EFFECTIVENESS OF SPECIFIC SPINAL STABILIZATION EXERCISES FOR MECHANICAL LOW BACK PAIN AMONG POSTPARTUM WOMEN

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DECLERATION

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

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Acronyms

AVD	Assisted birth Delivery
BHPI	Bangladesh Health Professions Institute
BMRC	Bangladesh Medical Research Council
CRP	Centre for the Rehabilitation of the Paralysed
C/S	Caesarian Section
LBP	Low Back Pain
MLBP	Mechanical Low Back Pain
MRI	Magnetic Resonance Imaging
MS	Musculo-skeletal
NSAID's	Non-Steroidal Anti-inflammatory Drug
NVD	Normal Vaginal Delivery
PT	Physiotherapy
QOL	Quality of life
HQOL	Health Related Quality of Life
RCT	Randomized Control Trial
UST	Ultrasound Therapy
WHO	World Health Organization

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Abstract

Objective: To evaluate the pain intensity in rest and different functional activities before and after introducing spinal stabilization exercises with conventional Physiotherapy and conventional Physiotherapy alone in postpartum women with mechanical low back pain. *Methodology:* 14 patients with postpartum mechanical low back pain were purposively selected from Gynecological and Women's Health unit, CRP, Mirpur. Then 7 patients with postpartum mechanical low back pain were randomly assigned to spinal stabilization with conventional physiotherapy group and 7 patients to the only conventional physiotherapy group for this randomized control trial study. The study was a single blinded study which has been conducted at Gynecological and Women's Health unit, CRP, Mirpur. Trial group was given spinal stabilization with conventional Physical therapy (exercises and also electrotherapeutic modalities) and control group was given conventional Physiotherapy (exercise and electrotherapeutic modalities) only. Both the group received the treatment for a period of 6 days. Numeric Pain Rating Scale was used to measure pain intensity in different functional activities such as swiping, squatting, chair sitting heavy weight lifting, walking, journey by bus or rickshaw and staring. Pain score was analyzed by calculating "Mann- Whitney U test". *Results:* Results showed that relative improvement occur in trial group than in control group. Pain scores on numeric Pain Rating Scale on different functional activities such as during toilet sitting, stair climbing were relatively reduced in trial group between both group comparisons and that was also statistically significant. *Conclusion:* Conventional physiotherapy is effective in improving pain and functional activities but spinal stabilization exercises has an added effect on reducing pain and improving functional activities.

Key words: Spinal stabilization exercises, Conventional physiotherapy, Postpartum mechanical low back pain.

CHAPTER I INTRODUCTION

Low back pain (LBP) is one of the most common symptoms experienced by people throughout the world (Charoenchai et al., 2006) and according to World Health Low back pain (LBP) is one of the most common symptoms experienced by people throughout the world (Charoenchai et al., 2006) and according to World Health Organization (2003) LBP is responsible for a major portion of people staying away from work or visiting a medical practitioner. It is estimated that 70 to 80% of the world's population has at least one episode of back pain in their lifetime. This condition maay 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).

LBP has been a universal problem. In the United States disabling low back pain episodes increased 26% from 1974 to 1978, while the population increased only 7% (Kulie et al., 2010). According to a new systematic review of the global prevalence of low back pain is a major problem throughout the world and highest in women (Bunzli et al., 2011). While prevalence estimates of low back pain vary, population-based data indicate that more than 70% of women experience low back pain during their lifetime, with 50% of women affected during pregnancy and 66% following their reproductive years (Chou et al., 2007).

Back pain during pregnancy is mostly regarded as normal and expected to spontaneously disappear after delivery. Other studies have indicated that not all women experience resolution of their pain spontaneously after delivery, and that low back pain and posterior pelvic pain develop differently during pregnancy. Regression of back and posterior pelvic pain may be slow and incomplete (Kulie et al., 2010). The prevalence of back pain 2 to 18 months postpartum is 2% to 65%. However, in most studies, no clear definition of the exact origin of the back pain in postpartum period has been given. But on the contrary some studies showed that the location of pain was most often in lumbar and posterior pelvic areas (Alkherayf et al., 2010).

The etiology behind back pain after pregnancy is still unclear, but biomechanical, hormonal factors, heavy work, menstruation, first pregnancy at a young age, multi pregnancy, increased weight, carrying a growing child and persistent tissue changes are supposed to be responsible (Kulie et al., 2010). Moreover, Physiotherapy treatment for postpartum back pain may incorporate many approaches and includes advice, education, manual therapy and exercise. Fitness programs and general exercise for chronic low back pain have been effective. A treatment program focusing on specific spinal stabilizing exercises had both statistically and clinically a significantly better effect on decreasing pain, improving functional status, health related quality of life and physical tests than physical therapy without specific stabilizing exercises (Bunzli et al., 2011).

1.2 Rationale

The aim of the study is to find out the effectiveness of spinal stabilization exercises for mechanical low back pain among postpartum women. A stabilizing exercise is meant to dynamically control the lumbar segments and the pelvic joints by activating the local muscles in coordination with the global muscles. Bangladesh is a country with over one third of the population living in and another one third living just above poverty level. The World Health Organization (2010) indicates that Bangladesh has poor prenatal and postpartum care, nutritional deficiencies, high incidence of non-skilled birth attendant utilization and the second highest maternal mortality and morbidity rates next to sub-Saharan Africa. These events make women living in Bangladesh more vulnerable to complications during pregnancy and continuing into the postpartum period that may reduce their health related quality of life (HRQOL). Amongst all women living in Bangladesh, over 80% reported at least one morbidity during one to three years following the birth, either by C-section (C/S), normal vaginal delivery (NVD) or assisted vaginal delivery (AVD). Low back pain is the most common complication after pregnancy period. Different studies exist in different clinical settings in different countries about the effectiveness of spinal stabilization exercises for mechanical low back pain. But no study is available about the effectiveness of spinal stabilization exercises for postpartum complications such as low back pain. So, development of physiotherapy profession in gynecological sectors will establish by conducting this type of research work.

1.5 Aims of the study

To evaluate the effectiveness of spinal stabilization exercises for mechanical low back pain among postpartum women.

1.6 Objectives of the study

- To evaluate the pain intensity at rest before and after introducing spinal stabilization exercises.
- To evaluate the pain intensity during different functional activities before and after applying spinal stabilization exercises.

1.7 Hypothesis

Spinal stabilization exercises are an effective intervention than Conventional Physiotherapy for mechanical low back pain among postpartum women.

1.8 Null Hypothesis

Spinal stabilization exercises are not an effective intervention than Conventional Physiotherapy for mechanical low back pain among postpartum women.

1.9 List of variables

Dependent variable

Low back pain among postpartum women

→

Independent variables

Conventional Physiotherapy (advice, education, manual therapy, exercise and fitness programs and electrotherapeutic modalities)

and

Spinal Stabilization Exercises

1.10 Operational definitions

Spinal stabilization exercises

The spinal stabilization program is a program of back exercises designed to teach patients strengthening and flexibility in a pain-free range. It not only improves the patient's physical condition and symptoms but also helps the patient with efficient movement. It provides the patient with movement awareness, knowledge of safe postures, functional strength and coordination that promotes management of low back pain (Bunzli et al., 2011).

Low back pain

Pain in the lumbosacral area of the spine encompassing the distance from the 1st lumbar vertebrae to the 1st sacral vertebrae (Ebenezer, 2003).

Mechanical low back pain

Mechanical low back pain is the general term that refers to any type of back pain caused by strain on muscles of the vertebral column and abnormal stress (Stanley et al., 2001).

Postpartum women

Referring to the time period following childbirth with reference to the mother (Ozgular et al., 2000).

CHAPTER –II: LITERATURE REVIEW

Pain may be defined as an unpleasant sensory and emotional experience associated with actual, potential tissue damage, or described in terms of such damage and Low back pain more accurately called lumbago or lumbosacral pain occurs below the 12th rib and above the gluteal folds (Sikiru et al., 2010).

Back pain is any type of pain or discomfort throughout the posterior or back portion of the trunk, from the pelvis up to the neck (Ansari et al., 2010). If the intervertebral disc of the lumbosacral spine mechanism is disturbed or serious pathology exists affecting muscles, ligaments, disc, apophyseal joints and fascias then low back pain may occur (Juniper et al., 2009).

Low back pain can affect the back anywhere below the ribs and above the legs. It is also defined as pain between the subcostal margins and inferior gluteal folds (Taucer et al., 2009). Back pain is more common in the lower back, which supports most of the body's weight. The back pain in the lower back can occur on one or both sides, occasionally extending into the buttocks or thighs (Kulie et al., 2010).

The term low back pain is a nonspecific phrase utilized to describe posterior trunk pain and muscular stiffness or spasm with or without diminished range of motion, which is localized between the inferior costal margin and the posterior iliac crests and may include other symptoms such as buttock or leg pain (Rinku et al., 2008).

The incidence of back pain in postpartum patients has also been quoted to be between 30% and 45%.This incidence is believed to be particularly high in those receiving epidural anesthesia during labor despite the fact that the role of epidural in postpartum back pain is still controversial (Breen et al., 1994). However, the relationship between antepartum back pain to postpartum pain to was only specifically evaluated in a few more recent studies (Sikiru et al., 2010). The reported incidence of persistent back pain symptoms also varied widely in the literature, the appearance of pain in more than 60% within 2 days after delivery to approximately 37% at 12 months, to up to 82% at 18 months for those with recurrent back pain from previous pregnancies.

Most reports on the persistence of back pain symptoms after pregnancy consisted of short-term follow up that is several months after delivery with only a few reports on longer-term follow up beyond 1 year (Macarthur et al., 1995).

Category one depends on duration of pain .Acute pain develops suddenly and lasts up to several weeks where sub acute pain lasts up to 3 months. and chronic pain comes on fast or slow, it lasts longer than 3 months (Breen et al., 1994).

Category 2 depends on nature of pain .Mechanical pain meaning that the underlying cause is an anatomical or functional abnormality, rather than underlying disease, malignant neoplasm or manifestation of visceral disease. One form of acute pain, is related or aggravated by movement and worsened by coughing and relieved with rest which is typical of a herniated disc or stress fracture. On the other hand non mechanical pain is constant and has little variation in intensity or with activity (Macarthur et al., 1995).

Pain has a mechanical origin and occurs when the joint between two bones have been placed in a position that over stretches the surrounding soft tissues. This is true for mechanical pain in any joint of the body, including the spine (Malterud,1998). Lesions of structures such as intervertebral discs and joints including degenerative discs, synovitis and or sprain of the sensory nerves of the various paravertebral structures could be the responsible cause for mechanical back pain (Ebenezer, 2003).

Pain is experienced as soon as a mechanical deformation of innervated structures is sufficient to irritate free nerve endings. Pain will arise by the application of forces sufficient to stress or deform the structures. It is not necessary to actually damage tissue containing the nerve ending to provoke pain (Rinku et al., 2008).

The postural syndrome is a mechanical deformation of postural origin causing pain of a strictly intermittent nature, which appears when the soft tissues surrounding the lumbar segments are placed on prolonged stretch. A frequently seen poor sitting posture includes a forward head, rounded shoulders, and a flexed low back (Machado et al., 2006).

Dysfunction Syndrome develops as a result of poor postural habit, spondylosis, trauma or derangement, the dysfunction syndrome is the condition in which adaptive shortening and resultant loss of mobility causes pain before achievement of full normal end range movement. Pain appears during test movements at end range and abolishes as soon as the patient's soft tissues are off stretch (Winjnhoven et al., 2006).

Derangement syndrome is the situation in which the normal resting position of the articular surfaces of two adjacent vertebrae is disturbed as a result of a change in the position of the fluid nucleus between these surfaces. The alteration in the position of the nucleus may also disturb annular material (Machado et al., 2006).

Demo means human beings; Graph means to draw a chart or a picture. So, demography is the scientific study of human population (Reza, 2006) .The statistical and quantitative study of characteristics of human populations on a national, regional or local basis in terms of age, sex and other variables including patterns of migration and survival. It is used in public health medicine to help identify health needs and risk factors (Singh et al., 2010).

Common 3 McKenzie mechanical syndromes**,** osteoarthritis or degenerative disc disease or spondylosis, spondylolisthesis, Spinal stenosis, trauma but initially it is mechanical but later it become chemical, Pregnancy (Kumar & Clark, 2002).

The predisposing factors for low back and its recurrence are mostly related to position and the short and long term consequences of maintaining them. Movement and activity may precipitate low back pain and therefore contribute to its incidence and recurrence. It is often the unexpected and unguarded movement that causes a sudden episode of low back pain. Lifting produces a strain, which is often a precipitation factor especially when heavy, prolonged and repeated lifting is involved (Singh et al., 2010).

Low back pain is the most common disabling musculoskeletal symptom and there is little understanding of risk factors of low back pain. Certain mechanical stresses, repetitive heavy lifting, a sedentary life style, obesity, certain personality profiles and

psychological stresses all have been cited as important risk factors associated with the frequency, severity and resultant disability of low back pain (Bach, 2009).

The most frequently risk factors for LBP is heavy physical workload including lifting, awkward posture and whole body vibration. Life style factors including smoking behavior, lack of physical exercise and short sleep hours also increases LBP. Working periods of 8 hours or more is also a risk factor for having LBP and the common ages affected are over 40 years. Obesity and pregnancy in its later stages can however, distort the curvature of the spine and result in back pain (Bakker et al., 2007).

Abnormal or faulty postural mechanism may produce pain in lower back region. Most commonly occurance of LBP is in the situation of prolong flexion. In that case ligaments are over stretched and loaded and produce mechanical stress on that structure , poor sitting posture may produce back pain in itself without any additional other strains of living (Cohen et al., 2009).

Some sleeping positions and work related postures such as standing and walking may develop low back pain. As a consequence of postural or positional mechanism made worse by overstretching of ligamentous structures may produce LBP (Altinelet al., 2008).

Working platforms which are not adjusted to individual requirements, and poorly designed seating for domestic, commercial and transportation purpose will prompt poor sitting posture. Some authorities have suggested that as much as 75% of all postural back pain is related to hyperlordosis (Borenstein, 2010).

Low back pain seems to be associated with physical activity at work and in leisure time, certain lifestyle factors and demographic characteristics (Bjorck et al., 2008).

Mechanical low back pain starts suddenly. It may be associated with occupations that involved heavy weight lifting, bending or twisting forces and heavy physical work, static work posture, pushing and pulling .Out of 230, reported LBP 8.2% workers who

had jobs with long working hours and 25.5% had treatment for their LBP (Kumar and Clark, 2002).

In one study shows that 5.4% out of 378 were unemployed (Stanley et al., 2001).The role of gender for common LBP is complex. Some studies showed that both male and female have a chance to be affected by LBP which needs a visit to a health professional for consultation but it was found that 6% of female compared with 4% of male that means female were more vulnerable (Ozguler et al., 2000). Another study also showed that females have equal generalized low back pain complains when compared with males (Malanga et al., 2003).But it was also found that in the age group 18 to 65 years had consulted with a new episode of LBP (Stanley et al., 2001)

Obesity and sedentary life also cause low back pain (Feyer, et al., 2000).Another study showed that smoking and Lack of physical activity are also responsible for LBP. Body Mass Index is simple index of weight for height that is commonly used to classify underweight, overweight and obesity. The health risk also associated with increasing BMI (Haq et al., 2008)

Aim of clinical assessment is to identify patients with acute LBP, any neurological deficit requiring urgent specialist management and assess functional limitations caused by the pain and also determine clinical management options (Sparker, 2005).

A wide range of treatment is available for low back pain which depends on the causes and duration of the symptoms. If patients are affected with acute low back pain, generally adviced to stay active rather than bed rest and taking over-the counter pain medicines. If the pain persists longer than 3 months, patients are benefited from more intensive treatment programme. Surgery is rarely needed for low back pain (Quittan, 2002).

Medications containing anti-inflammatory medications or NSAIDs are helpful in treatment of both back pain and the associated inflammation. Narcotic pain medications and muscle relaxers are often used to lead solve the symptoms of low back pain (Shakoor et al., 2007). Surgical intervention may be required when all

others treatment options seems to be ineffective with progressive neurological deficit. Common spinal surgery consists of discectomy, foramenotomy, lumber laminectomy, lumbar spine fusion, kyphoplasty etc (Russell et al., 1993)

Physical therapy adds to the existing literature by investigating the factors in a trial & an economical evaluation of medication and surgical interventions for low back pain. (Bunzli et al., 2011). Moreover another study showed that the most effective treatment option is physical therapy (Bjorck et al., 2008). Chartered Society of Physiotherapy (2002) defined physiotherapy as "Physiotherapy is a health care profession concerned with human function and movement and maximizing potential performance.It uses physical approaches to promote, maintain and restore physical, and social well-being, taking account of variations in health status. It is science-based, committed to extending, applying, evaluating and reviewing the evidence that underpins and informs its practice and delivery. The exercise of clinical judgment and informed interpretation at its course (Bunzli et al., 2011).
Postural correction is the common treatment for all syndromes regarding LBP. It allows the release of end stress loading in posture and dysfunction syndrome and maintenance for reduction in a derangement syndrome (Rinkus et al., 2008).

In many cases, physical therapy is an essential part of acute back pain rehabilitation to promote rapid recovery from pain and return to work as early as possible. Applying of heat and ice is also helpful to relax the muscles and reduce inflammation .In the treatment of sub acute and chronic spine pain, osteopathic physicians and chiropractors provide spinal manipulation techniques, such as thrust, muscle energy, counter-strain articulation and myofascial release (Samad et al., , 2010).

The European Guidelines do not recommended the use of any specific programs, such as stretching, strengthening, flexion or extension exercises for acute back pain. The McKenzie approach, is one of the most frequently used types of physiotherapy for acute back pain (Vleeming et ail., 2008).

A complete exercise program for the low back should consist of a combination of stretching for back pain relief, back strengthening exercises, low-impact aerobic exercises (Sadigi et al., 2008).

Regular, low impact cardiovascular exercises such as bicycling, walking or swimming ,Core strengthening exercises of abdominal and back muscles to increase stability and gentle stretching for maintaining flexibility are parts of an exercise programme for the back and spine to avoid or prevent re-injury (Samad et al., 2010).

The spinal stabilization program is a program of back exercises designed to teach patients strengthening and flexibility in a pain-free range. It not only improves the patient's physical condition and symptoms but also helps the patient with efficient movement. It provides the patient with movement awareness, knowledge of safe postures, and functional strength and coordination that promotes management of low back pain (Crirns et al., 2006).

Spinal Stabilization exercise parameters

A. Exercise 1:

Starting position: Four point kneeling on bed, continue to breathe normally.

Steps:

1) Slowly try to draw your abdominal wall.
2) Holding this position.
3) Maintain normal thorasic and lumbar curve.
4) The rib case and pelvis should remain in neutral position.
5) Aboid bending your elbows.
6) Perform it ten times per set, two sets a day.
7) Stop performing beyond painful range.

B. Exercise 2:

Starting position: Hook lying position on bed, maintain normal neutral spine.

Steps:

1) Holding the hands together and arms straight.

2) Raise knees so that it comes horizontal to the bed level and leg goes out.
3) Arms go over head at the same angle of the leg.
4) Alternate in the other leg.
5) Perform it five times per set, three sets a day.
6) Stop performing beyond painful range.

C. Exercise 3:

Starting position: Supine lying on bed, maintain normal neutral spine.

Steps:

1) Contract your abdominal muscles.
2) Raise your buttock about 2 inches above the bed.
3) Gently down the lower back.
4) Relax the muscles
5) Perform it 10 times per set, three sets a day.
6) Stop performing beyond painful range.

D. Exercise 4:

Starting position: Supine lying position, maintain neutral spine.

Steps:

1) Hands place on thighs,
2) Slider hand toward knees.
3) Shoulder blade and head reaches off the table.
4) Never bend your chin to your chest.
5) Maintain good cervical and lumbar spine (Maintain lumbar lordosis).
6) Perform it 5 times per set, two sets a day.
7) Stop performing beyond painful range.

E. Exercise 5:

Starting position: Prone lying position, use a fold of towel to support forehead

Steps:

1) Straight Leg Raise of one leg about six inches above the table.
2) Then slowly return.
3) Perform it ten times per set, three sets a day.

4) Stop performing beyond painful range.

F. Exercise 6

Starting position: Prone lying position.

Steps:

1) Raise one arm and one leg at a time
2) Perform it five times per set, three sets a day.
3) Stop performing beyond painful range.

G. Exercise 6

Starting position: Supine lying on bed,

Steps:

4) Use the hands to hold the thigh.
5) Keep the leg straight.
6) Ninty degree position from supine
7) Another knees keep ninty degree bend on bed.
8) Perform it three to five times per set, three sets a day.
9) Stop performing beyond painful range.

CHAPTER-III METHODOLOGY

This research was a quantitative evaluation of the comparison between the exercise programs combined with spinal stabilization exercise and conventional exercise alone for pain and functional activity management of the postpartum women with low back pain. To identify the effectiveness of this treatment approach, Numeric pain rating Scale used as measurement tool for measuring the pain intensity in several functional positions.

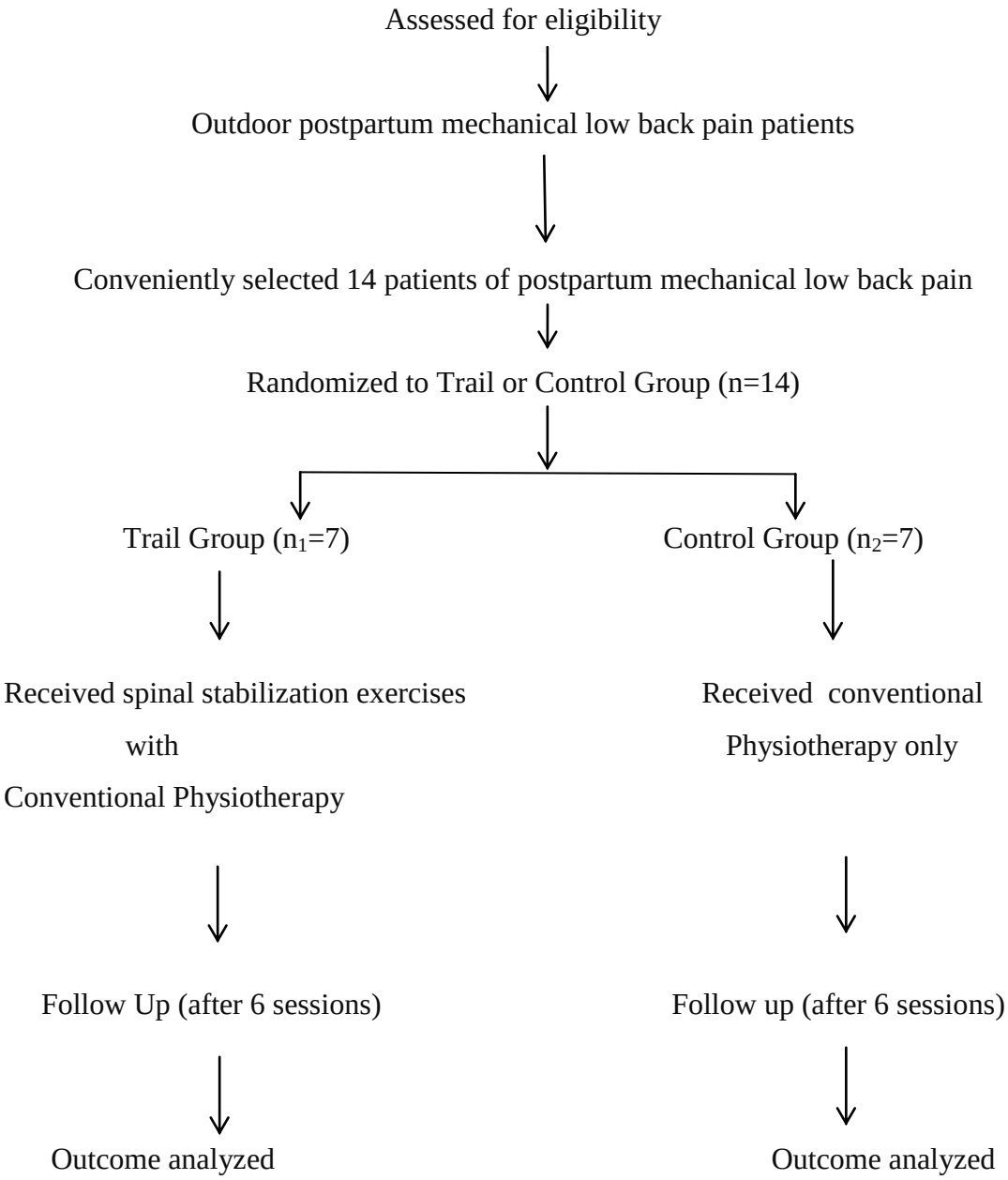
3.1 Study design

The study conducted by using Randomized Control Trail (RCT). From the outdoor patients (Postpartum women with mechanical low back pain) , 14 patients randomly selected and then 7 patients with low back pain randomly assigned to lumbar stabilization exercises with conventional physiotherapy group and 7 patients to the only conventional physiotherapy group for this randomize control trial study. The study was a single blinded study which has been conducted at gynecological physiotherapy department of CRP, Mirpur. A pretest (before intervention) and posttest (after intervention) administered with each subject of both groups to compare the pain effects before and after the treatment.

The design could be shown by-

r	O_1	X_1	O_2	(Experimental group)
r	O_3	X_2	O_4	(Control group)

3.2 Flowchart of the phases of randomized controlled trial



A flowchart for a randomized controlled trial of a treatment program including both trial and control group.

3.3 Study area

Outdoor Gynecological and Women's Health Physiotherapy Unit, CRP, Mirpur.

3.4 Study Population

A population means the entire group of people or items that meet or fulfill the criteria set by the researcher. The populations of this study were the postpartum women with mechanical low back pain who attended at Gynecological and Women's health unit, of CRP Mirpur.

3.5 Sample selection

Subjects, who met the inclusion criteria, were taken as sample in this study. Fourteen patients with postpartum low back pain selected from outdoor Gynecological and Women's health unit of CRP, Mirpur and then 7 patients with postpartum low back pain randomly assigned to spinal stabilizing exercises with conventional physiotherapy group and 7 patients to the only conventional physiotherapy group for this randomize control trial study. The study was a single blinded study. When the samples collected, the researcher randomly assigned the participants into experimental and control group, because it improves internal validity of experimental research. The samples were given numerical number C_1, C_2, C_3 etc for the control and E_1, E_2, E_3 etc for experimental group. Total 14 samples were included in this study, among them 7 patients were selected for the experimental group (received spinal stabilizing exercises with conventional physiotherapy) and rest 7 patients were selected for control group (conventional physiotherapy only).

3.6 Inclusion criteria

- The participants were those individuals who were diagnosed previously as postpartum mechanical low back pain or recently diagnosed by Physiotherapist.
- Patients within 6 months to 2 years postpartum.
- Patients with LBP, with or without radiating leg pain.
- Voluntary participants.
- Aged between 18 to 46 years.

- Patients had a minimum of 1 previous episode of LBP, alteration in normal activities or for which medical care/intervention had been ineffective.

3.7 Exclusion criteria

- Low back pain from pathological cause.
- The participants who had deformity of the spine.
- Patients with clinical disorder which may become worsen with lumbar stabilization exercises e.g.: severe uncontrolled hypertensive patient, severe acute bronchial asthma, recent fracture around lumbar spine.
- Numbness and paresthesia of toes of one or both lower limb as a result of low back pain.
- Subjects who were mentally unstable.
- Low back pain from spondylolisthesis, spondylosis, spondylolysis.
- Patients with severe respiratory distress syndrome.

3.8 Conventional Physiotherapy

Survey is a preliminary run of the main study to highlight any problems which can then be corrected and it is important always to run some pilot study before beginning the experiment (Bailey, 1997)). So, the researcher performed a survey before beginning the main study and the aim of this survey was to define the list of conventional physiotherapy treatment is provided by Gynocological and Women's health unit of CRP, Mirpur for managing the case of postpartum mechanical low back pain. Researcher took one week for survey and visited the respective unit of physiotherapy and consulted with relevant qualified physiotherapist to identify the conventional physiotherapy used for managing postpartum mechanical low back pain. The researcher formulated a list of evidence based physiotherapy interventions of neck pain and provided those to the physiotherapist to mark the interventions commonly used as conventional physiotherapy for postpartum mechanical low back pain. After finishing the survey, researcher became able to find out the conventional physiotherapy interventions used for the case and their frequency of use, with the verbal consent of respective clinical physiotherapist. For postpartum mechanical low back pain- Posture correction or ergonomic advice, Mechanical directional movements, Maitland grade of Mobilization, Therapeutic massage, Electro

therapeutic agents (E.g.: Infrared Radiation , Transcutaneous electrical nerve stimulator, Muscle vibrator), Stretching exercises, Pelvic floor muscle strengthening exercises, Oral NSAIDs were the most commonly used interventions.

3.9 Method of data collection

3.9.1 Data collection tools

A written questionnaire, pen and paper used as data collection tools in this study.

3.9.2 Questionnaire

The questionnaire developed under the advice and permission of the supervisor following certain guidelines. There were ten close ended questions with numeric pain rating scale which measured by examiner that is researcher herself and each question will be formulated to identify the change of pain with each activity.

3.9.3 Measurement tool

Numeric pain rating Scale

In this study researcher used numeric pain rating scale for measuring the intensity of pain (Mann et al., 2003), used a numeric scale to rate the pain status experienced by patients. It is known as Numeric Pain Rating Scale. The scale is a 10cm long scale ranging from 0-10. Here a zero (0) means no pain, 1-3 indicates mild pain, 3-5 indicates that pain is in moderate state and 6-10 is worst possible pain feeling experienced by patients.

3.9.4 Data collection procedure

The study procedure conducted through assessing the patient, initial recording, treatment and final recording. After screening the outdoor patients at Gynecological and Women's health unit, the sample were taken from population with purposive sampling. Fourteen subjects was chosen for data collection according to the inclusion criteria Then the researcher divided all participants into two groups randomly through lottery and coded C (7) for control group and E (7) for experimental group. Then researcher provided the consent form to the sample and also briefly understand about the aims and objectives of the corresponding research project. The patients who agreed to participate then the researcher did pretest both in control and trial group

patients and the intensity of pain noted with numeric pain rating score on questionnaire form. Given evidence based treatment protocol that is spinal stabilization exercises with conventional physiotherapy management performed by one qualified physiotherapist in the trial group and only conventional physiotherapy management for postpartum low back pain performed in the control group later. Six sessions of treatment provided for every subject in each group. The same procedure performed to take post-test at the end of six session of treatment. Researcher gave the assessment form to each subject before starting treatment and after six session of treatment and instructed to encircle the number of numeric pain rating scale according to their intensity of pain in front of the researcher in order to reduce the biasness. At the end of the study, specific test that was "Mann- Whitney U test" was performed for statistical analysis.

3.9.5 Intervention

A common intervention program was executed for both groups as conventional physiotherapy, it included- Postural advice, back extension exercise, manual therapy such as Maitland grade of mobilization, electrotherapeutic modalities (e.g.: Infra-red radiation, TENS, muscle vibrator), pelvic floor muscle strengthening which are the most frequently, used interventions. In this study, the experimental group treated with spinal stabilization exercises in addition with conventional physiotherapy. Clinical physiotherapist applied the spinal stabilization exercises and the conventional physiotherapies. Each group will got 6 sessions of treatment.

3.9.6 Ethical consideration

Research proposal was submitted for approval to the administrative bodies of ethical committee of CRP and also had followed the Bangladesh Medical Research guideline (BMRC) and World Health Organization (WHO) guideline. Again before beginning the data collection, researcher was obtained the permission from the concerned authorities ensuring the safety of the participants. In order to eliminate ethical claims, the participants were set free to receive treatment for other purposes as usual. Each participant was informed about the study before beginning and given written consent.
The researcher obtained consent to participate from every subject. A signed informed consent form was received from each participant. The participants were informed that

they have the right to meet with outdoor doctor if they think that the treatment is not enough to control the condition or if the condition become worsen. The participants were also informed that they were completely free to decline answering any question during the study and were free to withdraw their consent and terminate participation at any time. Withdrawal of participation from the study would not affect their treatment in the physiotherapy department and they would still get the same facilities. Every subject had the opportunity to discuss their problem with the senior authority or administration of CRP and have any questioned answer to their satisfaction.

3.10 Data analysis

In order to ensure that the research have some values, the meaning of collect data has to be presented in ways that other research workers or professionals can understand. In other words the researcher has to make sense of the results. As the result came from an experiment in this research, data analysis was done with statistical analysis (Mann, 2003).

All participants had code in order to ensure that the research have some values, the meaning of collected data has to number according to group to maintain participants confidentiality. Pain intensity score on numeric pain rating scale of all subjects in both experimental and control group was put before starting treatment and after completing treatment. Reduction of pain intensity for both groups is the difference between pre-test and post-test score.

Experimental studies with the different subject design where two different subject groups and the data is non-parametric and ordinal, which should be analyzed with 'Mann -Whitney U test'. As it was experimental and had unmatched groups of different subjects, who was randomly assigned to conventional physiotherapy with spinal stabilization exercises and only conventional physiotherapy group and the measurement of the outcome came from collecting Numeric pain rating score, with considering ordinal data, so the "Mann- Whitney U test" was used in this study to calculate the level of significance. 'Mann- Whitney U test' was calculated to test the hypothesis on the basis of following assumptions-

- Data were ordinal.
- Two different set of subjects in two conditions.

The formula of Mann-Whitney U test

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

Where, n_1 = the number of the subjects in trail group.

n_2 = the number of the subject in control group.

T_x = the larger rank total.

n_x = the number of the subjects of the group with larger rank total.

3.11 Significant level

In order to find out the significance of the study, the researcher calculated the 'p' value. The 'p' values refer the probability of the results for 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 levels, the results are said to be significant.

3.12 Elimination of confounding variables

Confounding variable has an effect on the study variables which can affect the result of the study. There were some confounding variables in this study such as patient's age, history of taking recent physiotherapy intervention, oral NSAID, steroid injection or other treatment which could influence the result of the study. Researcher found no significant difference between the mean age of two groups and the mean age of control group was 26 year and mean age of trial group was 27 year, so there was no effect of age which can influence the result. To control the confounding variables, researcher set the inclusion criteria as to include only those subjects who have no history of taking recent physiotherapy intervention, oral NSAID, steroid injection or other treatment.

CHAPTER- IV RESULTS

Socio-demographic information of the participants

Socio-demographic data of participants is inevitable for research (Mann, 2003). Here, researcher tries to present the socio-demographic information of the patients in tabulated form and also by different types of charts.

Mean Age of the Participants

Trial Group Subjects	**Age (Years)**	**Control Group Subjects**	**Age (Years)**
T1	32	C1	26
T2	35	C2	28
T3	25	C3	31
T4	21	C4	28
T5	34	C5	22
T6	20	C6	24
T7	22	C7	23
Mean age	**27 years**	**Mean age**	**26 years**

Table-1 Mean age of the participant of trial and control group.

From the above mentioned table, it is obvious that, mean age of participants in control group was 26 years and trial group was 27 years age on average

Occupation of the participants

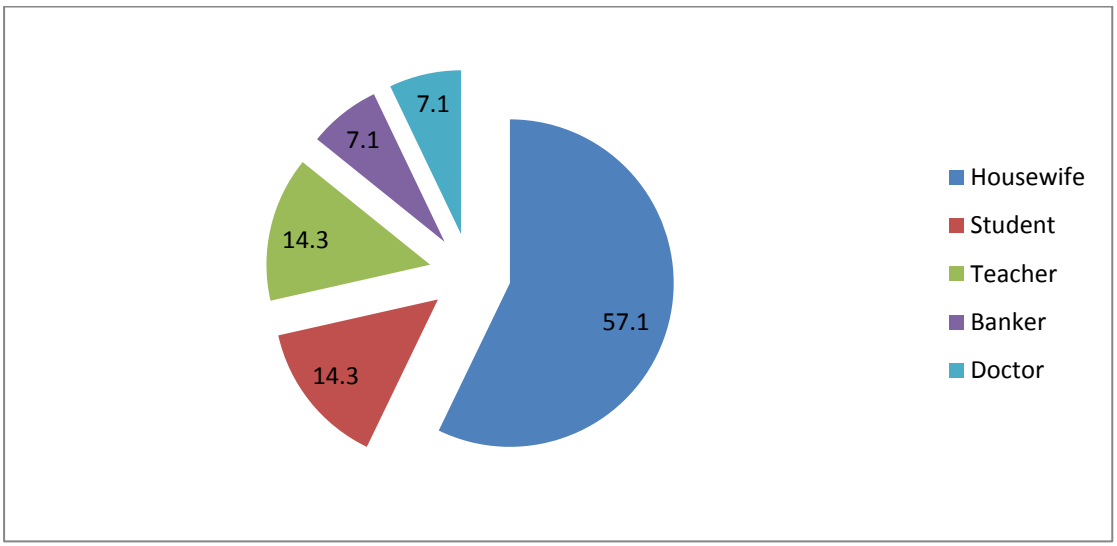


Figure -1 Occupation of the participants.

The occupation of the participants of the research project were sequentially housewife, housewife and student, teacher, banker and doctor and their percentage was 57.1%,14.3%, 14.3%,7.1% and 7.1%.

Reason of coming for treatment

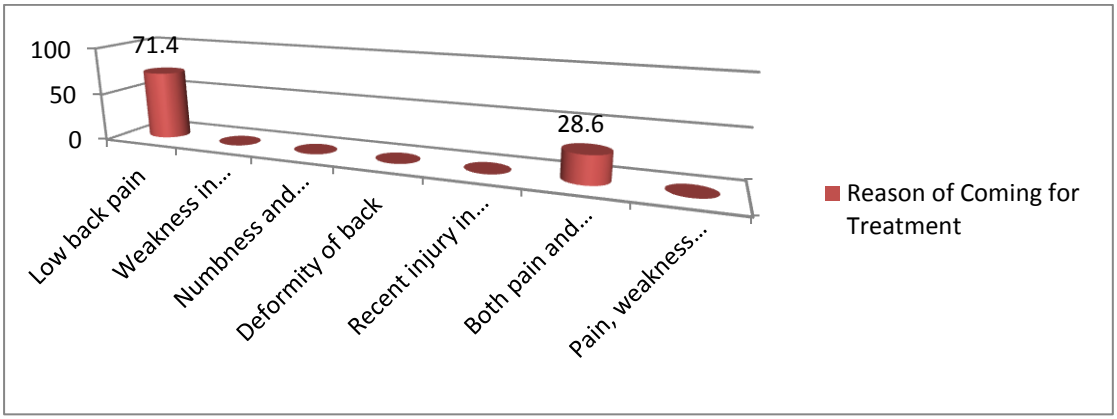


Figure-2 Reason of coming for treatment.

About 71.4% patients had only the complain of pain at lower back region but 28.6% patients had weakness of lower limb associated with low back pain. Researcher's focus was on low back pain not associated symptoms with pain due to limited time period.

Onset of current problem

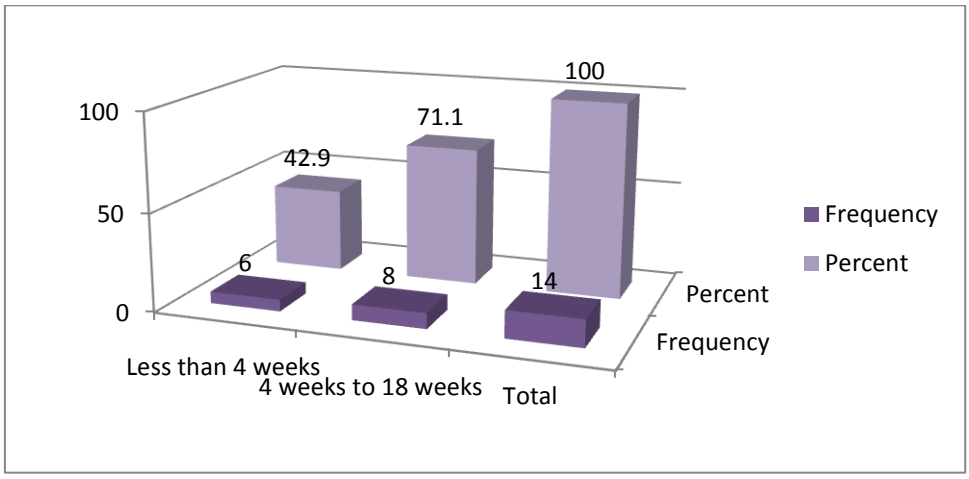


Figure 3 Onset of current problem.

Among total participants, 42.9% of participants onset of current problem before coming to the respective unit was less than 4 weeks, 71.1% was between 4 weeks to 18 weeks.

Time of last delivery

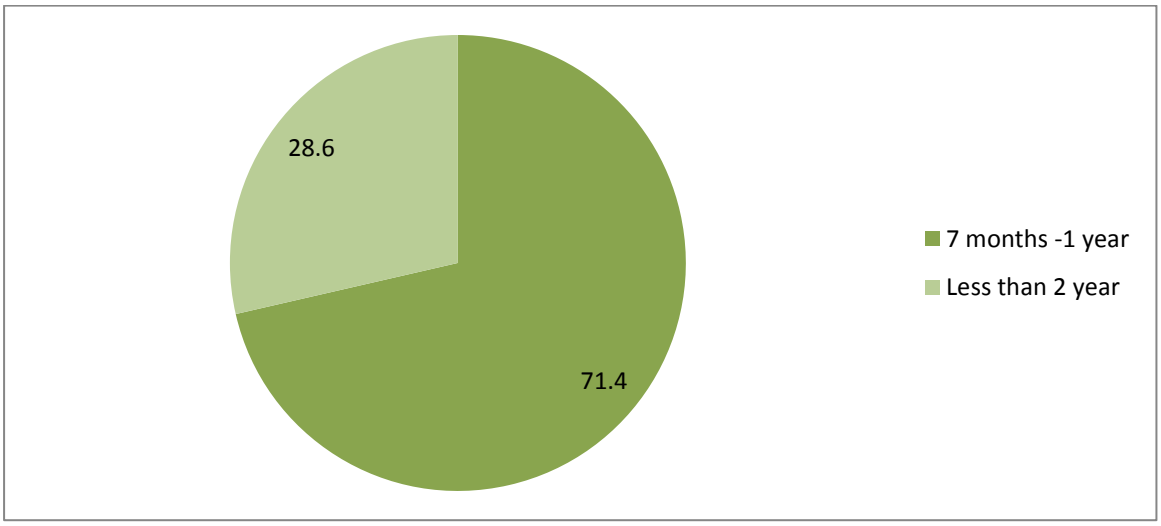


Figure 4 Time of last delivery.

Time of last delivery period of the participants was within 7 months to 1 year of 71.4% participants and less than 2 years of 28.6% participants.

Exact location of pain

Location	Frequency	Percent
Lower back region	14	100.0

Table -2 Exact location of pain of the participant.

Exact location of pain of the participants was lower back region that is the distance from the 1st lumbar vertebrae to the 1st sacral vertebrae.

Household work performance

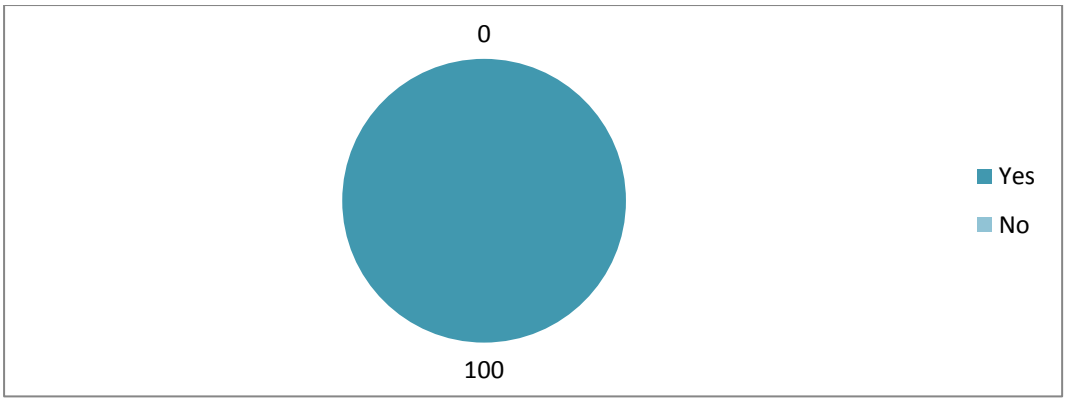


Figure 5 Number of participants Perform repetitive and forceful household work.

All participants were habituated to perform repetitive and household work that was included in the questionnaire by the researcher.

Resting pain

Comparison of changes of pain on Numeric pain rating scale at resting position between both groups

Trial group			Control group		
Subjects	Day 1 Pre	Day 6 post	Subjects	Day 1 Pre	Day 6 post
T1	6	3	C1	7	4
T2	6	4	C2	8	5
T3	7	5	C3	8	6
T4	7	3	C4	7	4
T5	7	4	C5	7	5
T6	9	5	C6	7	6
T7	8	3	C7	7	4
Mean	**7.143**	**3.857**	**Mean**	**7.286**	**4.857**

Table-3 Comparison of pain on Numeric pain rating Scale at resting position between trial and control groups.

In this study, day 1 pretest score of pain on Numeric Pain Rating Scale was 7.143 in trial group, 7.286 among control group. On day 6 post test scores after treatment showed that pain on Numeric Pain Rating Scale had relatively reduced in all groups.

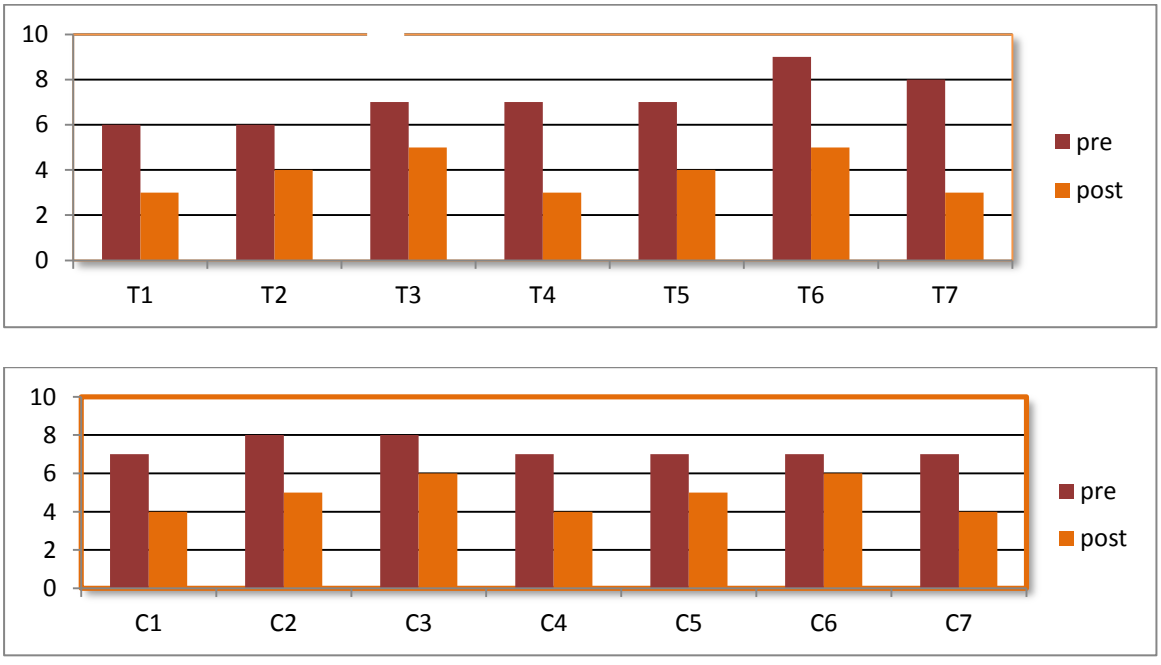


Figure-6 Reduction of Pain at resting position.

Pain during swiping

Comparison of changes of pain on Numeric pain rating scale during swiping between both groups

Trial group			**Control group**		
Subjects	Day 1 Pre	Day 6 post	Subjects	Day 1 Pre	Day 6post
T1	8	4	C1	8	6
T2	7	5	C2	7	5
T3	9	6	C3	6	4
T4	7	4	C4	8	6
T5	6	5	C5	6	5
T6	9	6	C6	6	4
T7	8	4	C7	8	6
Mean	**7.714**	**4.857**	**Mean**	**7.000**	**5.143**

Table-4 Comparison of pain on Numeric pain rating Scale during swiping between trial and control groups.

In this study, day 1 pretest score of pain on Numeric Pain Rating Scale was 7.714 in trial group, 7.000 among control group. On day 6 post test scores after treatment showed that pain on Numeric Pain Rating Scale had relatively reduced in all groups.

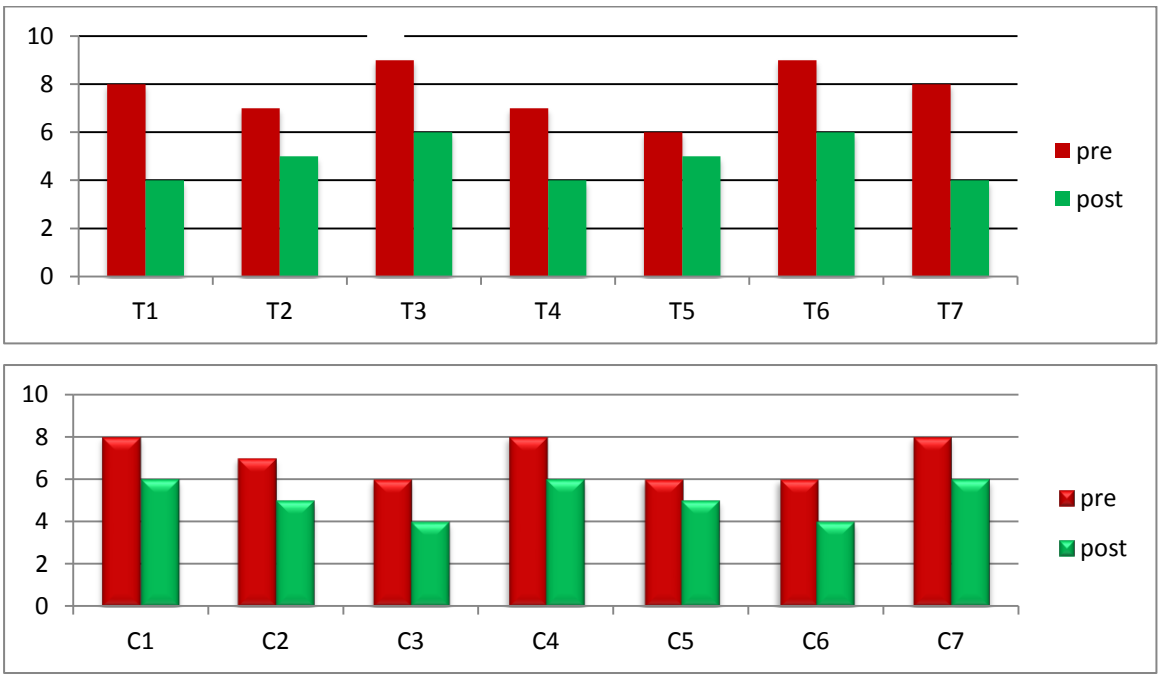


Figure-7 Reduction of pain during swiping.

Pain at toilet sitting

Comparison of changes of pain on Numeric pain rating scale during toilet sitting between both groups

Trial group			Control group		
Subjects	Day 1 Pre	Day 6 post	Subjects	Day 1 Pre	Day 6post
T1	6	3	C1	6	5
T2	7	4	C2	6	4
T3	8	5	C3	8	6
T4	6	3	C4	7	5
T5	7	4	C5	6	4
T6	7	5	C6	8	6
T7	7	3	C7	5	5
Mean	**6.857**	**3.857**	**Mean**	**6.571**	**5.000**

Table-5 Comparison of pain on Numeric pain rating Scale at toilet sitting between trial and control groups.

In this study, day 1 pretest score of pain on Numeric Pain Rating Scale was 6.857 in trial group, 6.571 among control group. On day 6 post test scores after treatment showed that pain on Numeric Pain Rating Scale had relatively reduced in all groups.

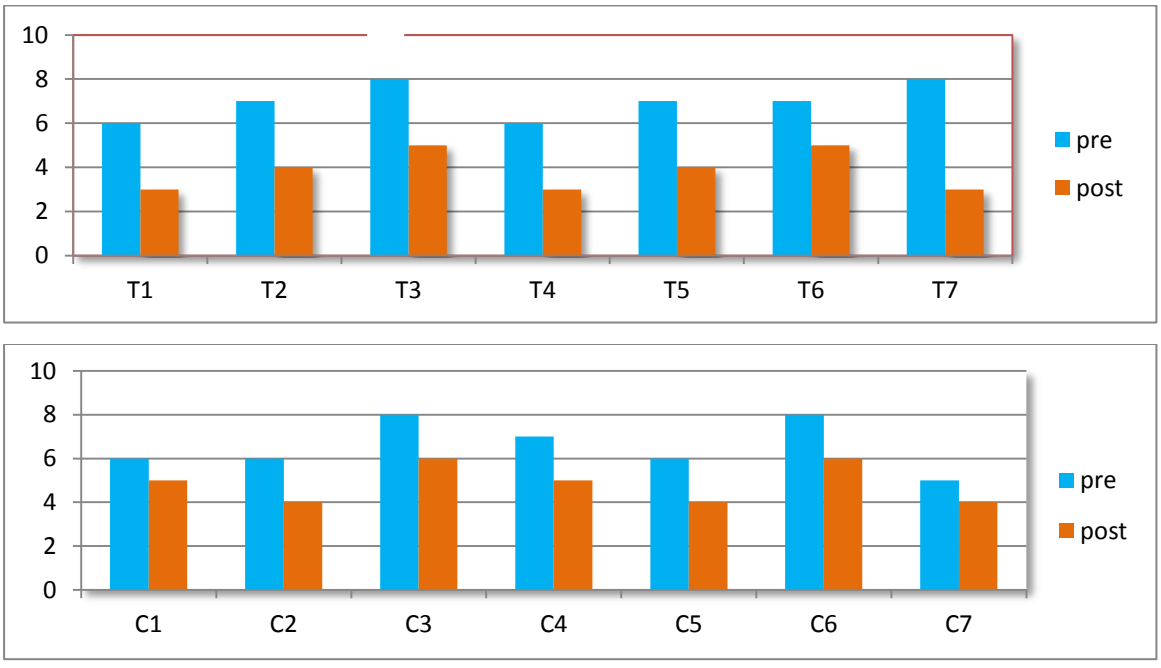


Figure-8 Reduction of Pain at toilet sitting.

Pain during floor sit to stand

Comparison of changes of pain on Numeric pain rating scale during floor sit to stand between both groups

Trial group			**Control group**		
Subjects	Day 1 Pre	Day 6 post	Subjects	Day 1 Pre	Day 6post
T1	7	3	C1	8	6
T2	6	4	C2	8	5
T3	8	5	C3	7	4
T4	9	3	C4	8	6
T5	6	4	C5	7	5
T6	6	5	C6	7	4
T7	6	3	C7	7	6
Mean	**6.857**	**3.857**	**Mean**	**7.428**	**5.143**

Table-6 Comparison of pain on Numeric pain rating Scale during floor sit to stand between trial and control groups.

In this study, day 1 pretest score of pain on Numeric Pain Rating Scale was 6.857 in trial group, 7.428 among control group. On day 6 post test scores after treatment showed that pain on Numeric Pain Rating Scale had relatively reduced in all groups

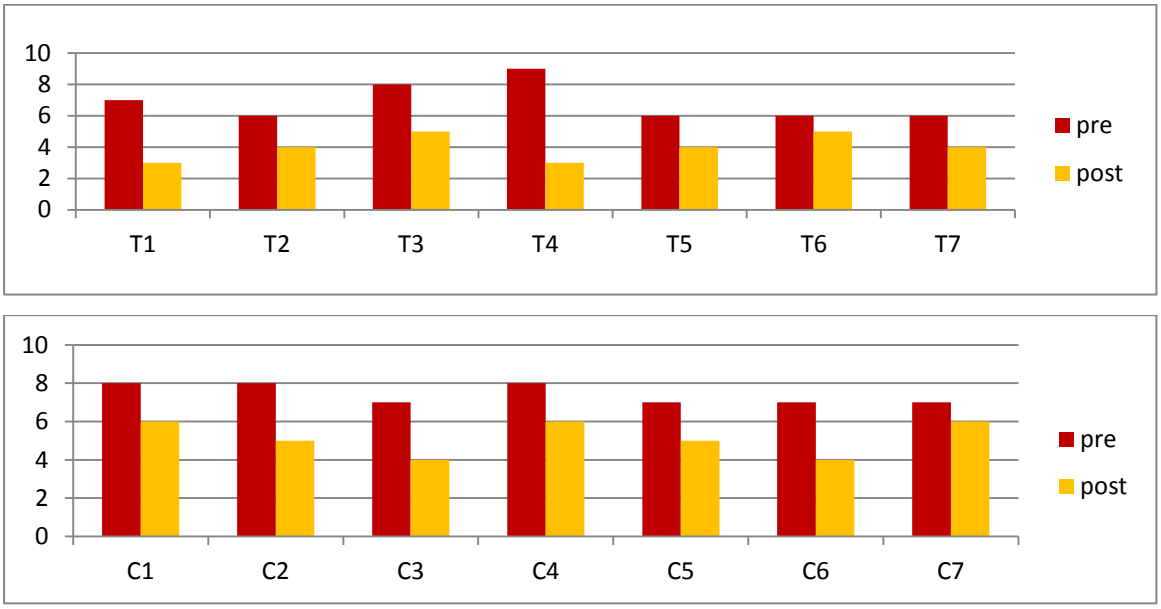


Figure-9 Reduction of pain during floor sit to stand.

Pain during sitting on chair

Comparison of changes of pain on Numeric pain rating scale during sitting on chair between both groups

Trial group			Control group		
Subjects	Day 1 Pre	Day 6 post	Subjects	Day 1 Pre	Day 6post
T1	7	2	C1	5	3
T2	7	3	C2	7	4
T3	7	4	C3	7	5
T4	6	2	C4	5	3
T5	6	3	C5	6	4
T6	7	4	C6	7	5
T7	7	2	C7	5	3
Mean	**6.714**	**2.857**	**Mean**	**6.000**	**3.857**

Table-7 Comparison of pain on Numeric pain rating Scale during sitting on chair between trial and control groups.

In this study, day 1 pretest score of pain on Numeric Pain Rating Scale was 6.714 in trial group, 6.000 among control group. On day 6 post test scores after treatment showed that pain on Numeric Pain Rating Scale had relatively reduced in all groups.

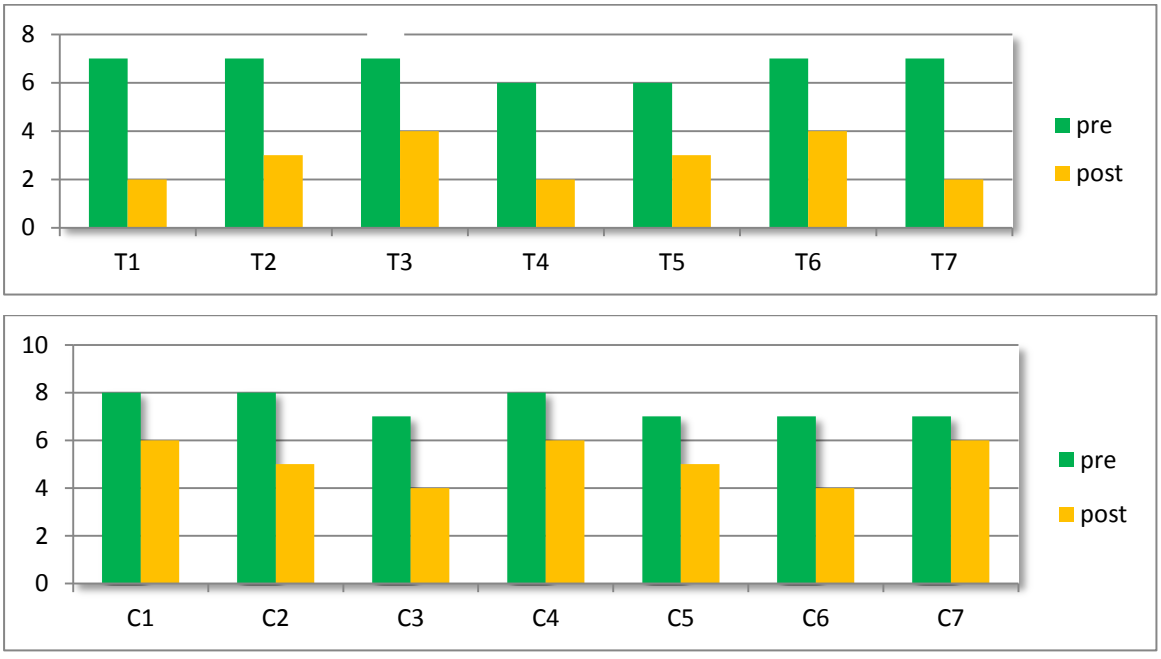


Figure-10 Reduction of pain during sitting on chai

Pain during walking

Comparison of changes of pain on Numeric pain rating scale during walking between both groups

Trial group			Control group		
Subjects	Day 1 Pre	Day 6 post	Subjects	Day 1 Pre	Day 6post
T1	6	3	C1	7	5
T2	7	4	C2	8	6
T3	7	5	C3	8	7
T4	9	3	C4	7	5
T5	7	4	C5	8	6
T6	9	5	C6	8	7
T7	7	3	C7	8	5
Mean	**7.428**	**3.857**	**Mean**	**7.714**	**5.857**

Table-8 Comparison of pain on Numeric pain rating Scale during walking between trial and control groups.

In this study, day 1 pretest score of pain on Numeric Pain Rating Scale was 7.428 in trial group, 7.714 among control group. On day 6 post test scores after treatment showed that pain on Numeric Pain Rating Scale had relatively reduced in all groups.

Figure-11 Reduction of pain during walking.

Pain during journey by bus or rickshaw

Comparison of changes of pain on Numeric pain rating scale during journey by bus or rickshaw between both groups

Trial group			Control group		
Subjects	Day 1 Pre	Day 6 post	Subjects	Day 1 Pre	Day 6post
T1	8	5	C1	8	7
T2	7	3	C2	7	4
T3	5	2	C3	7	5
T4	7	5	C4	8	7
T5	7	3	C5	6	4
T6	9	2	C6	7	5
T7	6	5	C7	9	7
Mean	**7.000**	**3.571**	**Mean**	**7.428**	**5.571**

Table-9 Comparison of pain on Numeric pain rating Scale during journey by bus or rickshaw between trial and control groups.

In this study, day 1 pretest score of pain on Numeric Pain Rating Scale was 7.000 in trial group, 7.428 among control group. On day 6 post test scores after treatment showed that pain on Numeric Pain Rating Scale had relatively reduced in all groups.

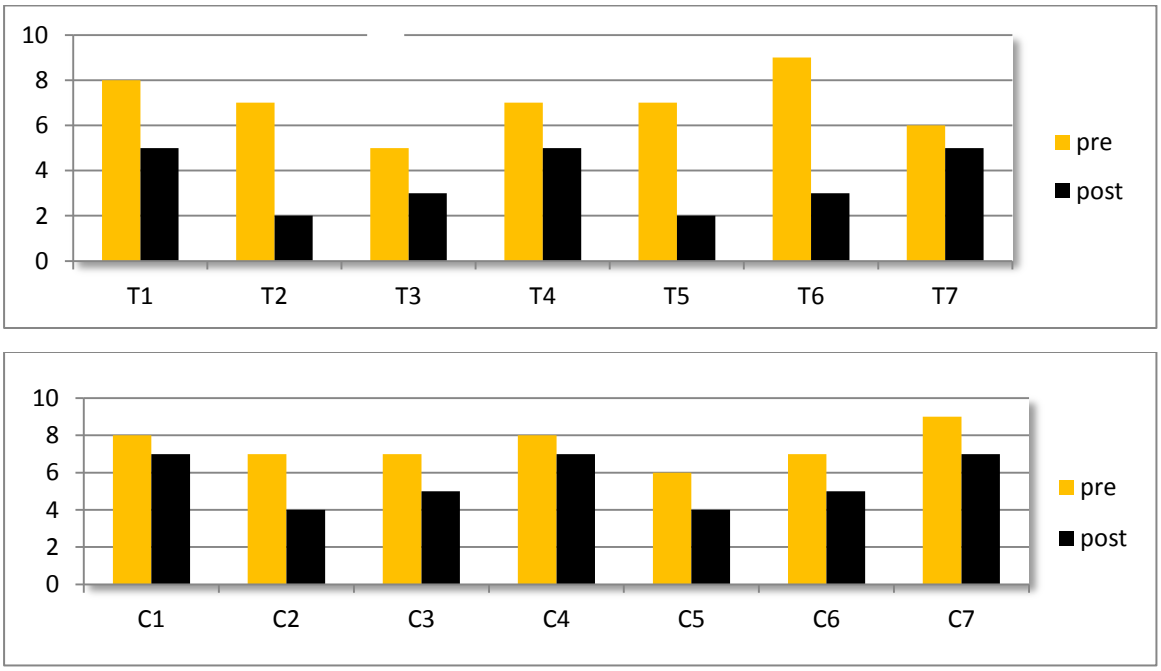


Figure- 12 Reduction of pain during journey by bus or rickshaw.

Pain during stair climbing

Comparison of changes of pain on Numeric pain rating scale during stair climbing between both groups

Trial group			Control group		
Subjects	Day 1 Pre	Day 6 post	Subjects	Day 1 Pre	Day 6post
T1	7	4	C1	6	3
T2	8	5	C2	6	4
T3	6	4	C3	7	5
T4	8	4	C4	7	3
T5	8	5	C5	6	4
T6	8	4	C6	6	5
T7	8	4	C7	5	3
Mean	**6.428**	**4.285**	**Mean**	**6.142**	**3.857**

Table-10 Comparison of pain on Numeric pain rating Scale during stair climbing between trial and control groups.

In this study, day 1 pretest score of pain on Numeric Pain Rating Scale was 4.429 in trial group, 4.143 among control group. On day 6 post test scores after treatment showed that pain on Numeric Pain Rating Scale had relatively reduced in in all groups.

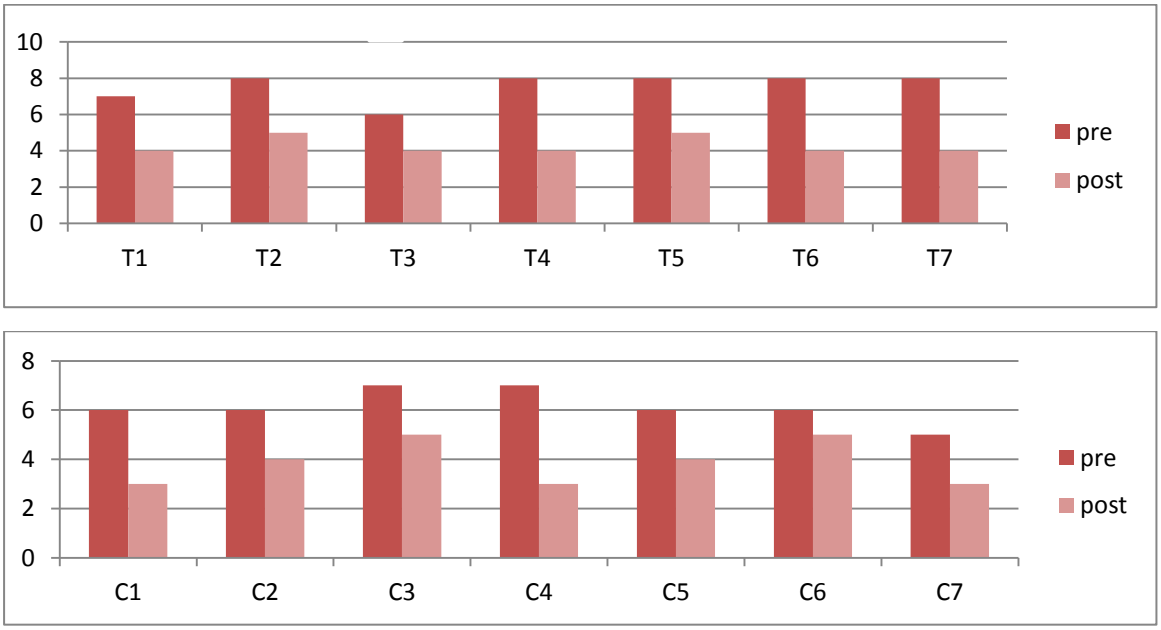


Figure-13 Reduction of pain during stair climbing.

Pain during heavy weight lifting

Comparison of changes of pain on Numeric pain rating scale during heavy weight lifting between both groups

Trial group			**Control group**		
Subjects	Day 1 Pre	Day 6 post	Subjects	Day 1 Pre	Day 6post
T1	9	6	C1	7	4
T2	9	7	C2	8	5
T3	8	5	C3	8	6
T4	8	6	C4	6	4
T5	8	7	C5	7	5
T6	8	5	C6	8	6
T7	9	6	C7	8	4
Mean	**8.428**	**6.000**	**Mean**	**7.428**	**4.857**

Table-11 Comparison of pain on Numeric pain rating Scale during heavy weight lifting between trial and control groups.

In this study, day 1 pretest score of pain on Numeric Pain Rating Scale was 8.428 in trial group, 7.428 among control group. On day 6 post test scores after treatment showed that pain on Numeric Pain Rating Scale had relatively reduced in all groups.

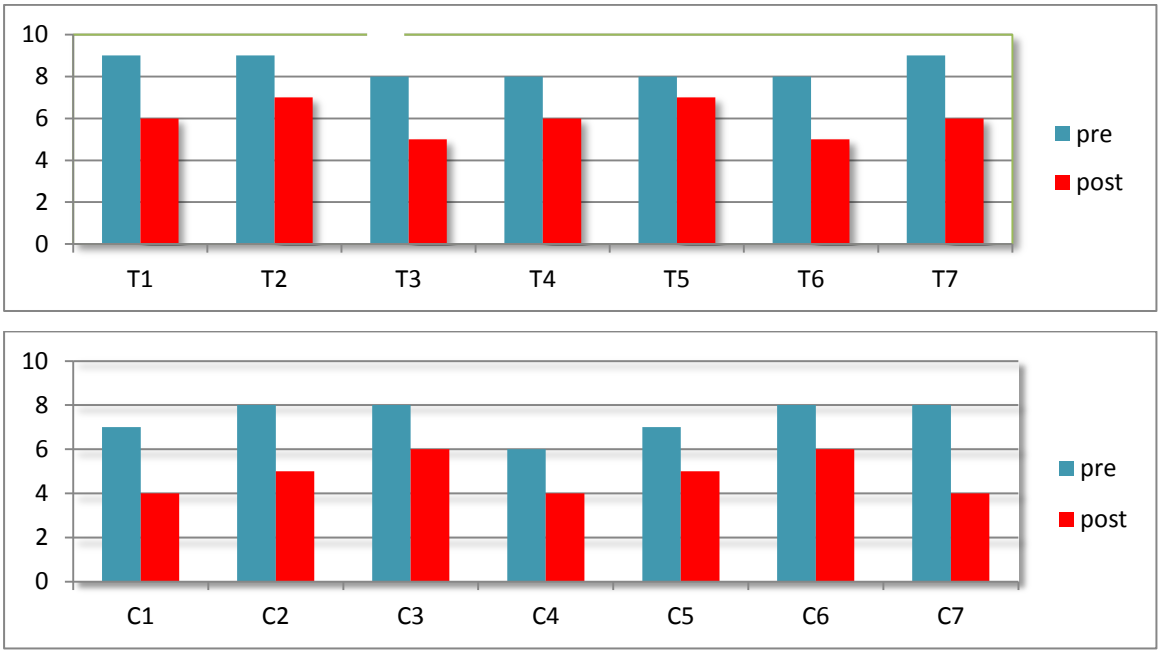


Figure-14 Reduction of pain during heavy weight lifting.

Pain during bed rolling (supine lying to right side lying or supine lying to left side lying)

Comparison of changes of pain on Numeric pain rating scale during bed rolling between both groups

Trial group			**Control group**		
Subjects	Day 1 Pre	Day 6 post	Subjects	Day 1 Pre	Day 6post
T1	6	2	C1	8	5
T2	5	2	C2	6	3
T3	6	3	C3	6	4
T4	5	2	C4	8	5
T5	7	2	C5	7	3
T6	5	3	C6	6	4
T7	5	2	C7	8	5
Mean	**5.571**	**2.285**	**Mean**	**7.000**	**4.142**

Table-12 Comparison of pain on Numeric pain rating Scale during bed rolling between trial and control groups.

In this study, day 1 pretest score of pain on Numeric Pain Rating Scale was 5.571 in trial group, 7.000 among control group. On day 6 post test scores after treatment showed that pain on Numeric Pain Rating Scale had relatively reduced in all groups.

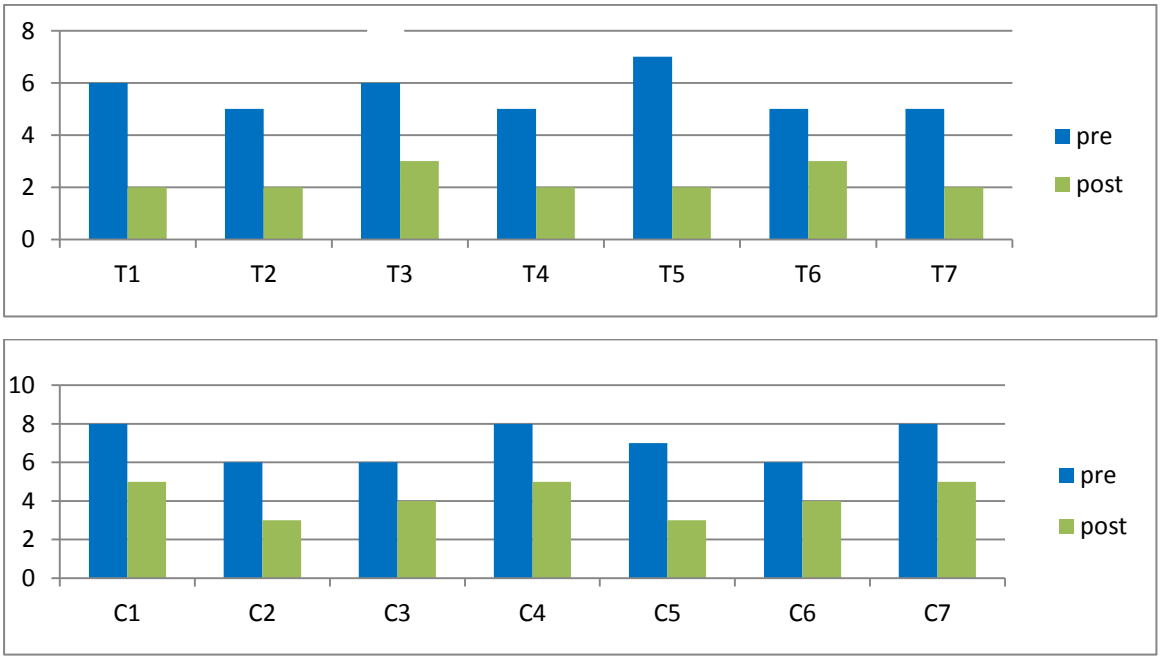


Figure-15 Reduction of pain during bed rolling.

Variables in the study statistically significance at the following level of significance

No	Variables	Observed 'U' value	Observed P value	
1.	Pain at resting position	11	<.05=11	Significant
2.	Pain during swiping	16	<.05=11	Not Significant
3.	Pain during toilet sitting	8.8	<.05=11	Significant
4.	Pain during floor sit to stand	13	<.05=11	Not Significant
5.	Pain during sitting on chair	14	<.05=11	Not Significant
6.	Pain during walking	3	<.05=11	Significant
7.	Pain during journey by bus or rickshaw	9	<.05=11	Significant
8.	Pain during stair climbing	7	<.05=11	Significant
9.	Pain during weight lifting	9.6	<.05=11	Significant
10.	Pain during bed rolling	-17.5	<.05=11	Significant

Table 13 Level of significance in different variables of pain.

CHAPTER –V DISCUSSION

In 2004, a study was conducted in Norway to evaluate the efficacy of specific stabilization exercises for patients with postpartum low back pain to reduce pain and improve functional status. Eighty one postpartum women (after one to three months of pregnancy and their mean age was 32years) were randomized into a trial group (n = 40) and a control group (n = 41). Subjects in the intervention group were instructed a specific stabilization exercises with conventional physiotherapy management and control group received only individualized physiotherapy by six experienced physiotherapist over a period at two different clinical setting. One year follow-up evaluation also conducted at home. The results of the study showed that a treatment program with specific stabilizing exercises, integrated functionally was effective in reducing pain and improving functional status (Stuge et al., 2004).

In this experimental study 14 patients with postpartum mechanical low back pain were randomly assigned to the trial group and to the control group. Among these 14 patients, 7 patients were included in the trial group who received spinal stabilization exercises with conventional physiotherapy and the rest the 7 patients were included in the control group, who received conventional physiotherapy only. Each group attended for 6 sessions of treatment within five weeks in the Gynecological and Women's Health unit of CRP, Mirpur in order to demonstrate the improvement. The purpose of this study was to evaluate the effectiveness of specific stabilization exercises with conventional physiotherapy compare to only conventional physiotherapy for patients with postpartum mechanical low back pain. The outcome was measured by using Numeric Pain Rating scale for pain intensity in different functional position.

The researcher found significant improvement of pain. In Experimental group, Mean difference of reduction of resting pain was 3.286 which was more than Mean difference in control group that is 2.429. Also there was also significant improvement was found in different functional activities by comparing the pain intensity level on Numeric Pain Rating Scale between pretest and posttest session that was sequentially 1.857, 1.571, 2.285, 2.143, 1.857, 1.857, 2.285, 2.571 and 2.858.

The result of this study showed that, in subjects with postpartum mechanical low back pain who received spinal stabilization exercises relatively decrease pain in resting position and also all functional activities compared to individuals who received conventional physiotherapy only by calculating the mean difference. Considering this findings, it seems that spinal stabilization exercises is more pronounced in individuals with postpartum mechanical low back pain.

Researcher also found significant Improvement by calculating statistical test (Mann Whitney U test) in seven among ten functional activities considering the p value <0.05. These functional activities included journey by bus or rickshaw, toilet sitting, waking, resting position, stair climbing, weight lifting and bed rolling. This improvement may be found due to the exercises used were based on those that have been widely advocated and publicized to promote spinal stability and integration of exercises into daily activities (Sullivan, 2000).

But not statistically significant improvement has been found by calculating statistical test in three functional activities among ten and these were swiping, floor sit to stand, and sitting on chair. Significant improvement may be found due to receive less treatment over a shorter period, specific subgroup of patients such as subacute, chronic or recurrent had not shown and core stabilizing system of the spine had not measured in the study, not use of educational booklet and also no follow up at home. (Mindy et al., 2006)

5.1 Limitations

The main limitation of this study was its short duration.

The study was conducted with 14 patients of postpartum mechanical 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.

The researcher took participants of both acute, chronic and follow up cases with mechanical low back pain which also influence the study.

It is limited by the fact all daily activities of the subject were not monitored which could have influenced.

Researcher only explored the effect of spinal stabilization exercises for postpartum mechanical low back pain after 6 weeks, so the long term effect of spinal stabilization exercises for mechanical low back pain was not explored in this study.

The research was carried out in Gynecological and Women's health unit of CRP Mirpur, such a small environment, so it was difficult to keep confidential the aims of the study for blinding procedure. Therefore, single blind method was used in this study.

There was no available research done in this area in Bangladesh. So, relevant information about postpartum low back pain patients with specific intervention for Bangladesh was very limited in this study.

CHAPTER-VI CONCLUSIONS AND RECOMMENDATION

6.1 Conclusion

The study consisted of 14 participants divided randomly and equally into two groups. Trial group consisted of those who received Spinal stabilization exercises with conventional physiotherapy, while control group consisted of those who received only conventional physiotherapy. All participants underwent an extensive relevant physical, medical history and orthopedic examinations, also medical report if available from which their diagnosis of postpartum mechanical low back pain was made. All participants received 6 sessions of treatment, than follow up and evaluation was made.

The results of the study suggest that, pain at resting, during toilet sitting, floor sit to stand, siting on chair, walking, stair climbing, weight lifting, bed rolling on numeric pain rating scale was statistically significant but not statistically significant effect found during swiping and journey by bus or rickshaw.

Ultimately, the performance of Spinal stabilization exercise with conventional physiotherapy is more effective, regardless only conventional physiotherapy. From this research the researcher wishes to explore the effectiveness of Spinal stabilization along with conventional physiotherapy to reduce the features of postpartum patients with mechanical low back pain which will be helpful to facilitate their rehabilitation through physiotherapy management and to enhance functional activities.

Low back pain is a global health problem that just not affects only postpartum women but also pregnant and non - pregnant women.. The manifestations are not only pain but also limitation in movements and restriction to activities of daily living. From this research, researcher also concluded the specific variables and comparison of their improvement rates. This will aid the professionals to decide the specific evidence based protocol for applying interventions in case of postpartum mechanical low back pain.

6.2 Recommendations

For future studies, the following recommendations may be made:

A larger sample size may improve the statistical significance of some of the results

A longer time frame and long-term follow-up examination (1 month after the study and if possible 6 to 12months after the study) a may prove valuable in showing the long-term effect of the treatment, as was done in the study by Mindy C., et al., (2006).

Double blinding procedure should maintain to reduce biasness.

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APPENDIX- 1 CONSENT FORM

Consent Form (English)

Assalamu-Alaikum / Namasker. My name is Nidi Orin Maybee, student of B.Sc. in physiotherapy at Bangladesh Health Professions Institute (BHPI), CRP. I am conducting a study for partial fulfillment of Bachelor of Science in Physiotherapy degree, titled, "Effectiveness of specific stabilization exercises for mechanical Low Back Pain among postpartum women".

Through this research, I will see the efficacy of specific stabilization exercises along with existing physiotherapy for the case of postpartum low back pain. For this regard, I would need to collect data from the postpartum women having low back pain.

Considering the area of research, you have met the inclusion criteria and I would like to invite you as a participant of my study. If you participate in this study, I will evaluate for a particular intervention (Effectiveness of specific stabilization exercises in Combination with Conventional Physiotherapy) for low back pain. The interventions that would be given are safe and will not cause any harm.

I want to meet with you a few couple of sessions during your as usual therapy. Your participation will be voluntary. You have the right to withdraw consent and discontinue participation at any time. If you have any query about the study or your right as a participant, you may contact with, researcher Nidi Orin Maybee or Md. Millat Hossain, Lecturer, Department of physiotherapy, BHPI, CRP, Savar, Dhaka-1343.

Do you have any questions before I start?
So may I have your consent to proceed with the interview?
Yes ……/No……
I …… have read and understand the contents of the form.
I agree to participate in the research without any force.
Signature of the participant _____
Signature of the interviewer _____

সম্মতিপত্র

আসসালামুআলাইকুম/ নমস্কার। আমার নাম নিধি অরিন মেবী, বাংলাদেশ হেলথ ইপ্রফেশনস ইনস্টিটিউট এর ফিজিওথেরাপী চতুথ বষের ছাত্রী। আমি এই গবেষণাটি ব্যাচেলর অব সায়েন্স ইন ফিজিওথেরাপী ডিগ্রির পরিপূণতার জন্য করছি। আমার গবেষণার নাম- গর্ভ পরবর্তী)৫ মাস থেকে ২ বছর পর্যন্ত (মাজা ব্যাথা রোগীদের জন্য নির্দিষ্ট কিছু স্টাবিলাইজেসন ব্যায়াম এর উপকারিতা

এই গবেষণার মাধ্যমে আমি জানতে পারব - গর্ভ পরবর্তী) ৫ মাস থেকে ২ বছর পর্যন্ত (মাজা ব্যাথা রোগীদের জন্য নির্দিষ্ট কিছু স্টাবিলাইজেসন ব্যায়াম এর উপকারিতা। এই জন্য আমার গর্ভ পরবর্তী) ৫ মাস থেকে ২ বছর পর্যন্ত (মাজা ব্যাথা রোগীদের থেকে প্রয়োজনীয় তথ্য জানতে হবে।

গবেষণার ক্ষেত্রে অনুযায়ী, আপনি এই গবেষণায় অন্তভুক্তির যোগ্যতা অর্জন করেছেন। আমি আপনাকে এই গবেষণায় অংশ গ্রহনের আমন্ত্রন জানাচ্ছি।যে সব চিকিৎসা পদ্ধতি আপনার উপর প্রয়োগ করা হবে তা সম্পূর্ণ নিরাপদ এবং নিশ্চিত যে ,কোন ক্ষতি সাধন করবে না।

আমি আপনার সাথে বেশ কয়েকবার দেখা করব। আমার অংশ গ্রহন হবে ঐচ্ছিক। এই গবেষণায় যে কোন মুহূর্তে আপনি আপনার সম্মতি নিতে পারেন কিংবা অংশ গ্রহন থেকে বিরত থাকতে পারেন।

আপনার যদি এ গবেষণা সম্পকে কোন জিজ্ঞাসা থাকে তবে অনুগ্রহপূবক যোগাযোগ করবেন গবেষক নিধি অরিন মেবী অথবা মিল্লাত হোসেন, প্রভাষক, ফিজিওথেরাপী বিভাগ, বি এইচ পি আই, সিআরপি, সাভার, ঢাকা-১৩৪৩।
শুরু করার পূর্বে আপনার কি কোন প্রশ্ন আছে?

আমি কি শুরু করতে পারি?

হ্যাঁ না

প্রশ্নকর্তার স্বাক্ষর .....

আমি ..... এই সম্মতি পত্রটি পড়েছি ও বুঝেছি। আমি স্বেচ্ছায় এই গবেষণায় অন্তর্ভুক্ত হচ্ছি।

অংশগ্রহণকারীর স্বাক্ষর .....

১ নং সাক্ষীর স্বাক্ষর .....

২ নং সাক্ষীর স্বাক্ষর .....

APPENDIX-2 Questionnaire

Questionnaire (English)

SECTION-A (1) Subjective Information

This questionnaire is developed to measure the pain of the patient with post-partum low back pain. And this section will be filled by physiotherapist by using a pencil.

Patient code no.

This questionnaire is developed to measure the pain of the patient with post-partum low back pain.

Patients name: Occupation:

Age: Address:

Sex: Date:

(Circle all that are appropriate)?

1. What is the main issue that brought you in today?

I. Pain in lower back
II. Weakness of the lower limb
III. Paresthesia or numbness in toes
IV. Deformity
V. Recent injury in back
VI. I & II
VII. I, II & III

2. Your last delivery time……

I. Within six month
II. Within in one year
III. Two years or not more than two years

1. How long has the current problem been going on?

i. Years…..
ii. Months……
iii. Weeks…

2. Where is the location of your pain?

i. Lumbar region
ii. Posterior pelvic area

iii. Buttock area

iv. Posterior thigh area

v. Extend into the foot

3. Do you perform any repetitive or forceful household tasks or movements?

1. Yes
2. No

SECTION-B (2) Pain Status before treatment

This questionnaire is designed for postpartum women with mechanical low back pain. (Mccaffery et al., 1999) used a numeric scale to rate the pain status experienced by patients. It is known as Numeric Pain Rating Scale. The scale is a 10cm long scale ranging from 0-10. Here a zero (0) means no pain, 1-3 indicates mild pain, 3-5 indicates that pain is in moderate state and 6-10 is worst possible pain feeling experienced by patients.

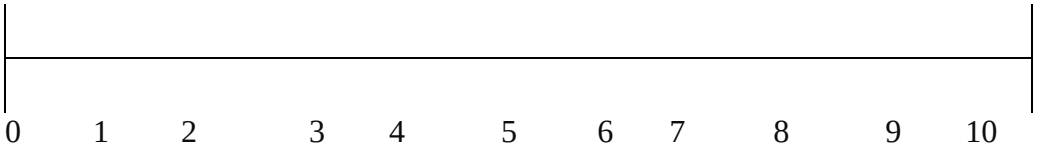
This section of questionnaire will be filled by the patient using a black or blue coloured ball pen. If the patient struggles to understand the meaning of a question, physiotherapist is requested to clear the meaning of certain portions.

1. How severe your pain is at resting position?

Pretest:

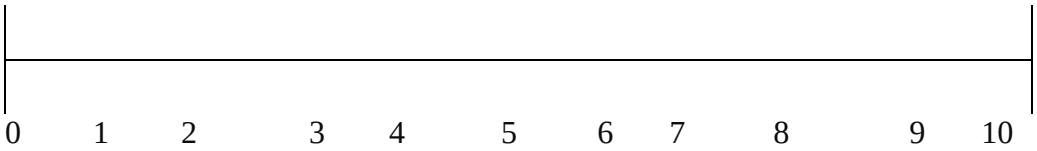
2. How severe is your pain during swiping?

Pretest:



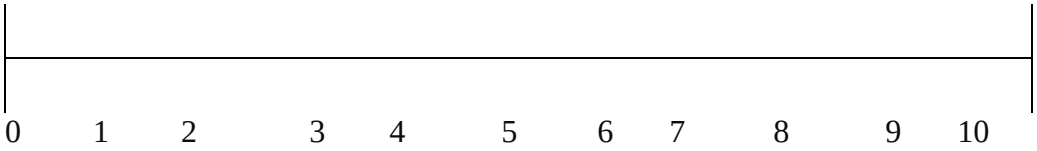
3. How severe is your pain during toilet sitting?

Pretest:



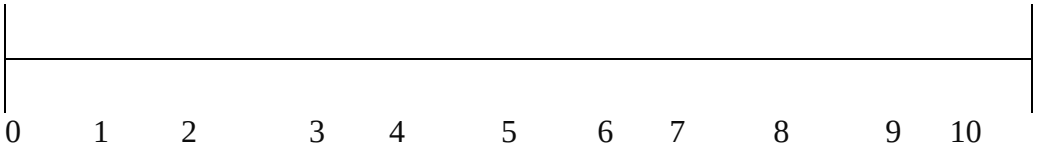
4. How severe is your pain during floor sit to stand?

Pretest:



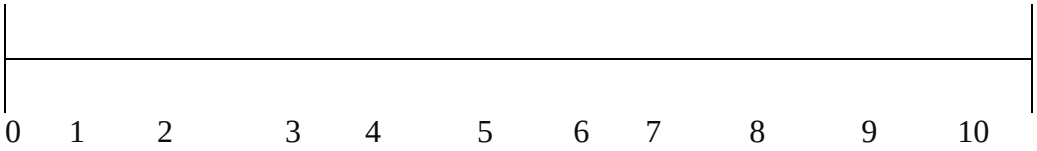
5. How severe is your pain during sitting on chair?

Pretest:



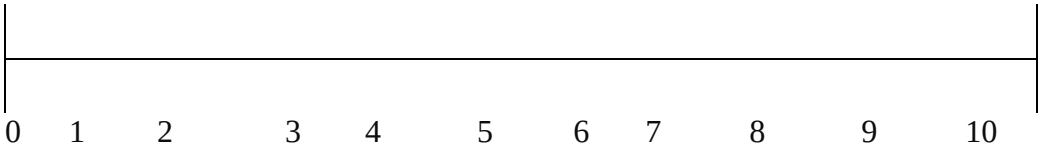
6. How severe is your pain during walking?

Pretest:



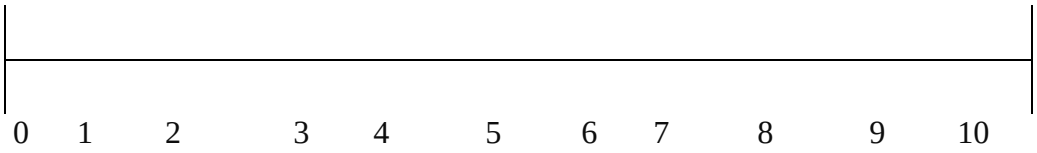
7. How severe is your pain during journey by bus or rickshaw?

Pretest:



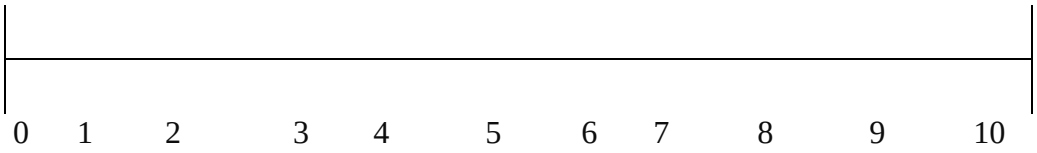
8. How severe is your pain during stair climbing?

Pretest:



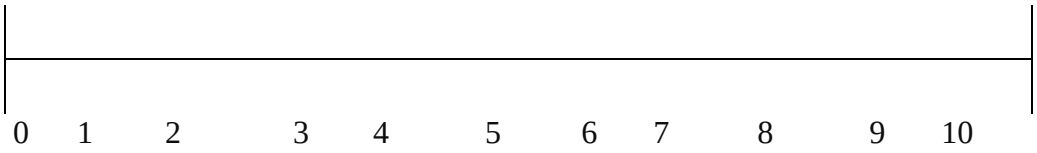
9. How severe is your pain during heavy weight lifting?

Pretest:



10. How severe is your pain during rolling (Supine to right and supine to left)?

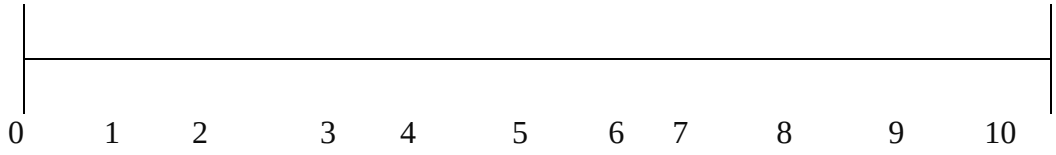
Pretest:



SECTION-C (3) **Pain Status after treatment**

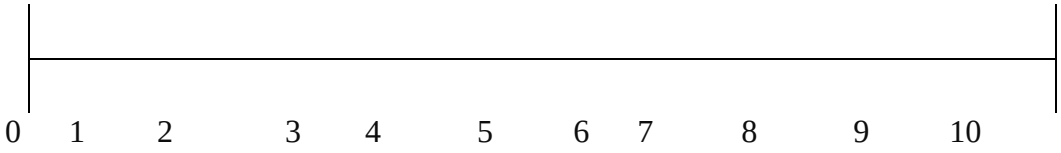
1. How severe your pain is at resting position?

Post-test:



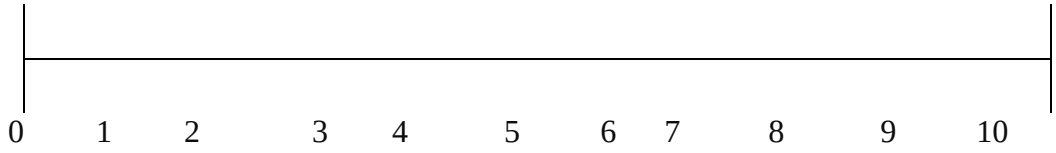
2. How severe is your pain during swiping?

Post-test:



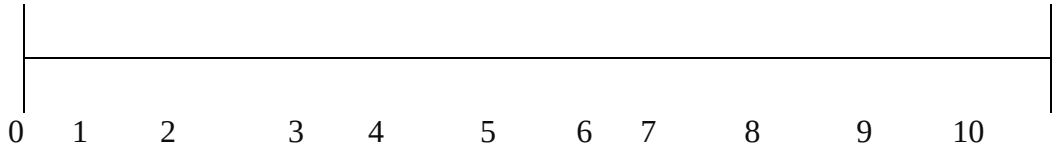
3. How severe is your pain during toilet sitting?

Post-test:



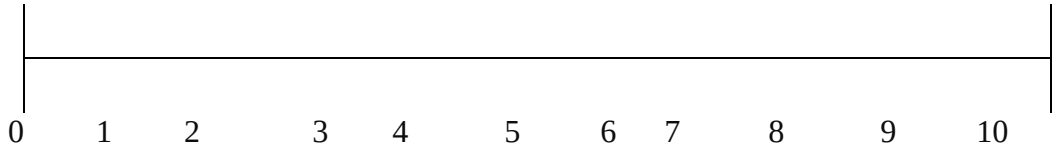
4. How severe is your pain during floor sit to stand?

Post-test:



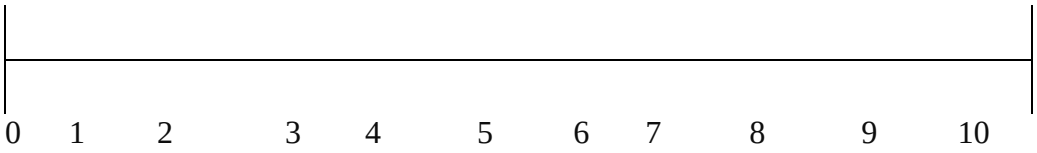
5. How severe is your pain during sitting chair?

Post-test:



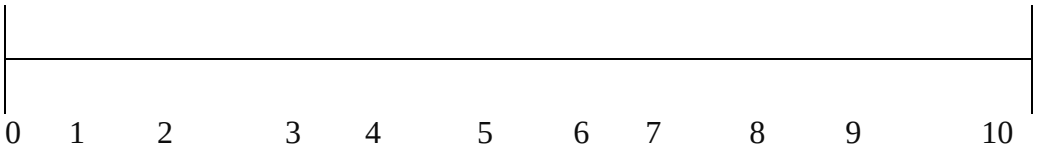
6. How severe is your pain during walking?

Post-test:



7. How severe is your pain during journey by bus or rickshaw?

Post-test:

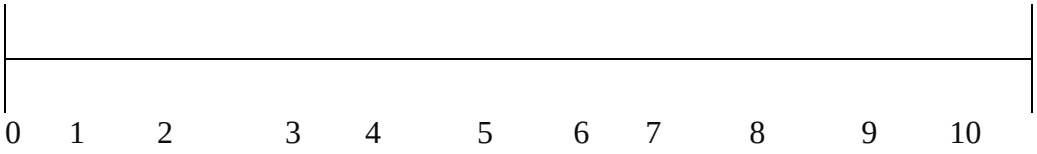


8. How severe is your pain during stair climbing?

Post-test:

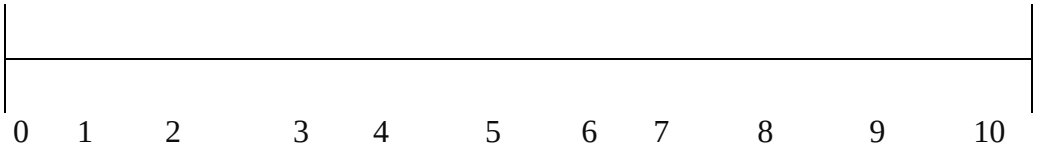
9. How severe is your pain during heavy weight lifting?

Post-test:



10. How severe is your pain during rolling (Supine to right and supine to left)?

Post-test:



প্রশ্নপত্র (বাংলা)

বিষয়ঃ গর্ভ পরবর্তী ৫ মাস থেকে ২ বছর পর্যন্ত মাজা ব্যাথা রোগীদের জন্য নির্দিষ্ট কিছু স্টাবিলাইজেসন ব্যায়াম এর উপকারিতা

খণ্ড – এ) ১ (রোগীর সম্পর্কে বর্ণনা)

(এই প্রশ্নপত্র শুধুমাত্র গর্ভ পরবর্তী মাজা ব্যাথা রোগীদের ব্যাথা পরিমাপ করার জন্য সাজানো হয়েছে এবং এই অংশটুকু ফিজিওথেরাপিস্ট পেন্সিল দ্বারা পূরণ করবেন) .তারিখ: ·····

রোগীরনাম: পেশা:

বয়স: ঠিকানা:

চিকিৎসা শুরুর সময়ঃ----------

চিকিৎসা শেষ হবার সময়ঃ----------

(সঠিক উত্তরে গোল দাগ দিন)

১। আপনি প্রধানত কোন সমস্যার জন্য আজ এখানে এসেছেন ?

১। মাজা ব্যাথা

২। পায়ের মাংসপেশীতে দুর্বলতা

৩। পায়ের আঙ্গুলে অবশ ভাব অনুভব করা

৪। কোমরের শিরদাঁড়া বিকৃত হয়ে যাওয়া

৫। সাম্প্রতিক কমরে আঘাত প্রাপ্ত হওয়া

৬। ১ এবং ২ নং সমস্যা

৭। ১ ,২ এবং ৩ নং সমস্যা

২। আপনার সর্বশেষ গর্ভপাতের সময়কাল.....

১। ৬ মাসের মধ্যে

২। ১ বছরের মধ্যে

৩। ২ বছর অথবা তারচেয়ে কম সময়কাল

৩। বর্তমাতমান সমস্যাটি কতদিন ধরে হচ্ছে ?

১। সপ্তাহ.....

২। মাস.....

৩। বছর.....

৪। আপনার ব্যাথার সঠিক অবস্থানটি কোথায় ?

১। কোমরের নিম্নাংশে

২। শ্রোণীদেশিয় এলাকা

৩। পাছায়

৪। উরুর পিছন ভাগ

৫। কোমর থেকে পা পর্যন্ত

৫। আপনি কি প্রতিনিয়ত গৃহস্থলিয় ভারি কাজকর্ম করতে অভ্যসথ ?

১। হ্যাঁ

২। না

খণ্ড – বি) ২ (চিকিৎসার পূর্বেব্যাথার পরিমাণ)

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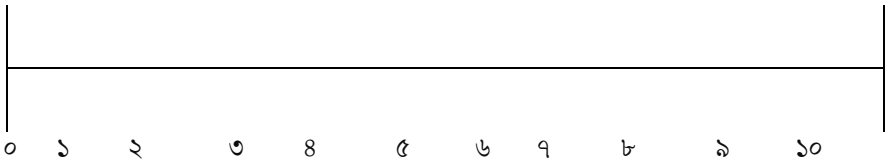
এই প্রশ্নপত্র শুধুমাত্র গর্ভ পরবর্তী মাজা ব্যাথা রোগীদের ব্যাথা পরিমাপ করার জন্য সাজানো হয়েছে। McCaffery et al.)১৯৯১ (রোগীদের ব্যাথার অভিজ্ঞতা বর্ণনা করার জন্য নিওমেরিক পেইন রেটিং স্কেল ব্যবহার করেন। এটি একটি সংখ্যাসূচক স্কেল যা ব্যাথার পরিমাণ নির্ধারণ করে। এটি একটি ১০ সেঃ মিঃ দীর্ঘ স্কেল যেখানে ০ থেকে ১০ পর্যন্ত সংখ্যা দেয়া আছে। এখানে) ০ (মানে কোন ব্যাথা নেই) ,১-৩ (মানে হাল্কা ব্যাথা) ,৪-৬ (মানে সহনীয় ব্যাথা এবং) ৭-১০ (মানে তীব্র ব্যাথা।

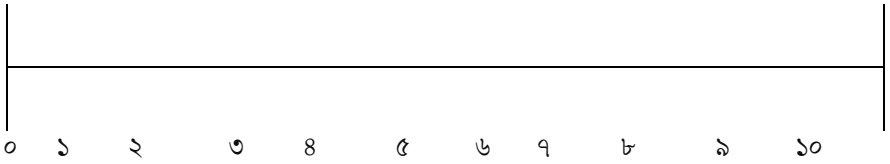
প্রশ্নপত্রের এই অংশ রোগী একটি কালো বা নীল বল কলম ব্যাবহার করে রোগী পূরণ করবেন। রোগী কোন প্রশ্ন বুঝতে না পারলে ফিজিওথেরাপিস্ট সে অংশ বুঝতে সাহায্য করবেন। ১) বিশ্রামরত অবস্থায় আপনার ব্যাথার পরিমান কত?

চিকিৎসার পূর্বেঃ



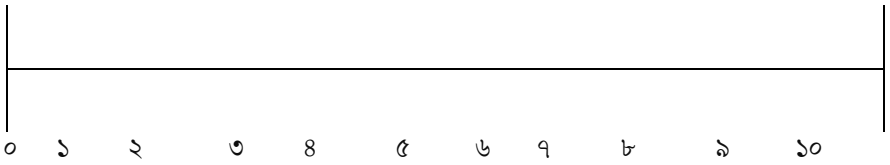
২) ঘর ঝাড়ু দেয়ার সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পূর্বেঃ



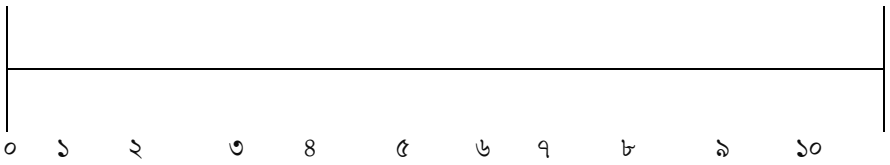
৩) টয়লেট এ বসার সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পূর্বেঃ



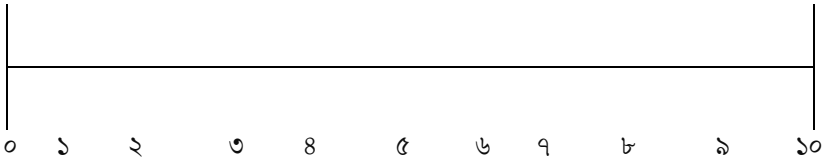
৪) বসা থেকে উঠে দাঁড়ানোর সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পূর্বেঃ



৫) চেয়ারে বসে থাকার সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পূর্বেঃ



৬) হাঁটার সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পূর্বেঃ

৭) রিকশা কিংবা বাস ভ্রমণের সময় আপনার ব্যাথার পরিমান কত?

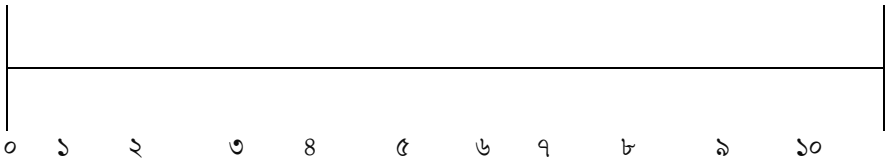
চিকিৎসার পূর্বেঃ

৮) সিঁড়ি বেয়ে উপরে উঠার সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পূর্বেঃ

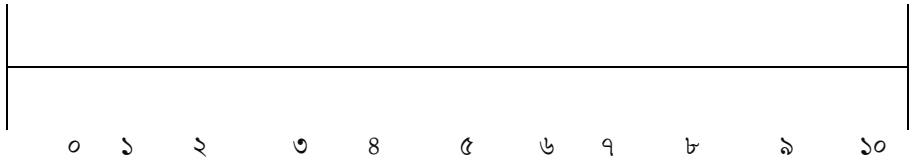
৯) ভারী বস্তু তোলার সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পূর্বেঃ



১০) চিত হয়ে শোয়া থেকে যেকোনো এক পাশ যেমন ডান পাশ বা পাশ হবার সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পূর্বেঃ



খণ্ড – সি (৩) চিকিৎসার পরে ব্যাথার পরিমাণ

১) বিশ্রামরত অবস্থায় আপনার ব্যাথার পরিমান কত?

চিকিৎসার পরেঃ

২) ঘর ঝাড়ু দেয়ার সময় আপনার ব্যাথার পরিমান কত ?

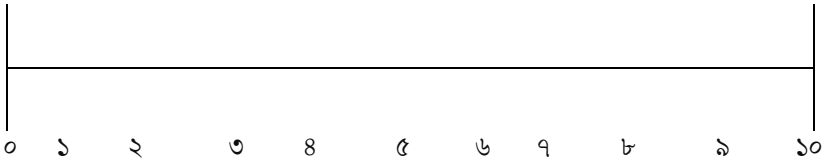
চিকিৎসার পরেঃ

৩) টয়লেট এ বসার সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পরেঃ

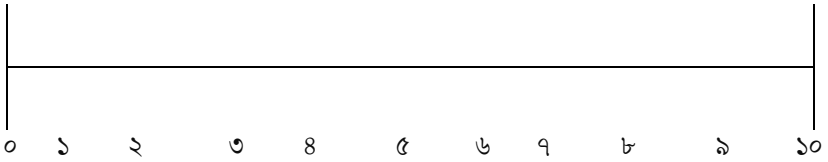
৪) বসা থেকে উঠে দাঁড়ানোর সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পরেঃ



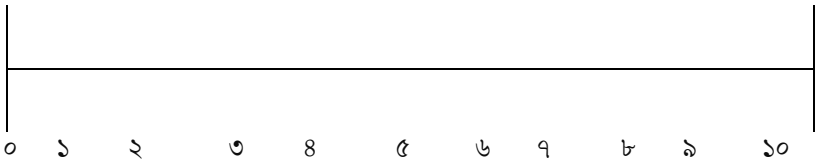
৫) চেয়ারে বসে থাকার সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পরেঃ



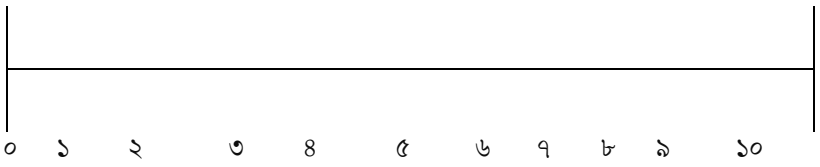
৬) হাঁটার সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পরেঃ



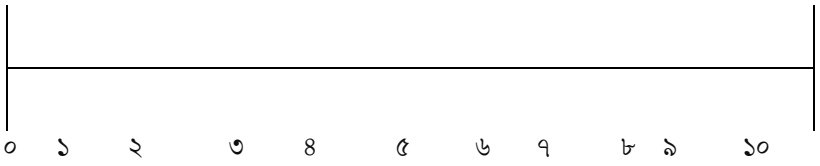
৭) রিকশা কিংবা বাস ভ্রমণের সময় আপনার ব্যাথার পরিমান কত?

চিকিৎসার পরেঃ



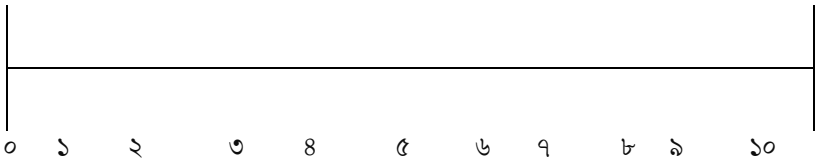
৮) সিঁড়ি বেয়ে উপরে উঠার সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পরেঃ



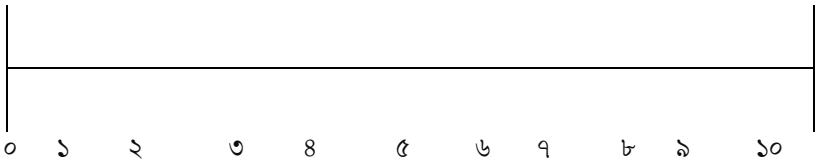
৯) ভারী বস্তু তোলার সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পরেঃ



১০) চিত হয়ে শোয়া থেকে যেকোনো এক পাশ যেমন ডান পাশ বা পাশ হবার সময় আপনার ব্যাথার পরিমান কত ?

চিকিৎসার পরেঃ



APPENDIX -3 STATISTICAL TEST

Mann-Whitney U test:

This test is used for the analysis of the result of experimental study which has two subject design in two different group. The 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:

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

Where, n_1 = the number of the subjects in trail group.

n_2 = the number of the subject in control group.

T_x = the larger rank total.

n_x = the number of the subjects of the group with larger rank total.

Reduction of pain during resting position

Pain intensity at post treatment session for postpartum women with mechanical low back pain at resting position in both control and trial group is shown on the table.

Control group			Trial group		
Subjects	Day 6 Post	Rank	Subjects	Day 6 Post	Rank
C1	4	6	T1	3	2
C2	5	10.5	T2	4	6
C3	6	13.5	T3	5	10.5
C4	4	6	T4	3	2
C5	5	10.5	T5	4	6
C6	6	13.5	T6	5	10.5
C7	4	6	T7	3	2
		Total=66			Total=39

Table-14 U test calculation for pain on Numeric pain rating Scale at resting position between trial and control groups.

Statistical test

Now U formula,

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

Where,

n_1 = 7,

n_2= 7,

T_x= 66,

n_x= 7

Now U formula is,

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

$U = 7\times7 + \frac{7(7+1)}{2} - 66$

$= 49 + 28 - 66$

$= 11$

U value is 11. The critical value of U at $p \leq 0.05$ is 11. Therefore, the result is significant at $p \leq 0.05$ at one tailed hypothesis. So, the difference is statistically significant.

Reduction of pain during swiping

Pain intensity at post treatment session for postpartum women with mechanical low back pain during swiping in both control and trial group is shown on the table.

Control group			**Trial group**		
Subjects	Day 6 Post	Rank	Subjects	Day 6 Post	Rank
C1	6	12	T1	4	5
C2	5	7.5	T2	5	7.5
C3	4	5	T3	6	12
C4	6	12	T4	4	5
C5	5	7.5	T5	5	7.5
C6	4	5	T6	6	12
C7	6	12	T7	4	5
		Total=61			Total=54

Table 15 U test calculation for pain on Numeric pain rating Scale during swiping between trial and control groups.

Statistical test:

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

Where,

n_1 = 7,

n_2= 7,

T_x= 61,

n_x= 7

Now U formula is,

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

U = 7×7 + $\frac{7(7+1)}{2}$ − 61

= 49 + 28 − 61

= 16

U value is 16. The critical value of U at p≤ 0.05 is 11. Therefore, the result is not significant at p≤ 0.05 at one tailed hypothesis. So, the difference is not statistically significant.

Reduction of pain at toilet sitting

Pain intensity at post treatment session for postpartum women with mechanical low back pain during toilet sitting in both control and trial group is shown on the table

Control group			Trial group		
Subjects	Day 6 Post	Rank	Subjects	Day 6 Post	Rank
C1	5	10	T1	3	2
C2	4	5.5	T2	4	5.5
C3	6	13.6	T3	5	10
C4	5	10	T4	3	2
C5	4	5.5	T5	4	5.5
C6	6	13.6	T6	5	10
C7	5	10	T7	3	2
		Total=68.2			Total=37

Table-16 U test calculation for pain on Numeric pain rating Scale during toilet sitting position between trial and control groups.

Statistical test

Now U formula,

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

Where,

n_1 = 7,

n_2= 7,

T_x= 68.2,

n_x= 7

Now U formula is,

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

U = $7\times7 + \frac{7(7+1)}{2} - 68.2$

= 49 + 28 – 68.2

= 8.8

U value is 8.8. The critical value of U at p≤ 0.05 is 11. Therefore, the result is significant at p≤ 0.05 at one tailed hypothesis. So, the difference is statistically significant.

Reduction of pain during floor sit to stand

Pain intensity at post treatment session for postpartum women with mechanical low back pain during floor sit to stand in both control and trial group is shown on the table.

Control group			**Trial group**		
Subjects	Day 6 Post	Rank	Subjects	Day 6 Post	Rank
C1	6	13	T1	3	2
C2	5	7	T2	4	5.5
C3	4	5.5	T3	5	7
C4	6	13	T4	3	2
C5	5	7	T5	4	5.5
C6	4	5.5	T6	5	7
C7	6	13	T7	3	2
		Total=64			Total=31

Table 17 U test calculation for pain on Numeric pain rating Scale during floor sit to stand between trial and control groups.

Statistical test

Now U formula,

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

Where,

n_1 = 7,

n_2= 7,

T_x= 64,

n_x= 7

Now U formula is,

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

$U = 7 \times 7 + \frac{7(7+1)}{2} - 64$

= 49 + 28 – 64

= 13

U value is 13. The critical value of U at p≤ 0.05 is 11. Therefore, the result is not significant at p≤ 0.05 at one tailed hypothesis. So, the difference is not statistically significant.

Reduction of pain during sitting on chair

Pain intensity at post treatment session for postpartum women with mechanical low back pain during sitting on chair in both control and trial group is shown on the table.

Control group			Trial group		
Subjects	Day 6 Post	Rank	Subjects	Day 6 Post	Rank
C1	3	5	T1	2	3
C2	4	10.5	T2	3	5
C3	5	13.5	T3	4	10.5
C4	3	5	T4	2	3
C5	4	10.5	T5	3	5
C6	5	13.5	T6	4	10.5
C7	3	5	T7	2	3
		Total=63			Total=40

Table 18 U test calculation for pain on Numeric pain rating Scale during sitting on chair between trial and control groups.

Statistical test

Now U formula,

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

Where,

n_1 = 7,

n_2= 7,

T_x= 63,

n_x= 7

Now U formula is,

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

$U = 7\times7 + \frac{7(7+1)}{2} - 63$

$= 49 + 28 - 64$

$= 14.$

U value is 14. The critical value of U at $p \leq 0.05$ is 11. Therefore, the result is not significant at $p \leq 0.05$ at one tailed hypothesis. So, the difference is not statistically significant.

Reduction of pain during walking

Pain intensity at post treatment session for postpartum women with mechanical low back pain during walking in both control and trial group is shown on the table.

Control group			**Trial group**		
Subjects	Day 6 Post	Rank	Subjects	Day 6 Post	Rank
C1	5	8	T1	3	2
C2	6	11.5	T2	4	4.5
C3	7	13.5	T3	5	8
C4	5	8	T4	3	2
C5	6	11.5	T5	4	4.5
C6	7	13.5	T6	5	8
C7	5	8	T7	3	2
		Total=74			Total=31

Table 19 U test calculation for pain on Numeric pain rating Scale during walking between trial and control groups.

Statistical test

Now U formula,

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

Where,

n_1 = 7,

n_2= 7,

T_x= 74,

n_x= 7

Now U formula is,

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

$$U = 7\times7 + \frac{7(7+1)}{2} - 74$$

= 49 + 28 – 74

= 3

U value is 3. The critical value of U at p≤ 0.05 is 11. Therefore, the result is significant at p≤ 0.05 at one tailed hypothesis. So, the difference is statistically significant.

Reduction of pain during journey by bus or rickshaw

Pain intensity at post treatment session for postpartum women with mechanical low back pain during journey by bus or rickshaw in both control and trial group is shown on the table.

Control group			**Trial group**		
Subjects	Day 6 Post	Rank	Subjects	Day 6 Post	Rank
C1	7	13	T1	5	9
C2	4	5.5	T2	3	3.5
C3	5	9	T3	2	1.5
C4	7	13	T4	5	9
C5	4	5.5	T5	3	3.5
C6	5	9	T6	2	1.5
C7	7	13	T7	5	9
		Total=68			Total=37

Table 20 U test calculation for pain on Numeric pain rating Scale during journey by bus or rickshaw between trial and control groups.

Statistical test

Now U formula,

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

Where,

n_1 = 7,

n_2= 7,

T_x= 68,

n_x= 7

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

$U = 7 \times 7 + \frac{7(7+1)}{2} - 68$

$= 49 + 28 - 68$

$= 9$

U value is 9. The critical value of U at p≤ 0.05 is 11. Therefore, the result is significant at p≤ 0.05 at one tailed hypothesis. So, the difference is statistically significant.

Reduction of pain during stair climbing

Pain intensity at post treatment session for postpartum women with mechanical low back pain during stair climbing in both control and trial group is shown on the table.

Control group			**Trial group**		
Subjects	Day 6 Post	Rank	Subjects	Day 6 Post	Rank
C1	3	2	T1	4	7
C2	4	7	T2	5	12.5
C3	5	12.5	T3	4	7
C4	3	2	T4	4	7
C5	4	7	T5	5	12.5
C6	5	12.5	T6	4	7
C7	3	2	T7	4	7
		Total=45			Total=60

Table 21 U test calculation for pain on Numeric pain rating Scale during stair climbing between trial and control groups.

Statistical test

Now U formula,

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

Where,

n_1 = 7,

n_2= 7,

T_x= 68,

n_x= 7

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

$$U = 7 \times 7 + \frac{7(7+1)}{2} - 60$$

= 49 + 28 – 60

= 7

U value is 7. The critical value of U at p≤ 0.05 is 11. Therefore, the result is significant at p≤ 0.05 at one tailed hypothesis. So, the difference is statistically significant.

Reduction of pain during heavy weight lifting

Pain intensity at post treatment session for postpartum women with mechanical low back pain during heavy weight lifting both control and trial group is shown on the table.

Control group			Trial group		
Subjects	Day 6 Post	Rank	Subjects	Day 6 Post	Rank
C1	4	2	T1	6	9.8
C2	5	5.5	T2	7	13.5
C3	6	9.8	T3	5	5.5
C4	4	2	T4	6	9.8
C5	5	5.5	T5	7	13.5
C6	6	9.8	T6	5	5.5
C7	4	2	T7	6	9.8
		Total=36.6			Total=67.4

Table 22 U test calculation for pain on Numeric pain rating Scale during heavy weight lifting between trial and control groups.

Statistical test

Now U formula,

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

Where,

n_1 = 7,

n_2= 7,

T_x= 67.4,

n_x= 7

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

U = 7×7 + $\frac{7(7+1)}{2}$ − 67.4

= 49 + 28 – 67.4

= 9.6

U value is 9.6. The critical value of U at p≤ 0.05 is 11. Therefore, the result is significant at p≤ 0.05 at one tailed hypothesis. So, the difference is statistically significant.

Reduction of pan during bed rolling (supine lying to right side lying or supine lying to left side lying)

Pain intensity at post treatment session for postpartum women with mechanical low back pain during bed rolling both control and trial group is shown on the table.

Control group			**Trial group**		
Subjects	Day 6 Post	Rank	Subjects	Day 6 Post	Rank
C1	5	19.5	T1	2	3
C2	3	7.5	T2	2	3
C3	4	10.5	T3	3	7.5
C4	5	19.5	T4	2	3
C5	3	7.5	T5	2	3
C6	4	10.5	T6	3	7.5
C7	5	19.5	T7	2	3
		Total=94.5			Total=30

Table -23 U test calculation for pain on Numeric pain rating Scale during bed rolling between trial and control groups.

Statistical test

Now U formula,

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

Where,

n_1 = 7,

n_2= 7,

T_x= 94.5,

n_x= 7

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

$$U = 7\times7 + \frac{7(7+1)}{2} - 94.5$$

= 49 + 28 – 94.5

= -17.5

U value is -17.5. The critical value of U at p≤ 0.05 is 11 Therefore, the result is significant at p≤ 0.05 at one tailed hypothesis. So, the difference is statistically significant