	4.991	0	28
Hurt when walking	4.526	0	28
Keep standing still	3.82	0.001	28
Keep twisting	4.539	0	28
Sit in a upright hard chair	4.716	0	28
Sit in a soft arm Chair	4.415	0	28
Lying in a bed	2.645	0.013	28
Normal lifestyle	4.929	0	28
Interfere with work	5.384	0	28
Change work place	3.326	0.002	28

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

The formula of Mann-Whitney U test:

$$U = n_1 n_2 + \frac{n_2(n_2+1)}{2} - \sum_{i=n_1+1}^{n_2} R_i$$

Where:

U=Mann-Whitney U test

N_1 = sample size one

N2= Sample size two

R_i = Rank of the sample size

The *U* test is included in most modern statistical packages which do the calculations

3.13.2. Level of Significance

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 experimental 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 (DePoy and Gitlin, 2015).

Table: 3.3. Between group comparison of flexor muscle strength (Mann Whitney U test)

	Category of Participants	Mean Rank	Mann-Whietney U test	P value
Between Group comparison of flexor Muscle	Experimental	18.33	70	0.049
	Control	12.67		

Table: 3.4. Between group comparison of extensor muscle strength (Mann Whitney U test)

	Category of Participants	Mean Rank	Mann-Whietney U test	P value
Between Group comparison of extensor Muscle	Experimental	15.97	105	0.577
	Control	15.03		

Willcoxon Signed Rank test

The **Wilcoxon signed-rank test** is a non-parametric statistical hypothesis test used to compare two related samples, matched samples, or repeated measurements on a single sample to assess whether their population mean ranks differ (i.e. it is a paired difference test**.**

The formula of Wilcoxon Sign Rank test

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

Where, T = table value

N = Sample size

Table: 3.5. Within group comparison of flexor and extensor group muscle strength in control group (Willcoxon Signed Rank test).

Category of muscle strength	Willcoxon Signed Rank test	
	Z value	P value
Flexor group muscle strength	2	0.46
Extensor group muscle strength	2.646	0.00

Table: 3.6. Within group comparison of flexor and extensor group muscle strength in experimental group (Willcoxon Signed Rank test).

Category of muscle strength	Willcoxon Signed Rank test	
	Z value	P value
Flexor group muscle strength	2.828	0.005
Extensor group muscle strength	2.828	0.005

Oswestry Disability Questionnaire calculation

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

Table: 3.7. Within group comparison of ODI quessnaire in experimental and control group (Willcoxon Signed Rank test).

	Category of Participants	Willcoxon Signed Rank test	
		Z value	P value
Within group comparison of ODI	Experimental	3.508	0.000
	Control	3.317	0.001

Table: 3.8. Between group comparison of ODI quessnaire (Mann-Whitney U test)

	Category of Participants	Mean Rank	Mann-Whietney U test	P value
Between group comparison of ODI	Experimental	18.33	52	0.002
	Control	12.67		

3.14. Ethical consideration:

The research proposal was presented to the Institutional Review Board (IRB). Then the proposal was approved and obtained permission from the concerned authority of ethical committee of Bangladesh Health Professions Institute (BHPI). Again before beginning the data collection, researcher was obtaining the permission from the concerned authorities ensuring the safety of the participants. The whole process of this research project was done by following the Bangladesh Medical Research Council (BMRC) guidelines and World Health Organization (WHO) Research guidelines. This is an experimental study and involvement of clients, physiotherapist and other facilities need to complete this study. If patients experience any negative effects, treatment will be stopped and the patient will be referred to the doctor. The researcher strictly maintains the confidentiality regarding participant's condition and treatments.

3.15. Informed Consent

The researcher obtained consent to participate from every participant. A single informed consent form received from each participant. The participants 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 worsens. The participants also are 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.

Table no: 4.1. Comparison of base line characteristics of participants

Variables	Experimental group	Control group
	Mean with SD	Mean with SD
Age	36.40(9.73)	39.27(8.81)
Gender	Male 5 (33.3%) Female 10 (66.7%)	Male 7(46.7) Female 8 (53.3%)
Height (M	1.58 (.06)	1.79(1.00)
Weight (Kg)	62.7(6.88)	61.8(8.67)
BMI	Normal9 (60%) Overweight6 (40%)	Normal 8(26.7%) Overweight4 (13.3%) Obesity3 (10.0%)
ODI (pretest)	44.4(9.89)	48.6(21.0)

Table IX compares the baseline characteristics of participants between experimental and control group. In addition, two groups did not show significant differences at baseline regarding demographic characteristics. In experimental group, the mean age (± SD) of the participants was 36.40 (9.73) years and in control group 39.27 (8.81) years. In experimental group male 5(33.3%) and female 10 (66.7%) and control group male 7 (46.7%) and female 8 (53.3%). In addition, mean weight (± SD) in experimental and control group participants was 62.7 (± 6.88) kg and 61.8 (8.67) kg

and mean height (± SD) was 1.58 (±.06) cm and 1.79 (± 1.00) cm .Mean (± SD) BMI of the experimental group was normal 9(60%), overweight6 (40%) and control group was normal 8(26.7%), overweight 4(13.3%), obesity 3(10%). Mean (± SD) pretest ODI score in experimental group was 44.4 (± 9.89) and in control group was 48.6 (21.0).

Socio-Demographical Characteristics

Occupation

Figure 4.1 showed, among the 15 participants, in experimental group housewife was 7 (46.7%), businessman was 4 (26.7%) , Garments worker 1 (6.7%), day labor 1(6.7%) , teacher 1(6.7%) , rickshawala 1(6.7%) and in control group housewife was 4 (26.7%), businessman was 2 (13.3), garments worker 2(13.3), and service holder 3(20%), teacher 1(6.7%), student 1(6.7%), others 2(13.3%).

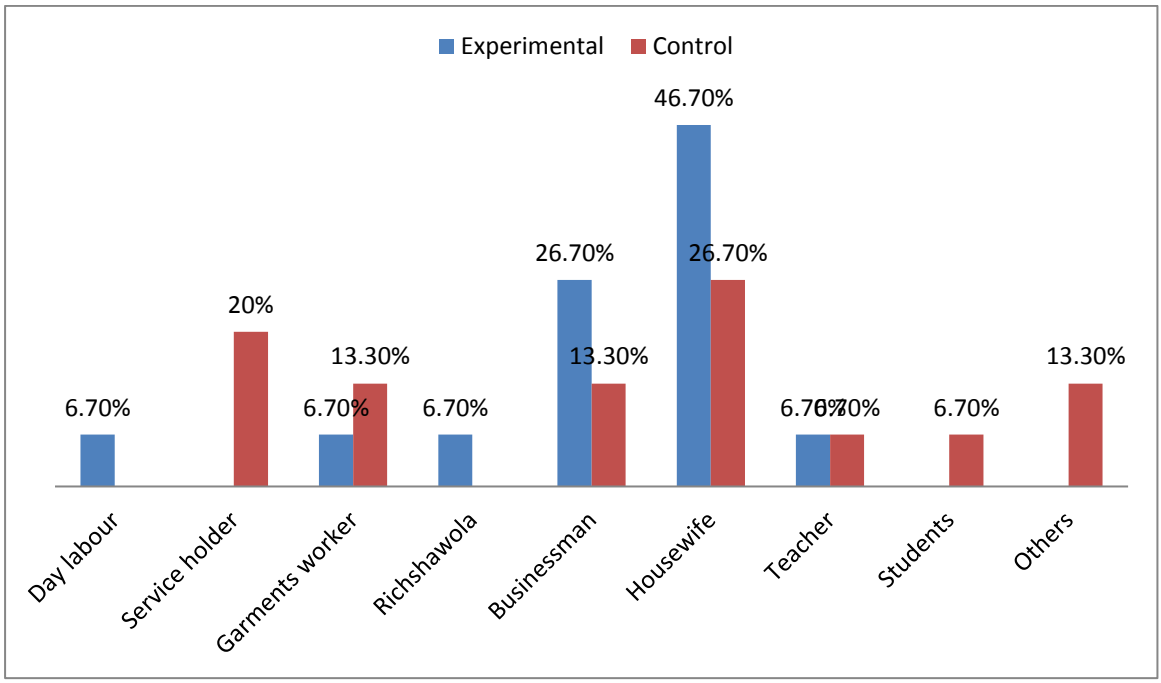

Figure no. 4.1. Occupation of the participants

Educational status

Among all the participants in experimental group majority of the participants educational status was secondary 9 (60%), and illiterate 3(20%), primary 2(1. In the control group majority of the participants educational status was secondary 4 (26.7%) , graduate and masters was 3(20%), illiterate 3(20%) and HSC pass was 3(20%).

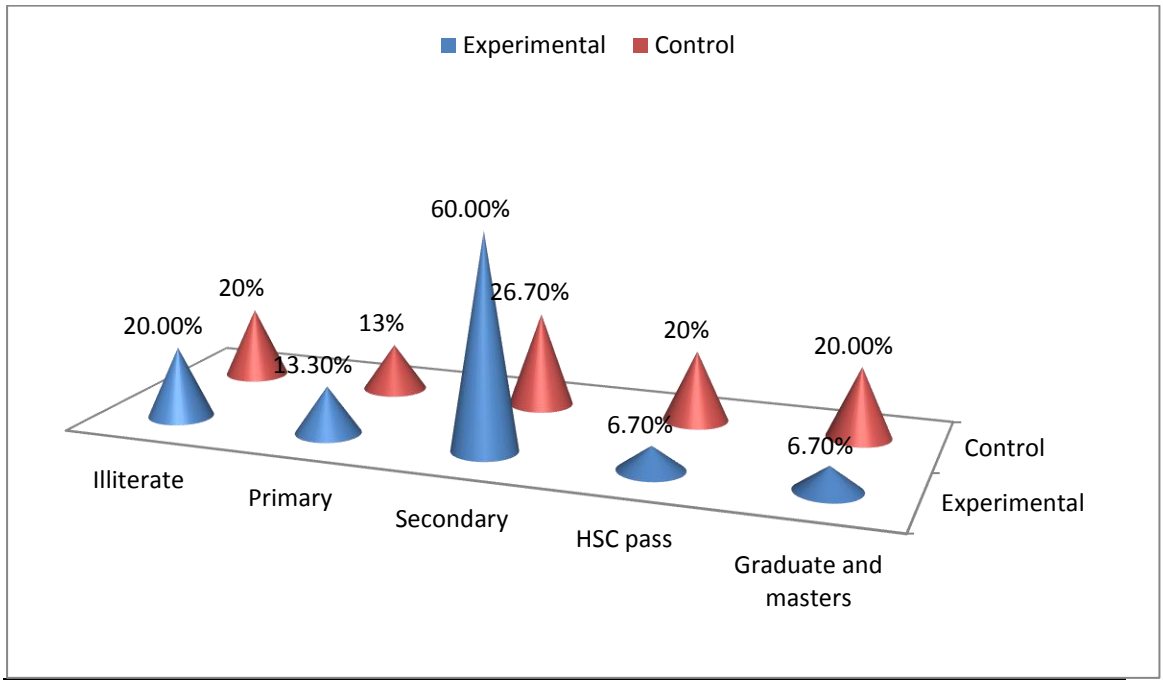

Figure no: 4.2.Educational status of the participants

History of trauma

Among all the participants in experimental group 9 (60%) was no history of trauma and 6 (40%) was history of trauma. In the control group among the 15 participants 8(53.3%) was no history of trauma and 7(46.7%) was history of trauma.

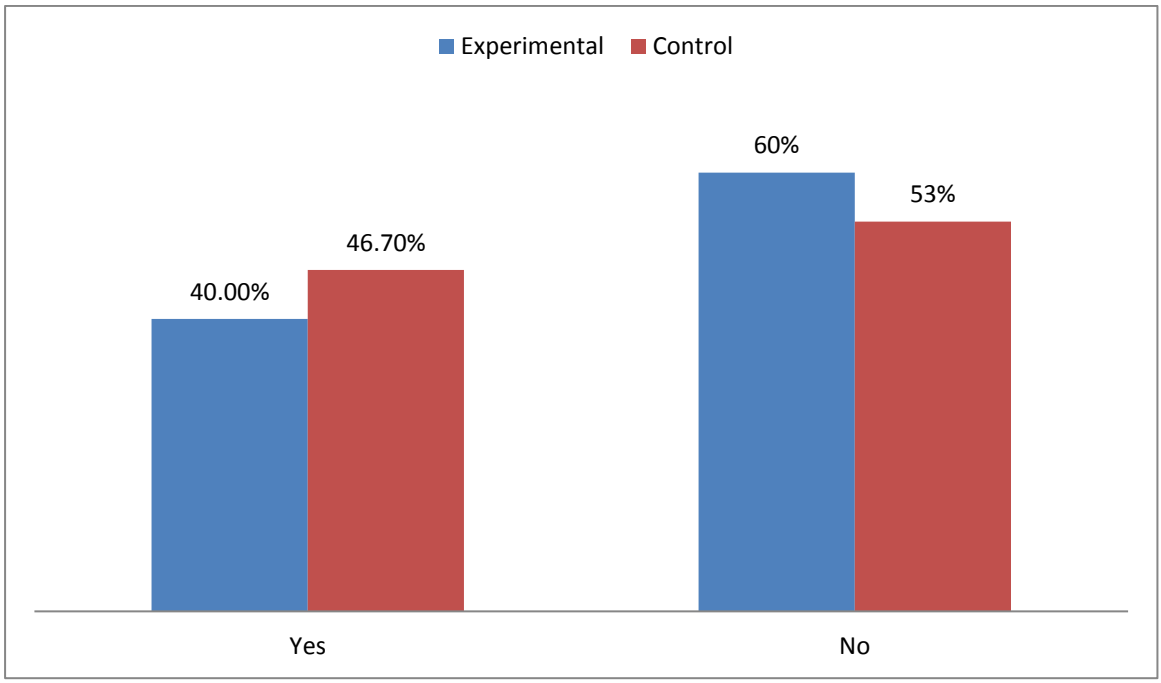

Figure no: 4.3 .History of trauma

Dallas questionnaire

General pain intensity

In this study find out that in the general pain intensity , observed t value was 16.58 (3.7±0.928) in the experimental group at two tailed paired t test while this same variable for control group observed value was 7.835 (2.53±1.25) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed t value in general pain intensity in both group which were greater than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group . Both groups in aspect of general pain intensity were significant at .000 % level but the mean difference of experimental group was higher than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level of significant and 28 degrees of freedom standard table value was 2.048 and the same significant level and same degree of freedom observed t value was 3.355. The observed t value was greater than the table value that mean null hypothesis was rejected and alternative hypothesis was accepted which mean Segmental stabilization exercise combined with conventional therapy had found statistically significant than conventional therapy for the treatment of patient with chronic low back pain.

Pain intensity at night

In this study find out that pain intensity in night, observed t value was 14.229 (3.29±0.893) in the experimental group at two tailed paired t test while this same variable for control group observed value was 5.232 (1.64±1.21) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed

t value in pain intensity at night both group which were greater than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group . Both groups in aspect of pain intensity at night were significant at 0.000 % level but the mean difference of experimental group was higher than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level of significant and 28 degrees of freedom standard table value was 2.048 and the same significant level and same degree of freedom observed t value was 1.199. The observed t value was lesser than the table value that mean null hypothesis was accepted and alternative hypothesis was rejected which mean there was no different between Segmental stabilization exercise combined with conventional therapy and only conventional therapy for the treatment of patient with chronic low back pain in between group.

Pain interfere with lifestyle

This study find out that pain intensity at interfere with lifestyle, observed t value was 12.156 (3.79±1.20) in the experimental group at two tailed paired t test while this same variable for control group observed value was 3.77 (1.55±1.59) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed t value in pain intensity at interfere with lifestyle in both group which were higher than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of pain interfere with lifestyle were significant at 0.000 and 0.002 % level but the mean difference of experimental group was greater than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level

of significant and 28 degrees of freedom standard table value was 2.048 and the same significant level and same degree of freedom observed t value was 3.729. The observed t value was greater than the table value that mean null hypothesis was rejected and alternative hypothesis was accepted which mean Segmental stabilization exercise combined with conventional therapy had found statistically significant than only conventional therapy for the treatment of patient with chronic low back pain in between group.

Back stiffness

This study find out that, back stiffness observed t value was 10.510 (3.033±1.11) in the experimental group at two tailed paired t test while this same variable for control group observed value was 9.076 (1.80±0.768) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed t value in back stiffness both group which were higher than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of general pain intensity were significant at 0.000 % level but the mean difference of experimental group was greater than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level of significant and 28 degrees of freedom standard table value was 2.048 and the same significant level and same degree of freedom observed t value was 3.196. The observed t value was greater than the table value that mean null hypothesis was rejected and alternative hypothesis was accepted which means Segmental stabilization exercise combined with conventional therapy is more effective than only conventional therapy for the treatment of patient with chronic low back pain in between group.

Pain interfere with walking

This study find out that, Pain interfere with walking observed t value was 8.66 (2.64±1.18) in the experimental group at two tailed paired t test while this same variable for control group observed value was 6.555 (1.48±.874) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed t value in Pain interfere with walking in both group which were higher than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group Both groups in aspect of pain interfere with walking significant at 0.000 % level but the mean difference of experimental group was greater than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level of significant and 28 degrees of freedom standard table value was 2.048 and the same significant level and same degree of freedom observed t value was 4.991. The observed t value was greater than the table value that mean null hypothesis was rejected and alternative hypothesis was accepted which means Segmental stabilization exercise combined with conventional therapy is more effective than only conventional therapy for the treatment of patient with chronic low back pain in between group.

Hurt when walking

In this study find out that, hurt when walking observed t value was 8.318 (3.48±1.62) in the experimental group at two tailed paired t test while this same variable for control group observed value was 1.312 (.606±1.79) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed t value in Pain interfere or hurt when walking in experimental group was higher than table

value that means null hypothesis rejected and alternative hypothesis accepted for within group in experimental group and was significant at0.000 %. For control group Observed t value was lesser than table value that means null hypothesis accepted but the mean difference of experimental group was greater than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level of significant and 28 degrees of freedom standard table value was 2.048 and the same significant level and same degree of freedom observed t value was 4.526. The observed t value was greater than the table value that mean null hypothesis was rejected and alternative hypothesis was accepted which mean Segmental stabilization exercise combined with conventional therapy had found statistically significant than only conventional therapy for the treatment of patient with chronic low back pain in between group.

Standing still

In this study find out that, standing still observed t value was 12.867 (3.7±1.13) in the experimental group at two tailed paired t test while this same variable for control group observed value was 4.406 (1.30±1.14) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed t value in Pain interfere with standing still in both group which were higher than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group . Both groups in standing still pain intensity were significant at 0.000 and 0.001% level but the mean difference of experimental group was greater than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level of significant and 28 degrees of freedom standard

table value was 2.048 and the same significant level and same degree of freedom observed t value was 3.82. The observed t value was greater than the table value that mean null hypothesis was rejected and alternative hypothesis was accepted which mean Segmental stabilization exercise combined with conventional therapy is more effective than only conventional therapy for the treatment of patient with chronic low back pain in between group.

Twisting

In this study find out that, pain in keep twisting observed t value was 9.604 (3.92±1.58) in the experimental group at two tailed paired t test while this same variable for control group observed value was 5.307 (1.54±1.12) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed t value in Pain interfere with keep twisting in both group which were higher than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group . Both groups in aspect of general pain intensity were significant at 0.000 % level but the mean difference of experimental group was greater than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level of significant and 28 degrees of freedom standard table value was 2.048 and the same significant level and same degree of freedom observed t value was 4.539. The observed t value was greater than the table value that mean null hypothesis was rejected and alternative hypothesis was accepted which mean Segmental stabilization exercise combined with conventional therapy had found statistically significant than only conventional therapy for the treatment of patient with chronic low back pain in between group.

Sitting in a upright hard chair

In this study find out that, sitting in a upright hard chair observed t value was 13.60(3.566±.970) in the experimental group at two tailed paired t test while this same variable for control group observed value was 7.086 (1.15±0.74) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed t sitting in a upright hard chair in both group which were higher than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group . Both groups in aspect of general pain intensity were significant at 0.000 % level but the mean difference of experimental group was greater than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level of significant and 28 degrees of freedom standard table value was 2.048 and the same significant level and same degree of freedom observed t value was 4.716. The observed t value was greater than the table value that mean null hypothesis was rejected and alternative hypothesis was accepted which mean Segmental stabilization exercise combined with conventional therapy had found statistically significant than only conventional therapy for the treatment of patient with chronic low back pain in between group.

Sitting in a soft arm chair

In this study find out that, sitting in a soft arm chair observed t value was 5.036 (3.56±0.970) in the experimental group at two tailed paired t test while this same variable for control group observed value was 0.011 (1.15±0.54) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed t value sitting in a soft arm chair in experimental group higher than standard table that

means null hypothesis was rejected and alternative hypothesis was accepted in the within group and significant at 0.000% level. But in case of control group observed t value was lesser than table value that means null hypothesis accepted and alternative hypothesis rejected. But the mean difference of experimental group was greater than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level of significant and 28 degrees of freedom standard table value was 2.048 and the same significant level and same degree of freedom observed t value was 4.415. The observed t value was greater than the table value that mean null hypothesis was rejected and alternative hypothesis was accepted which mean Segmental stabilization exercise combined with conventional therapy had found statistically significant than only conventional therapy for the treatment of patient with chronic low back pain in between group.

Lying in a bed

In this study find out that, lying in a bed observed t value was 7.424 (3.04±1.58) in the experimental group at two tailed paired t test while this same variable for control group observed value was 4.302 (1.13±1.02) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed t value lying in a bed in both group which were higher than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group . Both groups in aspect of general pain intensity were significant at 0.000 % level but the mean difference of experimental group was greater than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level of significant and 28 degrees of freedom standard table value was 2.048 and

the same significant level and same degree of freedom observed t value was 2.645. The observed t value was greater than the table value that mean null hypothesis was rejected and alternative hypothesis was accepted which mean Segmental stabilization exercise combined with conventional therapy had found statistically significant than only conventional therapy for the treatment of patient with chronic low back pain in between group.

Normal life style

In this study find out that, normal life style observed t value was 11.506(3.82±1.28) in the experimental group at two tailed paired t test while this same variable for control group observed value was 5.477(1.68±1.19) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed t value in normal life style both group which were higher than standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group . Both groups in aspect of general pain intensity were significant at 0.000 and 0.001 % level but the mean difference of experimental group was greater than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level of significant and 28 degrees of freedom standard table value was 2.048 and the same significant level and same degree of freedom observed t value was 4.929. The observed t value was greater than the table value that mean null hypothesis was rejected and alternative hypothesis was accepted which mean Segmental stabilization exercise combined with conventional therapy had found statistically significant than only conventional therapy for the treatment of patient with chronic low back pain in between group.

Interfere with work

In this study find out that, interfere with work observed t value was 14.258(4.28±1.16) in the experimental group at two tailed paired t test while this same variable for control group observed value was 6.197 (1.70±1.06) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed t value in Interfere with work in experimental group was lesser than table value that means null hypothesis accepted and alternative hypothesis rejected. In case of control group observed t value was greater than table value that means alternative hypothesis accepted and null hypothesis rejected and significant at 0.008 % level but the mean difference of experimental group was greater than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level of significant and 28 degrees of freedom standard table value was 2.048 and the same significant level and same degree of freedom observed t value was 5.384. The observed t value was greater than the table value that mean null hypothesis was rejected and alternative hypothesis was accepted which mean Segmental stabilization exercise combined with conventional therapy is more effective than only conventional therapy for the treatment of patient with chronic low back pain in between group.

Change work place

In this study find out that, change work place observed t value was 5.102(2.08±1.57) in the experimental group at two tailed paired t test while this same variable for control group observed value was 1.061 (.426±1.55) in within group. 5% level of significant at 14 degrees of freedom standard t value was 2.145 and observed t value in change work place In experimental group observed t value was higher than

standard t value that means null hypothesis was rejected and alternative hypothesis was accepted in the within group and was significant at 0.000% level. But in control group observed t value was lesser than standard t value that means alternative hypothesis rejected and null hypothesis accepted but the mean difference of experimental group was greater than the control group mean that means segmental stabilization exercises with conventional therapy is more effective than only conventional therapy. The Unrelated/ independent t test in between group at 5 % level of significant and 28 degrees of freedom standard table value was 2.048 and the same significant level and same degree of freedom observed t value was 3.326. The observed t value was greater than the table value that mean null hypothesis was rejected and alternative hypothesis was accepted which mean Segmental stabilization exercise combined with conventional therapy had found statistically significant than only conventional therapy for the treatment of patient with chronic low back pain in between group.

Muscle Strength

Pre and post- test comparison of muscle strength in experimental group

In this study among the participants of experimental group (n=15) ,in case of flexor muscle strength in pre- test was 66.7% in muscle grade 3 and in post- test improve 80 % of grade 4. In case of extensor muscle strength in pre- test grade 3 was 46.7 % and in post- test improves 93.3% in grade 4.

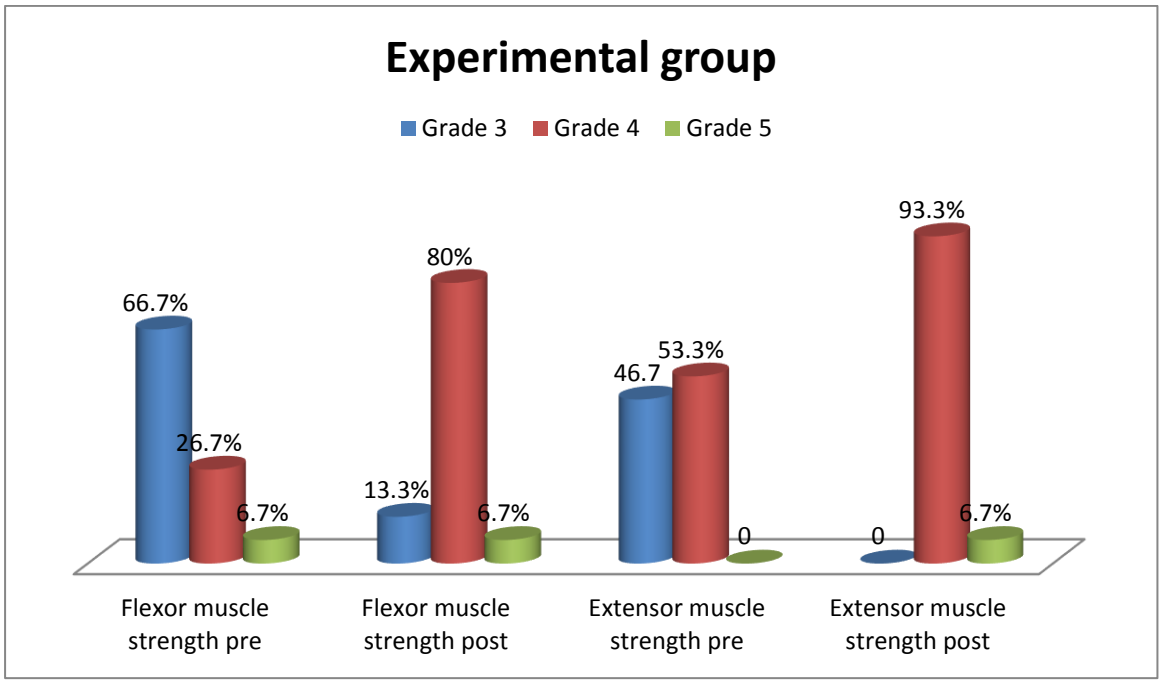

Figure no: 4.4. Pre and post-test comparison of muscle strength in experimental group

Pre and post- test comparison of muscle strength in control group

In this study among the participants of control group (n=15) , in case of flexor muscle strength in pre- test was 73.3% in muscle grade 3 and in post- test Improve 13.3 % of grade 5. In case of extensor muscle strength in pre- test grade 3 was 46.7 % and in post- test improves 86.7% in grade 4.

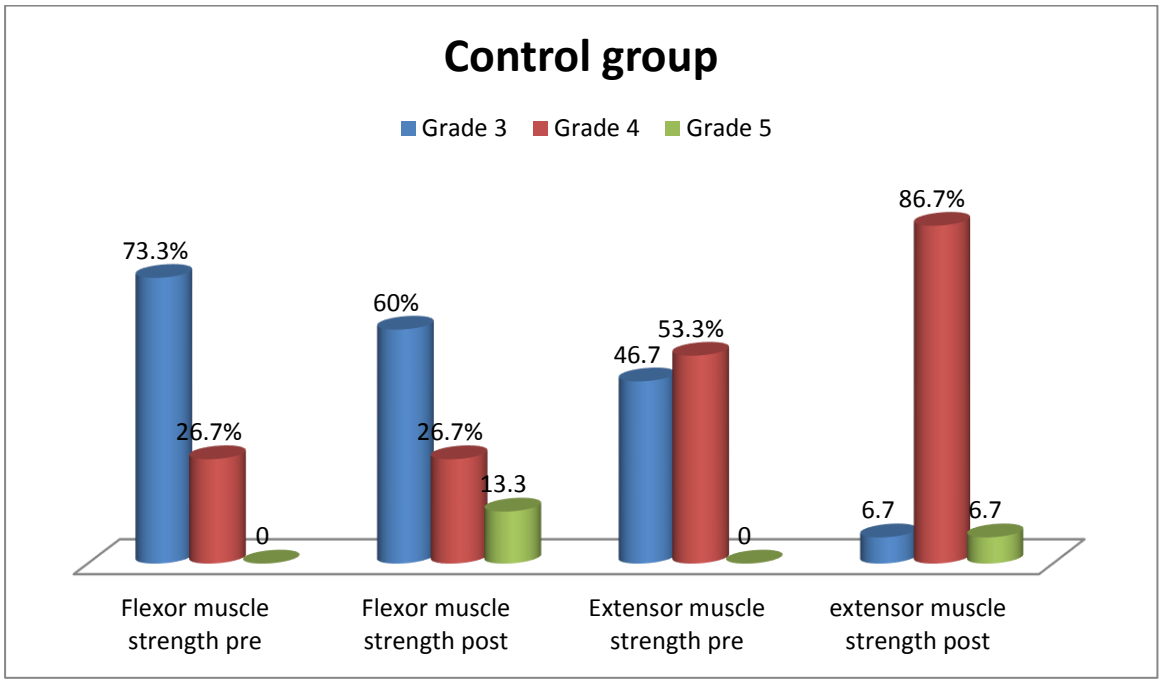

Figure no: 4.5. Pre and post- test comparison of muscle strength in control group

Mean muscle strength of both control and experimental group

In this study, among the participants, rate of mean muscle strength (flexor and extensor muscle group) of (from pre- test to post test or final assessment) find out that in experimental group flexor muscle strength is more improve than control group. In case of extensor muscle group there was no change in control and experimental group.

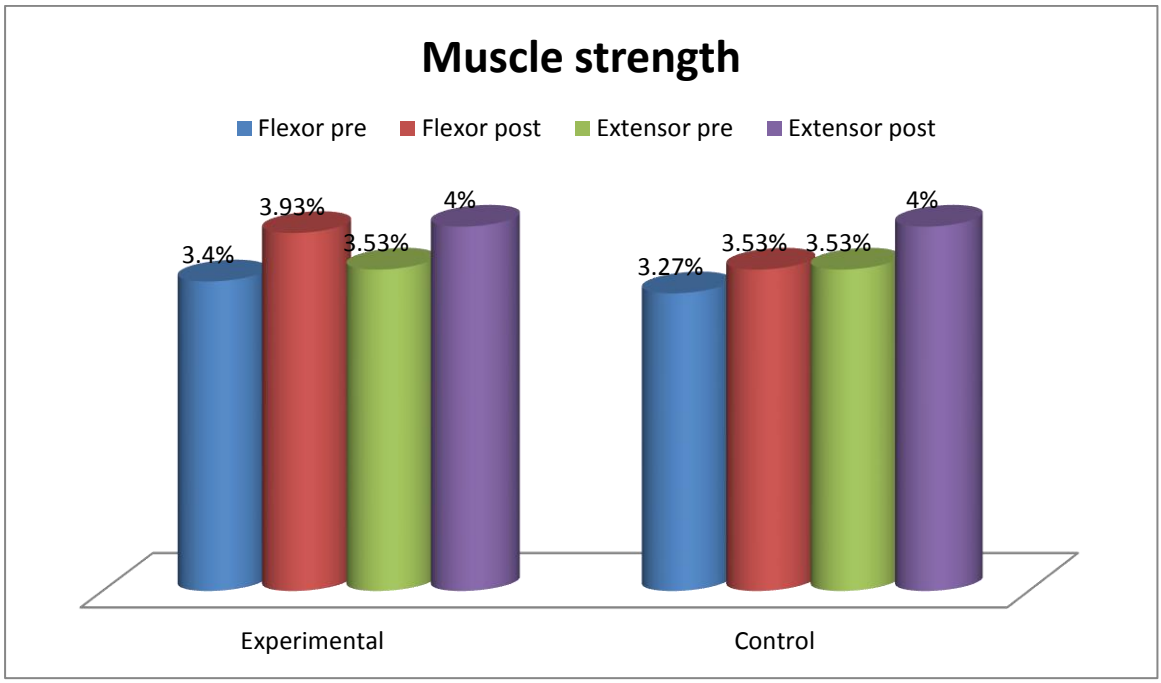

Figure no: 4.6. Mean muscle strength of both control and experimental group

Within group comparison of flexor and extensor group muscle strength in experimental group (Willcoxon Signed Rank test) in case of flexor muscle strength t value was 2.828 And p value 0.005 . That means null hypothesis is rejected and alternative hypothesis accepted at 5 % level on significant.

This shows that there is a significant change of flexor muscle strength in within group. In case of extensor muscle strength Z value was -2.828 and p value 0.005.This shows that there is a significant change of extensor muscle strength in within group.

Within group comparison of flexor and extensor group muscle strength in control group (Willcoxon Signed Rank test) shows that in case of flexor muscle strength Z value 2 and p = 0.46. This shows that there is no significant change of flexor muscle strength in within group. In case of extensor muscle strength Z value was 2.646 and p value 0.008.This shows that there is a significant change of extensor muscle strength in within group.

In between group comparison of flexor muscle strength the experimental group shows a higher mean rank of 18.33, compared to 12.67 for the control group. Mann-Whitney U test score for flexor muscle group is 70. The p value is 0.49 which is greater than 0.05. So we cannot reject the null hypothesis. That means in between group comparison of flexor muscle strength null hypothesis is accepted and alternative hypothesis rejected.

In between group comparison of extensor muscle strength the experimental group shows a higher mean rank of 15.97, compared to 15.03 for the control group. Mann-Whitney U test score for flexor muscle group is 105. The p value is 0.577 which is greater than 0.05.So null hypothesis accepted and alternative hypothesis rejected.

Table: 4.2. Comparative evaluation of within and between group comparisons of muscle strength

Variables	Mann whitney U score		Willcoxon Sign Rank test	
			Experimental group	Control group
	p - value		p - value	p value
Muscle strength	0.49	Flexor	0.00	0.46
	0.577	Extensor	0.00	0.00

This table proves that between group muscles strength in flexor group was no significant (p>0.49) and extensor group muscle strength was also no significant (p>0.57). But in case of within group of experimental shows significant improvement but in control group shows no significant improvement (p>.05) but in experimental group was highly significant. That means segmental stabilization exercises with conventional therapy effective for improve muscle strength in case of chronic low back pain.

Mean disability

In this study, among all the participants, rate of mean disability from pre- test or initial assessment to final or post- test assessment find out that decreased more in experimental group (from 44.40% to 16.73%) in comparison to the control group (from 44.13% to 30.93%).

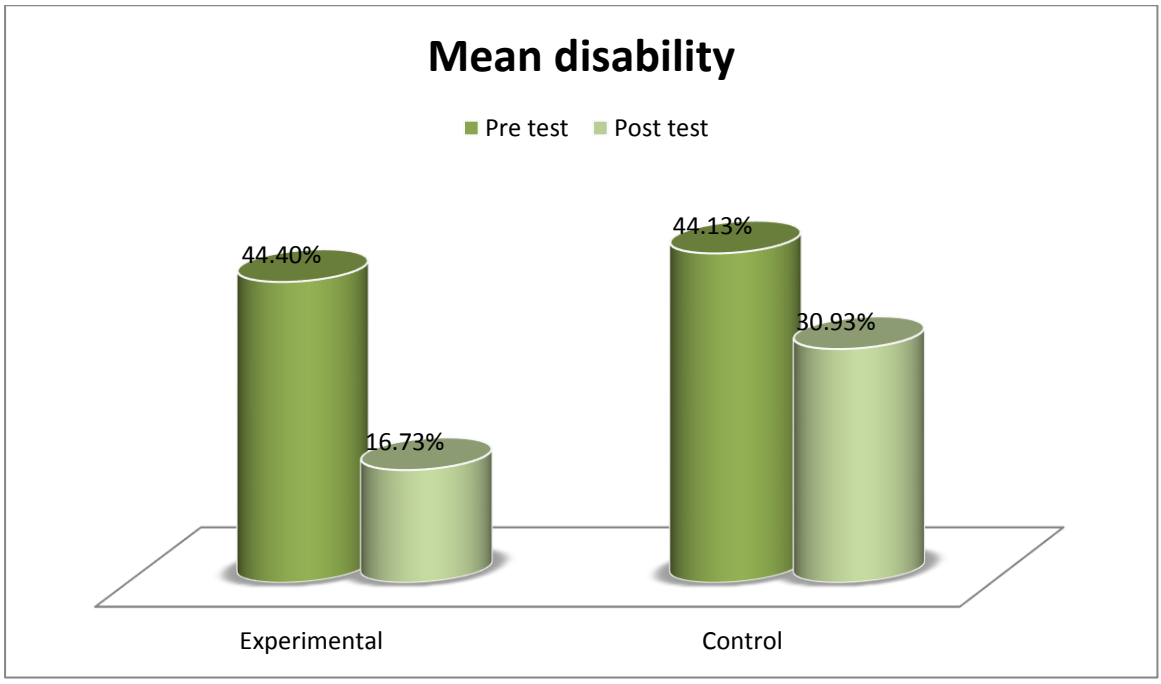

Figure no: 4.7. Mean disability

Post comparison of ODI among control and experimental group

In this study find out that among all the participants in post- test or final result in experimental group 73.3 % (n = 11) was minimal disability where in control group 33.3% (n = 5) was minimal disability. In case of severe disability there were no participants in experimental group but in control group was 26.7% severe disability.

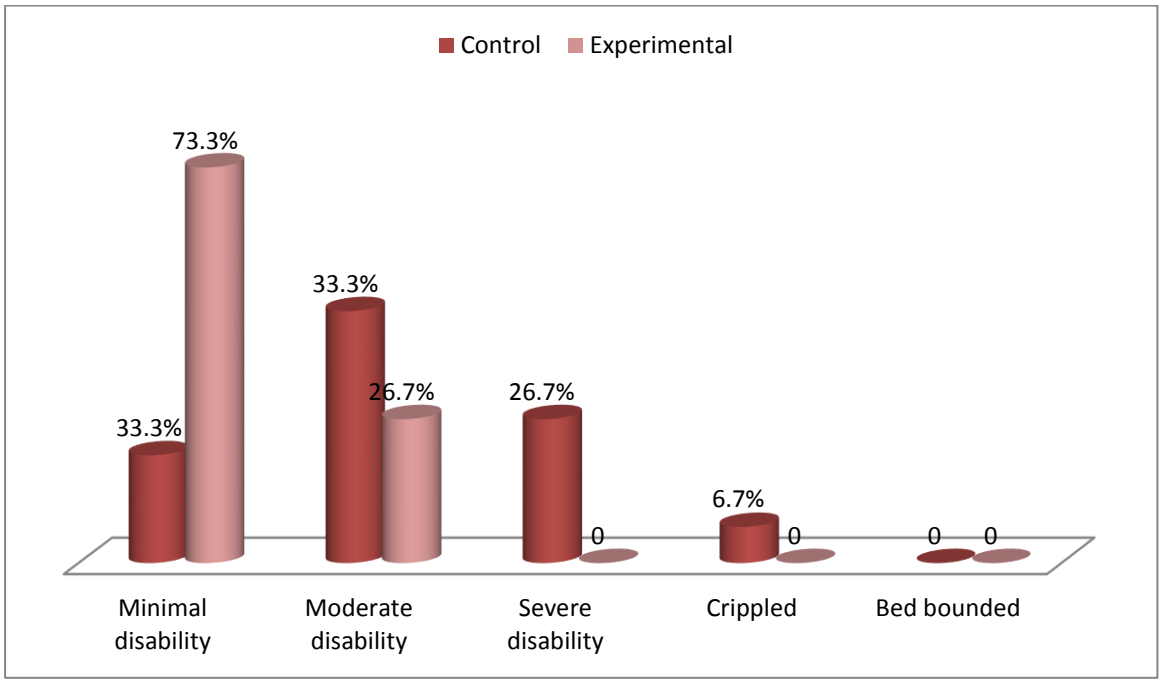

Figure no: 4.8. Post comparison of ODI among control and experimental group

Pre comparison of ODI among control and experimental group

In this study find out that among all the participants in pre- test experimental group 60 % (n = 9) was severe disability where in control group 13.3% (n = 2) was severe disability. In case of Crippled disability there was 6.7% (n= 1) participants in experimental group and in control group was 26.7% (n=4) crippled disability.

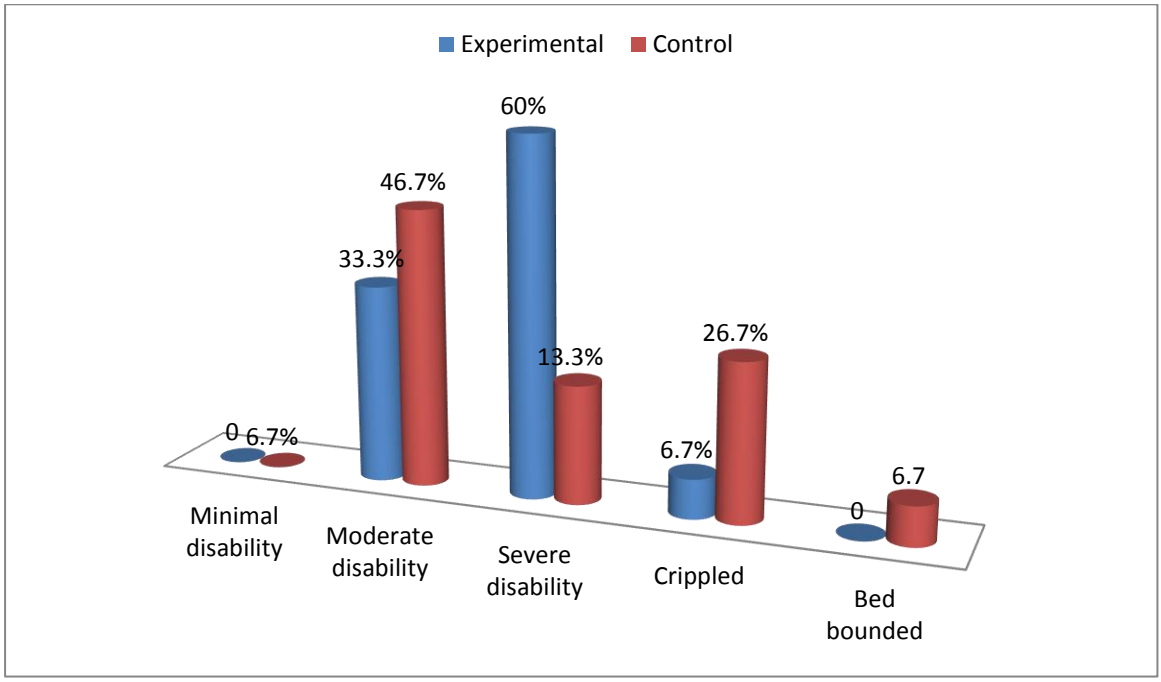

Figure no: 4.9. Pre comparison of ODI among control and experimental group

Within group comparison of ODI quessnaire experimental group (Willcoxon Signed Rank test) p value 0.000 that is less then0.05.This shows that there is a significant change of ODI quessnaire within group. ODI quessnaire of control group (Willcoxon Signed Rank test) p = 0.001 which is less than 0.05 and shows that there is a significant change of ODI in within group. But in experimental group shows highly significant than control group.

In between group comparison of ODI quessnaire the experimental group shows a higher mean rank of 18.33, compared to 12.67 for the control group. Mann-Whitney U test score for ODI quessnaire 52. The p value is 0.012 which is less than 0.05. So, null hypothesis is rejected and alternative hypothesis is accepted.

Table: 4.3. Comparative evaluation of within and between group comparisons of ODI

Variables	Mann Whitney U test	Willcoxon Sign Rank test	
		Experimental group	Control group
	p - value	p - value	p value
ODI quessnaire	0.012	0.000	0.001

This table shows that in comparative evaluation of between group ODI is significant and within group comparison of experimental group and control group both come significant that means segmental stabilization exercises with conventional therapy is effective for minimize disability for chronic low back pain patients.

Oswestry disability index (ODI) between and within group in each variable

Table: 4.4. Table Rank and test statistics of ODI in each variable between and within experimental and control group

Variable	Mann-Whitney U test	Will Coxon sign -rank test	
		Experimental group	Control group
	P	P	P
Pain intensity	0.000	0.000	0.000
Personal care	0.000	0.000	0.002
Lifting	0.001	0.001	0.008
Walking	0.001	0.001	0.007
Sitting	0.001	0.001	0.005
Standing	0.001	0.001	0.007
Sleeping	0.002	0.001	0.003
Sex life	0.001	0.008	0.014
Social life	0.007	0.001	0.003
Traveling	0.045	0.001	0.003

Table proved that between groups analysis in each components of ODI showed significant improvement occurred in all variables ($p < 0.05$). Within experimental group analysis showed that significant improvement occurred in all variables of ODI after application segmental stabilization exercise combined with conventional therapy ($p<0.05$). In addition, within control group analysis showed significant improvement in all variables of ODI ($p < 0.05$). It indicated that segmental stabilization exercise combined with conventional therapy found effective treatment technique for patient with chronic low back pain in terms of minimizing low back disability.

CHAPTER- V DISCUSSION

The aim of this study was to find out the effectiveness of segmental stabilization exercise with conventional therapy for chronic low back pain patient. In this study total participants were30 and divided into two groups experimental and control group. In baseline characteristics of experimental and control both groups was almost similar. The result found that the mean age of both group was 37.83 years (36.40 years in experimental group and 39.27 years in control group). The male was 40% and female was 60% in the both groups. Marital status of the participants was 90% married and 10% unmarried. Majority of the participants was housewife 36.7 % (n = 11), among them in control group (n = 4), experimental group (n = 7) and 20% was businessman. Family size 60% was small and 40% was large family. Among all the participants majority of the participants educational status was secondary 43.3% (n = 13) and in control group (n = 4) experimental group (n = 9). Among all the participants find out that majority of the participants 43.3% (n = 13) were within the age range of 31 – 40. The second highest rate of the participants 23.3 % (n = 7) within the age group of 41 – 50 and 21 – 30. Among all the participants majority of the participants height 5.1 – 5.5 was 40% (n=12), where in control group (n = 2) and experimental group (n = 10). The second highest height of the participants was 33.3 %,(n = 10), where in control group (n = 7) and experimental group (n = 3). In this study BMI of among all the participants (n = 30), 56.7 % normal (n = 17) where in control group 53.3 % (n= 8) and experimental group 60.0 % (n= 9). Second heist of the participants was overweight 33.3% (n= 10) where in control (group n = 4) and experimental group (n= 6) and 10 % was obesity.

The Dallas pain scale was measured for measuring pain and discomfort in different working position like general pain intensity, pain intensity at night, pain interference with lifestyles, back stiffness, interference with walking, hurts when walking, standing still, twisting activity, sitting in a upright hard chair, sitting in a soft arm chair, lying in bed, pain limit normal life style, interfere in work and change of workplace. In within group comparison of paired t test experimental group all the variables come highly significant changes, but in control group except hurt when walking and change work place all the variables come significant. In case of between group independent t tests except pain intensity at night all the variables come highly significant ($p < 0.05$) that means segmental stabilizing exercise with conventional therapy was not effective for pain intensity at night.

In case of back muscle strength in flexor and extensor group in the experimental group in flexor muscle pre- test grade 3 was 66.7% and post- test flexor muscle strength grade 4 was 80 %. But in case of extensor muscle strength pre- test grade 3 was 46.7% and post- test was 93.3 %. In control group pre- test flexor muscle grade 3 was 73.3% and grade 4 was 26.7 % in post- test and extensor pre- test grade 4 was 53.3% and post- test was 86.7%. In within group comparison of flexor and extensor group muscle strength in experimental group was significant that means null hypothesis rejected and alternative hypothesis accepted. In between group comparison of flexor and extensor muscle strength there was no significant change and in mean difference of extensor group muscle strength in initial and final in experimental and control group were equal that means null hypothesis accepted and alternative hypothesis rejected.

In case of ODI quessnaire mean disability of experimental group was higher than control group. Post comparison of ODI among control and experimental group find out that73.3% was minimal disability in experimental group where in control group 26.7 % was severe disability but in experimental group was no severe disability. In within group comparison of experimental and control group both group shows significant change but in experimental group was highly significant. In between group comparison ODI was significant change.

In this study, participants in the experimental and control group received 3sessions per week and totaling 12 sessions of treatment during the treatment period of study based on, Franca, et al. (2014) study. The authors evaluated efficacy of two exercise programs, segmental stabilization and strengthening of abdominal and trunk muscles, on pain, functional disability, and activation of the transverse abdominis muscle (TrA), in individuals with chronic low back pain. In these study inclusion criteria was low back pain for more than 3 months and exclusion criteria was history of back surgery, rheumatologic disorders, and spine infections. Thus, these criteria matched with the current study and the numbers of treatment sessions were appropriate to prove or disprove the hypothesis.

Different studies found (EldinandIbraheem. 2017; Quinn, et al., 2011) conventional physiotherapy as an effective treatment for patients with chronic low back pain. In contrast, few number of studies (Kapetanovic, et al., 2016;Franca,et al., 2010) find out that segmental stabilization exercises is effective for reduce pain, improve muscle strength and improve functional disability for chronic low back pain patients. The current study demonstrated that segmental stabilization with conventional therapy showed significant effect on chronic low back pain, muscle strength and ODI score.

The exercise program was carried out for 12 sessions in both groups. However, segmental stabilization with conventional therapy shown effective than only conventional therapy and statistical test was conducted between the groups to identify which intervention was more effective than others. Data was also analyze within control and experimental group and found both experimental and control group had reduced pain, improve muscle strength and ODI score but in most of the variables in the experimental group outcomes were highly significant.

General pain intensity of the patient was measure in the pre- test level and after completing of 12 sessions of treatment. However, patient general pain intensity between group was highly significant (p=0.002) .In addition, exercise significantly decreased pain in experimental group (p= 0.000) and control group (p = 0.000). This means that segmental stabilization exercise with conventional therapy significantly differ from conventional therapy whereas both exercises also were significantly decreased pain simultaneously. On the other hand in a study of Hosseinshifar, et al., (2013)) evaluated the efficacy of pain, disability, and thickness of the transverse abdominis and significant multifidus muscles in the segmental stabilization and McKenzie program and found significant outcome ($p < 0.05$) in between group both experimental and control group but in between group muscle strength was no significant ($P > 0.05$). In contrast, the present study outcomes on patient general pain intensity was similar as Hosseinshifar and his colleagues study but there was difference in outcome of pain intensity between trial and control group results. The main reason for this difference was that the treatment sessions was 18, per week 3 days total 6 weeks and in this study treatment sessions was 12 sessions per week 3 days total 4 weeks. Thereby, treatment sessions area impotent fact for improvement of treatment. In a study of Cho, et al., 2014 also find out that segmental stabilization

exercises effective for reduce pain in chronic low back and the treatment duration was 4weeks 3 times in a week total 12 sessions. Recent study of Akhter, et al., 2017, the results of this study illustrate that clinical and therapeutic effects of core stabilization exercise program over the period of six weeks are more effective in terms of reduction in pain, compared to routine physical therapy exercise for similar duration. But in this study treatment sessions was only 1 session per week that means total 6 sessions. On the other hand present study duration was 4 weeks and total session was 12 and this study also more effective for reducing pain in segmental stabilization group in case of chronic low back pain. In addition Puntumetakul, et al.(2013) find out that 10 weeks treatment sessions come more significant result in case of pain and improvement of muscle activation ($p < 0.05$). In case of decrease pain the present study result find out that in Dallas Pain Quessnaire except pain intensity at night all the variables come highly significant in experimental group compare to control group. More importantly, all exercises carried out in my study were isometric in nature. Researchers have documented that isometric exercises has hypoalgesic effect on the contracting body part, the contralateral and a distant body part to the contracting one (Kadetoff and Kosek, 2007). In addition, isometric exercises activate the secretion of endogenous opioid system which reduces pain perception (Stagg, et al., 2011).

The strengthening of the abdominal muscles is essential in recovery of the spinal neutral position because weakening of the abdominal muscles among the trunk muscles of low back pain patients is generally prevalent (Lee, et al.,2011). Imbalance between the abdominal muscles of the trunk and extensor muscles is a major cause of low back pain and reduces stabilization of the lumbar segment (Jung,et al.,2014).In the present thesis, significant improvement ($p< 0.05$) was observed in the lumbar spine muscles in flexor and extensor within group in experimental and control group

but between group there is no significant changes ($p > 0.05$) of muscles strength in lumbar spine. Richardson, et al. (2004) found that weakness and lack of motor control of deep trunk muscles, such as the lumbar multifidus (LM) and transverses abdominis (TrA) is an independent risk factor for chronic low back pain. In a study of Reiman, et al., 2009 find out that stabilization exercise has been shown to improve lumbar stability through better muscle strength and improvement of muscle and movement adjustment ability based on the sensory motor control mechanism. In a study of Jeong, et al., 2015 find out that that lumbar segmental stabilization exercise plus exercise to strengthen the muscles of the gluteus resulted in a greater decrease in low back pain disability index and increase in lumbar muscle strength and balance ability in chronic low back pain patients and result of this study in between group come ($p< 0.05$) significant. But in present study in within group come significant ($p< 0.05$) improvement and in between group no significant improvement of muscle strength. The difference between the present study and the study of Jeong, et al., 2015 find out that segmental stabilization plus gluteus muscles strengthening improve muscle strength and present study compare segmental stabilization with conventional therapy also treatment duration is a important fact because present study duration was total 12 sessions in compare to the study of Jeong, et al., study treatment session was 18 sessions. In another study by Akodu, et al., (2013), it was established that stabilization exercise is effective in increasing the cross-sectional area of the lumbar multifidus muscle, which is one of the muscles needed to maintain proper stability of the spine.

Based on the results of the study disability has reduced significantly after application of segmental stabilization exercises combined with conventional therapy. In addition, only segmental stabilization exercises were also found effective. Between groups

results in terms of Oswestry Disability Index (ODI) showed significant (p=0.002) improvement of disability. In addition, within group analysis (within intervention, p=0.000 and within control, p= 0.001) also found significant improvement in disability. In recent past, several studies assessed ODI after application of only segmental stabilization exercise and found improvement of disability (Smith, et al., 2014; Kapetanovic, et al., 2016). Similar findings emerged in the study conducted by Franca and his colleague. The authors also focused within and between group analysis of ODI and found significant changes (p =0.001). Despite of similar results, one group receives only segmental stabilization exercise and another group receive only stretching exercises but in the current thesis segmental stabilization with conventional therapy experimental group and only conventional therapy control group. Conversely, the researchers did not perform the follow up session .This point could mimic the changes of variation in a trustworthy way in compare with Franca and his colleague study. Gatti, et al. (2011) reported that stabilization exercise was found to be effective in reducing disability in patients with CLBP. It was also concluded, in a study by Akodu, et al.(2015), that stabilization exercise is effective in the reduction of pain and improvement of functional disability in patients with chronic low back pain. Smith, et al.(2014) reported that stabilization or (core stability exercise) have been suggested to reduce symptoms of pain and disability and form an effective treatment in patients with chronic low back pain. In present study also supported that segmental stabilization exercises reduce symptoms of pain and disability and this study use segmental stabilization exercises in sitting, supine lying, and prone lying. In a recent study of Ojoawo, et al., 2017 find out that segmental stabilization exercises effective on pain intensity and disability of patients with chronic low back pain , and the

stabilization exercises position carried out in supine or prone position or the combination of both positions effect of the result were same.

In this study have some limitation such as - Samples were collected only from CRP-Savar, it could not represent the wider chronic low back pain population and the study lacks in generalizability of results to wider population. The study was conducted with 30 patients of chronic 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. That there were no intermediate and long-term follow up examinations. The time limitation had a great deal of impact on the study. If there would have been enough time, knowledge on this thesis could extend. The research conducted by the M.sc in Physiotherapy student. As it was the first randomized clinical trial of the researcher, therefore, there might have some errors that had been overlooked.

CHAPTER – VI CONCLUSION AND RECOMMONDATION

Chronic low-back pain (LBP) has become one of the main causes of disability in the adult population around the world. The treatment procedure of low back pain is costly and need more time to recovery. Segmental stabilization exercise is an effective treatment procedure for chronic low back pain but in our country have not adequate study about this treatment procedure. The findings of this study helps to develop evidence based practice for chronic low back pain. This study measure the pain intensity in different functional position, muscle strength and disability in case of chronic low back pain. The main findings of this study is in case of pain intensity in different functional position in experimental group all variables come highly significant but in control group all the variables come significant except hurt when walking, and change work place come non-significant. So, we concluded that segmental stabilization exercise with conventional therapy is effective reducing pain in different functional position. In case of muscle strength within group comparison of flexor and extensor muscle strength come significant improvement in both experimental and control group but in experimental group come highly significant changes. In between group experimental and control mean difference is same that means in case of between group null hypotheses is accepted. In case of ODI quessnaire both experimental and control group come significant improvement but in experimental group come highly significant. The result of the study find out that segmental stabilization exercise with conventional therapy is more effective than only conventional therapy and the duration was total 4 weeks 12 sessions for chronic low back pain.

The researcher use only 30 participants as the sample of this study, in future the sample size would be more. This study total treatment session was 12 in future study treatment sessions must be longer duration. Population can be taken gender specific in future study. In future research study, matching will be done to avoid cofounding variable.

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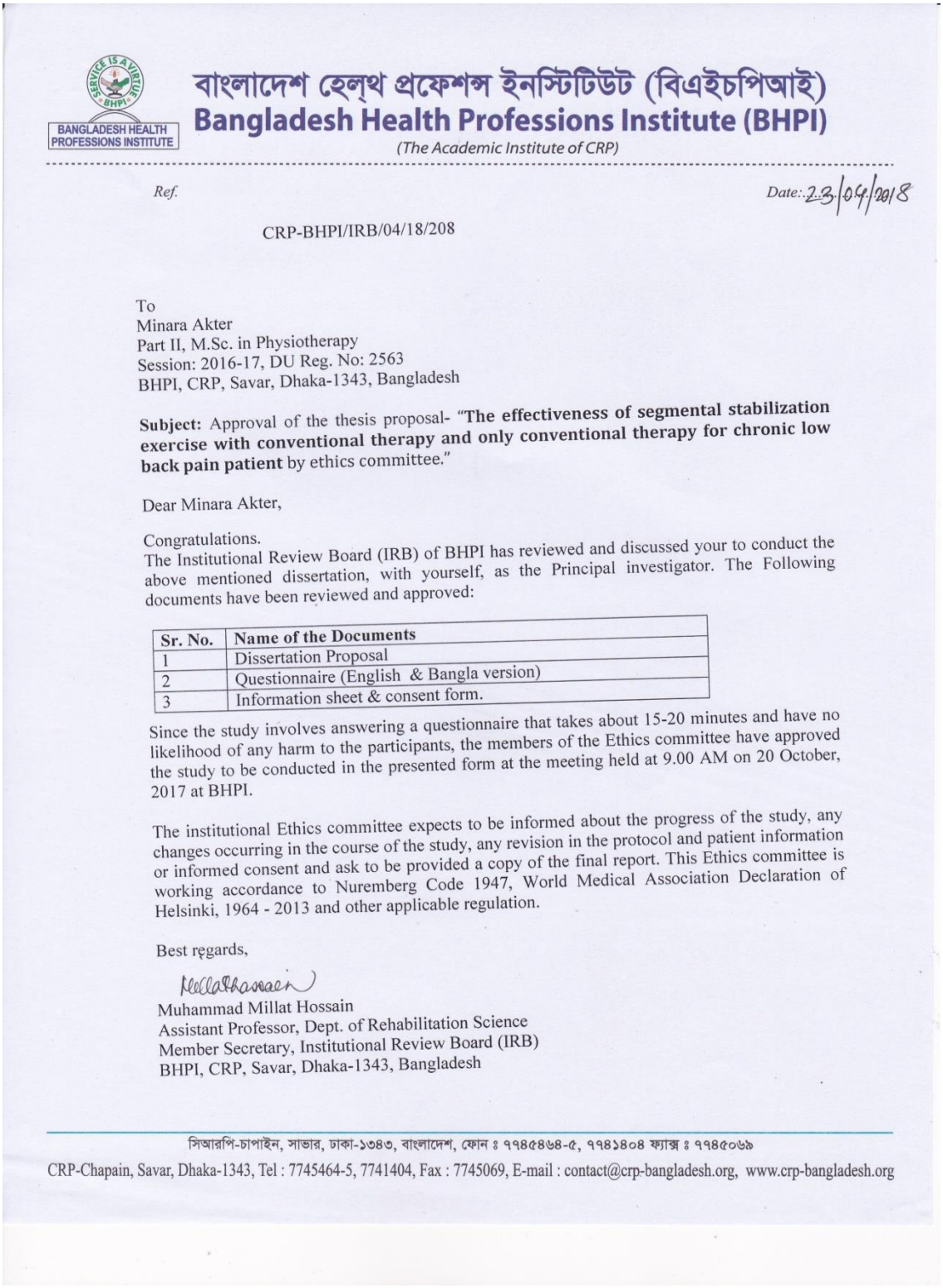
Appendix- A

Institutional Review Board (IRB) Letter



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

Ref.

Date: 23/04/2018

CRP-BHPI/IRB/04/18/208

To
Minara Akter
Part II, M.Sc. in Physiotherapy
Session: 2016-17, DU Reg. No: 2563
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal- **"The effectiveness of segmental stabilization exercise with conventional therapy and only conventional therapy for chronic low back pain patient** by ethics committee."

Dear Minara Akter,

Congratulations.
The Institutional Review Board (IRB) of BHPI has reviewed and discussed your 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.

Since the study involves answering a questionnaire that takes about 15-20 minutes and have no likelihood of any harm to the participants, the members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 9.00 AM on 20 October, 2017 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

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

Appendix- B

Permission Letter

Permission letter

Date: December 01, 2017

Head

Department of Physiotherapy

Center for the rehabilitation of the Paralyzed (CRP)

Chapain, Savar, Dhaka-1343

Through: Coordinator M. Sc. in Physiotherapy Program, BHPI, CRP, Savar, Dhaka.

Subject: Prayer for permission to collect data in order to conduct a thesis.

Sir,

With due respect, I am Minara Akter, a student of Part-II M. Sc. in Physiotherapy program at Bangladesh Health Professions Institute (BHPI). As per course curriculum, I shall have to complete a thesis. In this respect, my thesis titles "**The effectiveness of segmental stabilization exercise with conventional therapy and only conventional therapy for chronic low back pain patients**". In this thesis, my participants will be patients who are suffering from chronic low back. I believe outdoor musculoskeletal unit pain of physiotherapy department in CRP, Savar is the best place to collect data from participants. Data collection will require the patients and a small space of your reputed unit and will continue for 4 weeks from 2th December 2017. Data collector will received inform consent from all participants and kept it confidential. In addition, data collector would be graduate physiotherapists who are currently working in this unit. In order to complete of the thesis, I need permission to collect data and cooperation from those physiotherapist.

May I therefore, hope that you would be kind enough to give me permission for data and oblige thereby.

Sincerely Yours

Minara Akter

Student of Part-II M. Sc. in Physiotherapy Program

BHPI, CRP, Savar, Dhaka-1343

Session: 2016-2017

Approved

01/12/2017

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

Forwarded

01/12/17

Co-ordinator, MSc PT program.

Appendix – C: Consent Form (Bangla& English)

মৌখিক সম্মতিপত্র

আসসালামু আলাইকুম, আমি মিনারা আক্তার বাংলাদেশ হেলথ প্রফেশন্স ইন্সিটিউট এর এম.এস.সি ইন ফিজিওথেরাপি বিভাগের দ্বিতীয় পর্বের একজন ছাত্রী। আমি আমার সুপারভাইজারের সহায়তায় একটি গবেষণা প্রকল্প করছি যা আমার কোর্স কারিকুলাম এর অংশ বিশেষ। আমার গবেষণার বিষয় হল "সিআরপি সাভারের দীর্ঘ মেয়াদি কোমর ব্যথার রোগীদের ক্ষেত্রে সিগমেন্টাল স্টাবেলাইজেশন এক্সসারসাইজ এর সাথে নিয়মিত ফিজিওথেরাপির উপকারিতা"।

এই গবেষণার উদ্দেশ্য হল দীর্ঘ মেয়াদি কোমর ব্যথার রোগীদের ক্ষেত্রে সিগমেন্টাল স্টাবেলাইজেশন এক্সসারসাইজ এর সাথে নিয়মিত ফিজিওথেরাপির উপকারিতা বের করা।

এই গবেষণাটি একটি পরীখামূলক গবেষণা এবং রোগীদের তথ্য উপাত্ত সংগ্রীহত হবে কাঠামোগত প্রশ্নের মাধ্যমে এবং যারা গবেষণার জন্য উপযোগী তাদের নির্বাচন করাহবে। যদি আপনি অংশগ্রহণে আগ্রহী হন, তাহলে আমি আপনাকে কিছু প্রশ্ন করব যা ১৫-২০ মিনিট সময় নিবে একবারের জন্য যেটা আমি দুইবার পূরণ করতে হবে।

অংশগ্রহণকারীরা প্রশ্ন চলাকালীন যেকোনো সময়ই এই প্রশ্নোত্তর পর্ব ত্যাগ করতে পারবেন। এই গবেষণার জন্য কিছু তথ্য উপাত্ত সংগ্রহ করা হবে এবং এই তথ্য উপাত্ত রোগীর অনুমতি ব্যতিত অন্য কাউকে প্রদান করা হবে না। তথ্যগুলোনিরাপদে রাখা হবে ও গোপনীয়তা নিশ্চিত করা হবে।

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

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

উল্লেখিত বিষয় পড়ে, আমি সজ্ঞানে ও স্বেচ্ছায় এই গবেষণায় অংশ গ্রহন করতে আগ্রহ প্রকাশ করছি।

অংশগ্রহণকারীর স্বাক্ষরঃ .....

গবেষকের স্বাক্ষরঃ .....

সাক্ষীর স্বাক্ষরঃ .....

Informed Consent

Health Care Centre: Centre for the Rehabilitation of the paralyzed (CRP) Assalamualikum my name is Minara Akter, I am doing M.Sc in Physiotherapy from the Bangladesh Health profession Institute. With the help of my supervisor, I am conducting a research project, which is a part of my course curriculum. That is entitled as "**Effectiveness of segmental stabilization exercise with conventional therapy and only conventional therapy for chronic low back pain patients".**

The aim of the study is to determine the effectiveness of segmental stabilization exercise with conventional therapy for the treatment of chronic low back pain patients in the physiotherapy department of CRP.

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

The participants have the right to withdrawal consent and discontinue participation at any time. Information of this study will be collected and never will be shared with others without participant's permission. Information will be kept safely and confidentiality will be maintained. The participants do not get direct benefit from the study but we hope we

Will identify the effectiveness of physiotherapy treatment for chronic low back pain patients. The results of the study could give rise to some adaptations to the rehab program.

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

I agree to participate in the research project without any force

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

Signature of the Researcher---------- Date----------

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

Appendix-D: Quessnaire (Bangla and English)

প্রশ্নাবলী (বাংলা)

এই প্রশ্নাবলী ঘাড়ে ব্যাথার রোগীদের জন্য ব্যাথা,মাংসপেশির সক্ষমতা এবং কোমরের অক্ষমতা নির্ণয়ের জন্য তৈরি করা হয়েছে এবং এই অংশ কালো কলম দ্বারা তথ্যসংগ্রহকারী পূরণ করবেন।

দীর্ঘ মেয়াদি কোমর ব্যথার রোগীদের ক্ষেত্রে সিগমেন্টাল স্টাবেলাইজেশন এক্সসারসাইজ এর সাথে নিয়মিত ফিজিওথেরাপির উপকারিতা বের করা।

রোগীর কোড নং

অধ্যায়ঃ ১-পরিচিতি

১. অংশগ্রহণকারীর নামঃ

২. নির্দেশকৃত চিকিৎসকের নামঃ

৩. মোবাইলনাম্ব

দীর্ঘ মেয়াদি কোমর ব্যথার রোগীদের ক্ষেত্রে সিগমেন্টাল স্টাবেলাইজেশন এক্সসারসাইজ এর সাথে নিয়মিত ফিজিওথেরাপির উপকারিতা বের করা।

রোগীর কোড নং

অধ্যায়ঃ ২- আরথ-সামাজিক ও জনসংখ্যাতাত্তিক তথ্য

২.১ বয়সঃ

২.২ লিঙ্গঃ ১. পুরুষ ২. মহিলা

২.৩ উষ্চতাঃ

২.৪ ওজনঃ

২.৫ ঠিকানাঃ

২.৬ পেশাঃ

১. কৃষক ২. দিনমজুর ৩. চাকুরীজীবি ৪. গার্মেন্টসকর্মী ৫. গাড়িচালক ৬. রিক্সাচালক

৭. ব্যবসায়ী ৮. বেকার ৯. গ্রহিনী ১০. শিক্ষক ১১. ছাত্র ১২. অন্যান্য

২.৭ বৈবাহিক অবস্থা

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

২.৮ পরিবারের আকার

১. ছোট পরিবার ২. যৌথ পরিবার

২.৯ ছেলেমেয়ের সংখ্যাঃ

২.১০ আবাসিক এলাকা

১. গ্রাম ২. শহর

২.১১ শিক্ষাগত যোগ্যতা

১. কখনো স্কুলে যাইনি ২. প্রাথমিক শিক্ষা ৩. মাধ্যমিক শিক্ষা ৪. উচ্চ মাধ্যমিক শিক্ষা

৫. স্নাতক/ স্নাকোত্তর

২.১২ ধর্ম

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

২.১৩ ধূমপান

১. হ্যা ২. না

২.১৪ আঘাতের কোন ইতিহাস আছে কিনা

১. হ্যা ২. না

অধায়ঃ৩- ডালাস ব্যথা জনিত প্রশ্নাবলী

৩.১আপনারব্যথাকতটুকু?

কোন ব্যথা নাই অনেক ব্যথা

৩.২ রাতের বেলায় আপনার ব্যথা কতটুকু?

কোন ব্যথা নাই অনেক ব্যথা

৩.৩ আপনার ব্যথা কি আপনার জীবন যাত্রাকে বাধাগ্রস্থ করে?

কোন বাধাগ্রস্থ না অনেক বাধাগ্রস্থ করে

৩.৪ ব্যথার ওষুধ খেলে কি আপনার ব্যথা কমে?

সম্পূর্ণ কমে কমে না

৩.৫ আপনার কোমর কতটুকু শক্ত মনে হয়?

শক্ত মনে হয় না শক্ত মনে হয়

৩.৬ হাটলে কি আপনার ব্যথা বাড়ে?

ব্যথা বাড়ে না অনেক ব্যথা বাড়ে

৩.৭ আপনার ব্যথার জন্য কি আপনি সোজা হয়ে দাঁড়াতে পারেন?

সজা হয়ে দাঁড়াতে পারি পারি না

৩.৮ হাঁটার সময় কি ব্যথা অনুভব করেন?

কোন ব্যাথা নাই অনেক ব্যাথা

৩.৯ আপনার ব্যথার জন্য কি আপনি সামনে দিকে ঝুঁকতে পারেন?

ঝুঁকতে পারি ঝুঁকতে পারি না

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

বসতে পারি বসতে পারি না

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

বসতে পারি বসতে পারি না

৩.১২ আপনি কি শোয়ার সময় ব্যথা অনুভব করেন?

কোন ব্যথা নাই অনেক ব্যথা

৩.১৩ আপনার ব্যথা আপনার স্বাভাবিক জীবন যাত্রাকে কতটুকু বাধাগ্রস্থ করেছে?

কোন বাধাগ্রস্থ করে নাই বাধাগ্রস্থ করেছে

৩.১৪ আপনার ব্যথা আপনার স্বাভাবিক কাজকর্মকে কতটুকু বাধাগ্রস্থ করেছে?

কোন বাধাগ্রস্থ করে নাই বাধাগ্রস্থ করেছে

৩.১৫ আপনার কোমর ব্যথার জন্য আপনার কর্মস্থলে কতটুকু পরিবর্তন করেছেন?

কোন পরিবর্তন করি নাই সম্পূর্ণ পরিবর্তন করেছি

৪. কোমরের জইন্টের মাংশপেশির সক্ষমতার তথ্যবলী (অক্সফোর্ড গ্রেড স্কেল):

৪.১ কোমরের জইন্টের মাংশপেশির সক্ষমতার বর্তমানে কতটুকু আছে?

- ফ্লেক্সর.....
- এক্সটেনশন.....

অধ্যয়ঃ ৫-অস-ওয়স্ট্রি কোমর ব্যথার অক্ষমতা সংক্রান্ত প্রশ্নাবলী

পর্বঃ কোমরের প্রতিবন্ধিতা সম্পর্কিত তথ্যবলী (এই প্রশ্নাবলী তৈরি করা হয়েছে যাতে আমি জানতে পারি যে আপনার কোমরের সমস্যা আপনার প্রতিদিনের কাজে কি পরিমান বাধাগ্রস্থ করে) Oswestry disability index (ODI) এর প্রতিটি অংশের সর্বনিম্ন নম্বর ০ এবং সর্বচ্চ নম্বর ৫। মোট নম্বর = ৫০। প্রাপ্ত নম্বর = ( )

৫.১ ব্যথার তীব্রতা

□ আমার এই মুহূর্তে কোন ব্যথা নেই
□ আমার এই মুহূর্তে ব্যথা খুবই হালকা
এই মুহূর্তে ব্যথা মধ্যপন্থি
□ এই মুহূর্তে ব্যথা মোটামুটি তীব্র
□ এই মুহূর্তে ব্যথা খুব গুরুতর
□ এই মুহূর্তে ব্যথা অচিন্তনীয়

৫.২ ব্যক্তিগত যত্ন (ওয়াশিং, ড্রেসিং ইত্যাদি)

□ আমি সাধারনত নিজেকে দেখাশুনা করতে পারি, ব্যথা ছাড়া
□ আমি সাধারনত নিজেকে দেখাশুনা করতে পারি, কিন্তু এটা কিছুটা ব্যথাদায়ক

□ নিজেকে দেখাশুনা করা ব্যথাদায়ক, কিন্তু আমি কিছুটা সতর্কতা অবলম্বন করি

□ আমার কিছু সাহায্য প্রয়োজন হয়, কিন্তু অধিকাংশ কাজ আমি নিজে করতে পারি
□ আমার নিজের কাজকর্মের জন্য সারাদিন ব্যাপি অন্যর সাহায্যর প্রয়োজন হয়
□ আমি কষ্ট করেও কাপড় পরিষ্কার করতে পারি না এবং বিশ্রামে থাকি

৫.৩ উত্তোলন

□ আমি অতিরিক্ত ব্যাথা ছাড়া ভারী ওজন উত্তোলন করতে পারি
□ আমি ভারী ওজন উত্তোলন করতে পারি, কিন্তু এটা কিছুটা ব্যথা তৈরি করে
□ আমি ব্যথার জন্য ভারী ওজন উত্তোলন করতে পারি না, কিন্তু আমি সুবিধামত স্থানথেকে ওজন উত্তোলন করতে পারি, জেমনঃ টেবিল হতে
□ আমি ব্যথার জন্য ভারী ওজন উত্তোলন করতে পারি না, কিন্তু আমি সুবিধামত স্থানথেকে অল্প অথবা মোটামুটি ওজন উত্তোলন করতে পারি
□ আমি খুবই অল্প ওজন উত্তোলন করতে পারি
□ আমি কোন ওজনই উত্তোলন বা বহন করতে পারি না

৫.৪ হাঁটা

□ ব্যথা আমাকে যে কোন দূরত্বে হাটার ক্ষেত্রে বাঁধার সৃষ্টি করে না
□ ব্যথা আমাকে ১ মাইলের বেশি হাটার ক্ষেত্রে বাঁধার সৃষ্টি করে
□ ব্যথা আমাকে আধা মাইলের বেশি হাটার ক্ষেত্রে বাঁধার সৃষ্টি করে
□ ব্যথা আমাকে ১ মাইলের বেশি হাটার ক্ষেত্রে বাঁধার সৃষ্টি করে
□ ব্যথা আমাকে ১০০ গজের বেশি হাটার ক্ষেত্রে বাঁধার সৃষ্টি করে
□ আমি শুধু লাঠি বা ক্রাচ ব্যবহার করে হাঁটতে পারি
□ আমি বেশীরভাগে সময়ই বিছানায় থাকি এবং হামাগুরি দিয়ে টয়লেটে যাই

৫.৫ বসা

- □ আমি যেকোনো চেয়ারে ইচ্ছেমত বসতে পারি
- □ আমি শুধুমাত্র আমার পছন্দের চেয়ারে ইচ্ছেমত বসতে পারি
- □ আমি ব্যথার জন্য একঘন্টার বেশী বসতে পারি না
- □ আমি ব্যথার জন্য আধাঘন্টার বেশী বসতে পারি না
- □ আমি ব্যথার জন্য ১০ মিনিটের বেশী বসতে পারি না
- □ আমি ব্যথার জন্য সবসময় বসতে পারি না

৫.৬ দাঁড়ানো

- □ আমি ব্যথা ছাড়া আমার ইচ্ছামত দাড়িয়ে থাকতে পারি
- □ আমি ইচ্ছামত অনেকক্ষন দাড়িয়ে থাকতে পারি, কিন্তু এটা কিছুটা ব্যথার সৃষ্টি করে
- □ আমি ব্যথার জন্য একঘন্টার বেশী দাড়িয়ে থাকতে পারি না
- □ আমি ব্যথার জন্য আধাঘন্টার বেশী দাড়িয়ে থাকতে পারি না
- □ আমি ব্যথার জন্য ১০ মিনিটের বেশী দাড়িয়ে থাকতে পারি না
- □ আমি ব্যথার জন্য সবসময় দাড়িয়ে থাকতে পারি না

৫.৭ ঘুমানো

- □ ব্যাথা আমার ঘুমের কোন সমস্যা তৈরি করে না
- □ আমি একমাত্র বিছানায় ভালভাবে ঘুমাতে পারি
- □ আমি বিছানায় ছয় ঘন্টার কম ঘুমাতে পারি
- □ আমি বিছানায় চার ঘন্টার কম ঘুমাতে পারি
- □ আমি বিছানায় দুই ঘন্টার কম ঘুমাতে পারি
- □ আমি ব্যথার জন্য সবসময় ঘুমাতে পারি না

৫.৮ যৌন জীবন

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

৫.৯ সামাজিক জীবন

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

৫.১০ ভ্রমন

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

Questionnaire (English Version)

This quessnaire is developed to measure pain, muscle strength and disability of the patient with chronic low back pain and this portion will be filled by data collector using a black pain.

The effectiveness of segmental stabilization exercise with conventional therapy and only conventional therapy for chronic low back pain patient.

Part: 1- Personal details:

1.1. Patients name:

1.2. Referring physician name:

1.3.Mobile no:

1. 4. Code No:

The effectiveness of segmental stabilization exercise with conventional therapy and only conventional therapy for chronic low back pain patient.

Code no:

Part 2: Socio – demographic information

2.1. Age:

2.2. Sex: 1Male 2.Female

2.3. Height:

2.4. Weight:

2.5. Address: Village : Post office:

Thana: District:

2.6. Occupation:

1. Farmer 2. Day labor 3.Seervice holder 4. Garments worker

5. Driver 6. Rickshawola 7.Businessman 8.Unemployement

2.7. House wife 10. Teacher 11.Student 12. Others

2.8. Marital status:

1. Married 2. Unmarried 3. Window Divorce

2.9. Family Size:

1. Small family 2. Large family

2.10. Number of children:

Living place:

1. Urban 2. Rural

2.11. Educational status:

1. Illiterate 2. Primary 3. Secondary

4. HSC passes 5. Graduate and Masters

2.12. Religion:

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

2.13. Smoking

1. Yes 2. No

2.14. Any history of trauma

1. Yes 2.No

Part – 3: Dallas pain scale by using visual analogue scale (VAS) for pain measurement

3.1. How bad is your pain?

No pain severe pain

3. 2. How bad is the pain at night?

No pain Worst pain

3.3. Does the pain interfere with your lifestyle?

No problem total change in lifestyle

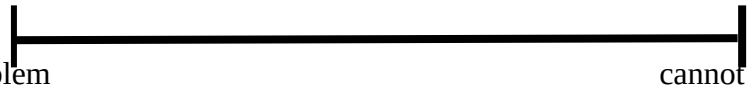
3.4. How good are the pain killers for your pain?

Complete relief no relief

3.5. How stiff is your back?

No stiffness worst possible stiffness

3.6. Does your pain interfere with walking?



No problem cannot walk

3.7Do you hurt when walking?

No pain worst possible pain

3.8. Does your pain keep you from standing still?

Can stand as long as I want cannot stand at all

3.9. Does your pain keep you from twisting?

No problem cannot twist

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

Sit as long as I like cannot us a hard chair at all

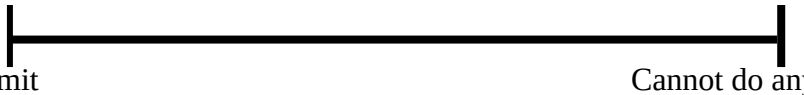
3.11. Does your pain allow you to sit in a soft arm chair?

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

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

No pain no relief at all

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



No limit Cannot do anything

3.14. Does your pain interfere with your work?

No problem Totally cannot work

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

No change So much that I cannot keep a job

Part – 4: Muscle Strength information

Muscle strength information of back muscles (OXFORD Grade Scale):

4.1. In which state muscle strength of lumbar spine lies at present?

- Flexor .....
- Extensor.....

Part - 5: Disability Information (This questionnaire has been designed to give us information as to how your back pain has affected your ability to manage in everyday life). Each section of Oswestry Disability Index (ODI) consists of lowest 0 point and highest 5 points. Total Score= 50 (Obtained Score**……)**

Oswestry Low Back Pain Disability Questionnaire

Section 5.1. – Pain intensity

 I have no pain at the moment

 The pain is very mild at the moment

 The pain is moderate at the moment

 The pain is fairly severe at the moment

 The pain is very severe at the moment

 The pain is the worst imaginable at the moment

Section 5.2. – Personal care (washing, dressing etc)

 I can look after myself normally without causing extra pain

 I can look after myself normally but it causes extra pain

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

 I need some help but manage most of my personal care

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

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

Section 5.3. – Lifting

 I can lift heavy weights without extra pain

 I can lift heavy weights but it gives extra pain

 Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently placed eg. On a table

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

□ I can lift very light weights

□ I cannot lift or carry anything at all

Section 5.4. – Walking

□ Pain does not prevent me walking any distance

□ Pain prevents me from walking more than 1 mile

□ Pain prevents me from walking more than ½ miles

□ Pain prevents me from walking more than 100 yards

□ I can only walk using a stick or crutches

□ I am in bed most of the time

Section 5.5. – Sitting

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

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

□ I like Pain prevents me sitting more than one hour

□ Pain prevents me from sitting more than 30 minutes

□ Pain prevents me from sitting more than 10 minutes

□ Pain prevents me from sitting at all

Section 5.6. – Standing

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

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

□ Pain prevents me from standing for more than 1 hour

□ Pain prevents me from standing for more than 30 minutes

 Pain prevents me from standing for more than 10 minutes

 Pain prevents me from standing at all

Section 5.7. – Sleeping

 My sleep is never disturbed by pain

 My sleep is occasionally disturbed by pain

 Because of pain I have less than 6 hours sleep

 Because of pain I have less than 4 hours sleep

 Because of pain I have less than 2 hours sleep

 Pain prevents me from sleeping at all

Section 5.8. – Sex life (if applicable)

 My sex life is normal and causes no extra pain

 My sex life is normal but causes some extra pain

 My sex life is nearly normal but is very painful

 My sex life is severely restricted by pain

 My sex life is nearly absent because of pain

 Pain prevents any sex life at all

Section 5.9. – Social life

 My social life is normal and gives me no extra pain

 My social life is normal but increases the degree of pain

 Pain has no significant effect on my social life apart from limiting my more energetic interests eg, sport

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

 Pain has restricted my social life to my home

 I have no social life because of pain

Section 5.10. – Travelling

 I can travel anywhere without pain

 can travel anywhere but it gives me extra pain

 Pain is bad but I manage journeys over two hours

 Pain restricts me to journeys of less than one hour

 Pain restricts me to short necessary journeys less than 30 minutes

 Pain prevents me from travelling except to receive treatment

Appendix – E: Treatment protocol of control group

Conventional Physiotherapy for chronic low back pain:

CRP
Centre for the Rehabilitation of the Paralysed

Centre for the Rehabilitation of the Paralysed (CRP)
Department of Physiotherapy
Head Office: CRP- Savar, CRP- Chapain, Savar Dhaka-1343, Bangladesh
Tel: +880 02 7745464-5, Fax: 7745069, E-mail: contact@crp-bangladesh.org, www. crp-bangladesh.org

Ref: CRP/PT/2102/08.01 2017 Date: 08.11.17

Conventional Physiotherapy for chronic low back pain :

There are different types of orthopadics conditions are getting physiotherapy treatment from Musculo-skeletal physiotherapy department in CRP (Center for the rehabilitation of paralysed). Among them chronic low back pain is most common and for this condition use various physiotherapeutic interventions such as –

1. Mckenzie Treatment protocol
2. Cyriax treatment protocil
3. Mobilization
4. Back stretching exercises
5. Back strengthening exercises (Back muscle , abdominal muscles, pelvic floor muscles, leg muscles)
6. Soft tissue mobilization
7. Pelvic floor strengthening / core strengthening (after reducing pain)
8. Neural stretching
9. Traction (manual traction and electrical)
10. Postural education
11. Patient education
12. Gym activities
    - Cycling ,Treadmil , Quards strengthening bar , Hamstring strengthening bar, Power rider
13. Electrotherapy
    - Infrared radiation (IRR)
    - Transcutaneous electrical nerve stimulation (TENS)
    - Ultrasountherapy (UST)

8/11/17
Mohammed Anwar Hossain
Associate Prof. of BHPI
Head of Physiotherapy Dept
CRP, Savar, Dhaka.

CRP-Mirpur, Dhaka, Plot: A/5, Block- A, Section- 14, Mirpur, Dhaka- 1206, Tel: 02 9025562-4, Fax: 02 9025561, Email: dgm-mirpur@crp-bangladesh.org. **CRP-Ganakbari,** PO: Dhamsena, P.S: Ashulia, Savar, Dhaka, Tel: 02 7789227, Email: ganakbari@crp-bangladesh.org. **AK Khan CRP- Chittagong,** Kalurghat, Mohra, Chadgaon, Chittagong, Tel: 031- 2573412, Email: chittagong@ crp-bangladesh.org. **Afsar Hussain CRP- Rajshahi,** House no: 11, Mohishbathan, Rajshahi Court Rajpara, Rajshahi, Tel: 0721 771709, Email: rajshahi@crp-bangladesh.org. **CARSA Foundation- CRP, Barisal,** 12 Gonopara, Barisal Sadar, Barisal, Phone: 0431 71556, Email: barisal@crp-bangladesh.org. **CRP- Moulvibazar,** 836 Sayed Muztaba Ali Road, Poschim Bazar, Tel: 0861 52469, E-mail: moulvibazar@crp-bangladesh.org

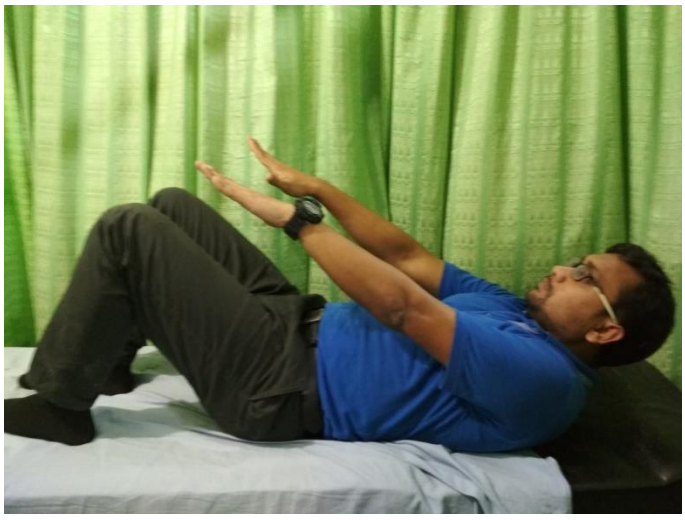
Appendix- F: Treatment protocol of experimental group

Treatment protocol: Strengthening of the Transverse abdominis (TrA) and lumber multifidus (LM)

Doses of treatment: Duration of treatment time - each treatment session will be 30 minutes. Total 4 week, 3 sessions per week.

- Exercises for theTransverse abdominis in 4 point kneeling

- Exercises for the Transverse abdominis in dorsal decubitus with flexed knees



- Exercise for the lumber multifidus in ventral decubitus

- Co – contraction of the Transverse abdominis and lumber multifidus in upright position