EFFECTIVENESS OF VASTUS LATERALIS RELEASE AND ILIOTIBIAL BAND STRETCHING FOR KNEE OSTEOARTHRITIS

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EFFECTIVENESS OF VASTUS LATERALIS RELEASE AND ILIOTIBIAL BAND STRETCHING FOR KNEE OSTEOARTHRITIS

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Declaration

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

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Contents

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Acronyms

ADL Activity of Daily Living.

BHPI Bangladesh Health Professions Institute.

BMRC Bangladesh Medical Research Council

CRP Center for Rehabilitation of Paralyzed

FIM Functional independence measurement

IRB Institutional Review Board

OA Osteoarthritis

RCT Randomized control trial

ROM Range of motion

VAS Visual Analogue Scale

WHO World Health Organization

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Abstract

Purpose: To identify the effectiveness of Vastus lateralis release and iliotibial band stretching for knee osteoarthritis.

Hypothesis: Vastus lateralis release and iliotibial band stretching along with conventional physiotherapy is more effective than only conventional physiotherapy for the treatment of knee osteoarthritis

Null Hypothesis: Vastus lateralis release and iliotibial band stretching along with conventional physiotherapy is not more effective than only conventional physiotherapy for the treatment of knee osteoarthritis patient.

Objectives: To find out the effectiveness of Vastus lateralis release and iliotibial band stretching in terms of pain of knee, range of motion (ROM) of knee joint and activities of daily living (ADL).

Methodology: The study was a single blinded Randomized Control Trail (RCT). From the outpatientdepartment, 20 patients with OA of knee were randomly selected and then 10patients with OA of knee were randomly assigned to vastus lateralis release and iliotibial band stretching with conventional physiotherapy group and 10 patients to the only conventional physiotherapy group. The study has been conducted at musculoskeletal department of CRP, Savar.

Results: Following treatment the study found that the experimental group showed a high response significant improvement in pain intensity, in knee bending ($p<0.05$), pain in walking ($p=0.05$), pain in long time standing ($p<.005$). Improvement of functional activities were also significant walking ($p<0.005$), household activities ($p<0.05$), walking upstairs ($p<0.005$). Increasing ROM was also significant active flexion ($p<.01$), passive flexion ($p<0.005$), passive extension ($p<0.05$).

Conclusion: This true experimental study shows that Vastus lateralis release and iliotibial band stretching with conventional physiotherapy is more effective than only conventional physiotherapy for knee osteoarthritis patient.

Key words: Osteoarthritis, Vastus lateralis release, Iliotibial band stretching.

CHAPTER-I INTRODUCTION

1.1 Background

Knee osteoarthritis is the common degenerative disease for the people of 40 years or more. Though medical science has advanced so much and people are getting lots of benefit of it still osteoarthritis and the pain associated with it is a major cause of activity limitation, functional disability and reduced health-related quality of life. It is a multifactorial disease such as, systemic factors (e.g. age, sex, hormones, genetics and nutritional factors), intrinsic joint vulnerabilities (e.g. previous damage, bridging muscle weakness, mal alignment and laxity) and extrinsic factors acting on joints (e.g. specific injurious activity and obesity) (Ding et al., 2005).

Osteoarthritis of knee joint is now a common disorder all over the country. Both male & female, are equally affected by this disorder because it is most prevalent and is associated with age. According to United Nations World Population Prospects 2006 Revision the life expectancy at birth of the world is 67.2 years (65.0 years for males and 69.5 years for females) for 2005–2010. In Bangladesh, Life expectancy at birth 69.75 years male: 67.93 years female**:** 71.65 years. It occurs most in women of age over 45. It occurs in 80% of people over 55 years of age, 23% experience limitation of activities, Radiographic evidence of osteoarthritis is present in the majority of people over age 65; 80% of those over 75, Approximately 11% of those over 65 have symptomatic osteoarthritis of the knee. Radiographs remain the usual means for assessment of osteoarthritic changes in the knee and their association with clinical features such as knee pain, walking difficulty, crepitus etc. (Croft, 2005).

Sources of pain in Knee osteoarthritis includes body mechanics (Wluka et al., 2006) such as knee alignment, body mass index, muscle strength, and muscle stiffness which influence the manner of knee loading. Abnormal mechanics triggers pain by facilitating the degradation of tissues (Maly et al., 2008). Degenerative changes in Knee osteoarthritis include medial compartment cartilage loss, joint narrowing and tibial plateau collapse. These changes lead to increased adduction moment and varus deformity (Andriacchi & Mundermann, 2006).

1.2 Rationale

In the Asia Pacific region Knee osteoarthritis is one of the most common degenerative disorders. It is a condition that affects mainly old aged people and they are the sufferer of OA. It occurs most in women of age over 45. It occurs in 80% of people over 55 years of age, 23% percent experience limitation of activities. The natural history of osteoarthritis of the knee is highly variable, in some cases the disease improves, remain stable in some and gradually worsen in rest. It causes impaired mobility in the elderly in frequent. Many people do not engage themselves in usual activities due to functional limitations caused by knee pain (Felson, 2006).

The research investigation is about vastus lateralis release and iliotibial band stretching with conventional physiotherapy comparing with only conventional physiotherapy. The vastus lateralis muscle is located on the side of the thigh. This muscle is the largest of the quadriceps group the specific task of the vastus lateralis muscle is to extend the lower leg and allow the body to rise up from a squatting position.

This study is designed to investigate the effectiveness of vastus lateralis release and iliotibial band stretching with conventional physiotherapy alone. The researcher found that a large number of patient with knee osteoarthritis suffer from tightness of vastus lateralis muscle and iliotibial band. This made the researcher very interested in this study.

1.3 Aim of the study

Identify the effectiveness of Vastus lateralis release and iliotibial band stretching with conventional physiotherapy for knee osteoarthritis.

1.4 Objectives of the study

1.4.a General objective

To identify the effectiveness of Vastus lateralis release and iliotibial band stretching for knee osteoarthritis.

1. 4.b Specific objective

1. To assess the effect on pain after introducing Vastus lateralis release and iliotibial band stretching
2. To measure the range of motion after introducing Vastus lateralis release and iliotibial band stretching.
3. To investigate the effect on daily activities after introducing Vastus lateralis release and iliotibial band stretching.

1.5 Hypothesis

Vastus lateralis release and iliotibial band stretching along with conventional physiotherapy is more effective than only conventional physiotherapy for the treatment of knee osteoarthritis.

1.6 Null hypothesis

Vastus lateralis release and iliotibial band stretching along with conventional physiotherapy is not more effective than only conventional physiotherapy for the treatment of knee osteoarthritis patient.

1.7 List of variables

1.7(a) Independent variables

- Vastus lateralis release,
- Iliotibial band stretching

1.7 (b) Dependent variable:

- Improvement of Knee osteoarthritis

1.8 Operational Definition

Osteoarthritis

Patients are diagnosed as having knee OA and pain at knee which is the barrier to do daily work/job properly, decreased joint range of motion, difficulty to perform activity of daily life (ADL).

Vastus lateralis

The division of the quadriceps muscle that covers the outer anterior aspect of the femur, arises chiefly from the femur, and inserts into the outer border of the patella by a flat tendon which blends with that of the other divisions of the muscle and sends an expansion to the capsule of the knee.

Origin - Upper aspect of the intertrochanteric line, base of the greater trochanter and onto its anterior surface, lateral lip of the linea aspera and lateral lip of the gluteal tuberosity.

Insertion - Into the lateral side of the quadriceps tendon.

Nerve supply - Posterior division of the femoral nerve.

Action - Extension of the leg at the knee (Datta, 2007).

Iliotibial band (IT Band)

The iliotibial band is a thick band of fascia on the lateral aspect of the knee, extending from the outside of the pelvis, over the hip and knee, and inserting just below the knee. The band is crucial to stabilizing the knee during running, as it moves from behind the femur to the front of the femur during activity.

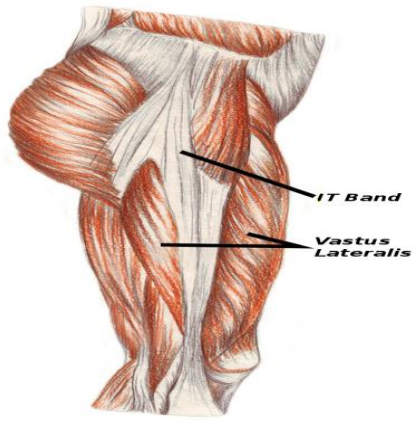

Figure 1: Vastus lateralis and Iliotibial band

CHAPTER-II LITERATURE REVIEW

Osteoarthritis of the knee is increasing with age day to day. Moreover it became more common in woman than man. There are many risk factors associated with it. The most common risk factors include obesity, knee injury, previous knee surgery, and occupational bending and lifting (Felson, 2006). The word OA is derived from Greek word 'osteo' means 'of the bone' and 'arthro', means 'joint', and 'itis', meaning inflammation, although the 'itis' of osteoarthritis is somewhat of a misnomer -- inflammation is not a conspicuous feature of the disease (Deshpande et al., 2015).

The prevalence of OA varies according to the definition of OA, the specific joint under study, and the characteristics of the study population. The age standardized prevalence of radiographic knee OA in adult's age ≥45 was 19.2% among the participants in the Framingham Study and 27.8% in the Johnston County Osteoarthritis Project. In the third National Health and Nutrition Examination Survey (NHANES III), approximately 37% of participants age >60 years or older had radiographic knee OA (Zhang & Jordan, 2008).

The pain of OA is usually related to activity. For OA of the knee, activities such as climbing stairs, getting out of a chair, and walking long distances bring on pain. Morning stiffness usually lasts less than 30 minutes. OA of knee is the commonest form of OA and cause pain and disability in elderly. It is generally termed as degenerative joint disease. But OA is not simply a process of wear and tear, but an abnormal remodeling of joint tissues which is caused by a host of inflammatory mediators within the affected joint (Goldring et al., 2012).

Knee OA is a chronic problem which leads patients in inability to doing normal activities thus causes disability and joint surgery. Various activities are consistently associated with knee OA such as kneeling, squatting, lifting/carrying and long time standing (McWilliams et al., 2011).

The main clinical feature of osteoarthritis is pain. Sever aching pain on weight bearing joint due to stress on the synovial membrane and bone surface. Throbbing pain occurs at night due to inflammation. Sometime pain referred distally and sharp stabbing pain comes if there is a loose body within the joint (Neogi et al., 2009).

The pain is caused by micro fractures of the subchondral bone and medullary hypertension with bone angina of subchondral bone causes pain at the joint, osteophytes causes stretching of nerve endings in the periosteum as well as ligamentum stretch also causes pain. Inflammation of joint capsule and synovium and its distention causes pain. Due to internal pathology of the joint periarticular muscle spasm occur and which also one of the cause of pain (Brandt, 2011).

There are four bones make up the knee.

Tibia —commonly called the shin bone runs from the knee to the ankle. The top of the tibia is made of two plateaus and a knuckle-like protuberance called the tibial tubercle. Attached to the top of the tibia on each side of the tibial plateau are two crescent-shaped shock-absorbing cartilages called menisci which help stabilize the knee.

Patella—the kneecap is a flat, triangular bone; the patella moves when the leg moves. Its function is to relieve friction between the bones and muscles when the knee is bent or straightened and to protect the knee joint. The kneecap glides along the bottom front surface of the femur between two protuberances called femoral condyles. These condyles form a groove called the patello femoral groove.

Femur—commonly called the thigh bone; it's the largest, longest and strongest bone in the body. The round knobs at the end of the bone are called condyles.

Fibula—long, thin bone in the lower leg on the lateral side, and runs alongside the tibia from the knee to the ankle.

The function of ligaments is to attach bones to bones and give strength and stability to the knee as the knee has very little stability. Ligaments are strong, tough bands that are not particularly flexible. Once stretched, they tend to stay stretched and if stretched too far, they snap (Palmer, 2007).

There are five ligaments of the knee. Medial Collateral Ligament (tibial collateral ligament) – attaches the medial side of the femur to the medial side of the tibia and limits sideways motion of your knee.

Lateral Collateral Ligament (fibular collateral ligament) – attaches the lateral side of the femur to the lateral side of the fibula and limits sideways motion of your knee.

Anterior cruciate ligament – attaches the tibia and the femur in the center of your knee; it's located deep inside the knee and in front of the posterior cruciate ligament. It limits rotation and forward motion of the tibia.

Posterior cruciate ligament – is the strongest ligament and attaches the tibia and the femur; it's also deep inside the knee behind the anterior cruciate ligament. It limits the backwards motion of the knee.
Patellar ligament – attaches the kneecap to the tibia.

The muscles in the leg keep the knee stable, well aligned and moving- the quadriceps (thigh) and hamstrings.
There are two main muscle groups - the quadriceps and hamstrings. The quadriceps are a collection of 4 muscles on the front of the thigh and are responsible for straightening the knee by bringing a bent knee to a straight position. The hamstrings is a group of 3 muscles on the back of the thigh and control the knee moving from a straight position to a bent position.
The 4 muscles of quadriceps are- vastus lateralis, vastus medialis, vastus intermedius, and rectus femoris. 3 muscles of hamstrings are -semitendinosus, semimembranosus and biceps femoris (Datta, 2007).

In a healthy knee, the rubbery meniscus cartilage absorbs shock and the side forces placed on the knee. Together, the menisci sit on top of the tibia and help spread the weight bearing force over a larger area. Because the menisci are shaped like a shallow socket to accommodate the end of the femur, they help the ligaments in making the knee stable. Because the menisci help spread out the weight bearing across the joint, they keep the articular cartilage from wearing away at friction points (Brandt et al., 2008).

The weight bearing bones in our body are usually protected with articular cartilage, which is a thin, tough, flexible, slippery surface which is lubricated by synovial fluid.
The synovial fluid is both viscous and sticky lubricant. Synovial fluid and articular cartilage are a very slippery combination—3 times more slippery than skating on ice, 4 to 10 times more slippery than a metal or plastic knee replacement. Synovial fluid is what allows us to flex our joints under great pressure without wear. Cartilage degeneration and other joint damage like effusion, synovial thickening, and bone attrition are related to pain (Maly et al., 2008).
Anatomical changes followed by OA are,
Articular Cartilage - Erosion occurs at the central and weight bearing areas of the bone lead to fibrillation which causes softening, splitting and fragmentation of the bones and

disorganization of proteoglycans occurs, water absorption of cartilage causing further softening and flaking. Break off flakes cartilage causing locking and inflammation at the joint. Proliferation occurs at the periphery of cartilage.

Bones - Due to eburnation cystic cavity formation in the subchondral bone thus causes venous congestion in the subchondral bone. Osteophytes formation at the margin of articular surface and alteration of bony shape at weight bearing joint, e.g. the femoral head become flat and mushroom shaped, tibial condyle become flattened. Synovial membrane - synovial membrane become hypertrophy and edematous. Fibrous degeneration occurs in later stage and reduction of synovial fluid secretion causing loss of nutrition and lubrication of the articular cartilage.

Capsule - Like synovial membrane fibrous degeneration also occurs at the joint capsule and low grade chronic inflammatory change are seen at the joint capsule. Muscles - Muscle wasting occurs due to disuse atrophy that causes limitation of the movement and ultimately causes functional limitation and at last fibrous atrophy at later stage. With different pathophysiological mechanism OA represents a disease of group (Roach et al., 2007).

The exact cause of osteoarthritis is unknown. But it can be the consequences of mechanical or biological events that destabilize the normal coupling of synthesis and degradation of extracellular matrix in articular cartilage and subchondral bone. It is commonly assumed that multiple factors, including aging, gender, obesity, congenital or acquired deformity etc. Age related changes to the joint and muscle, hormonal changes, excess body weight, congenital abnormalities and previous joint injury leading to muscle weakness and joint instability are the causes of OA (Buckwalter et al., 2005).

The American College of Rheumatology has established clinical criteria for diagnosing primary osteoarthritis of the hand, hips, and knees -Osteoarthritis of the Knee, Knee pain and at least three of the following 6 criteria:

50 years of age or older, stiffness lasting less than 30 minutes, crepitus, bony tenderness, bony enlargement, no warmth to the touch (Arden & Nevitt, 2006).

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Diagnosis of osteoarthritis focuses on two major goals. When diagnosing OA, the doctor must first differentiate osteoarthritis from other types of arthritis. It is also important to determine whether a patient has primary osteoarthritis or a secondary form of osteoarthritis associated with another disease or condition. Early, accurate diagnosis

of osteoarthritis is necessary so that appropriate treatment options can be considered. To diagnose osteoarthritis, doctor will make assessments using: Medical history will include information about past medical conditions, allergies, treatments, and surgical procedures as well as current medical issues (Walker et al., 2013).

During the physical examination, doctor will observe for any signs and symptoms which commonly are associated with osteoarthritis. The doctor will look for: Joint swelling, Joint tenderness, Decreased range of motion in joints, visible joint damage (i.e., bony growths). In imaging studies X-rays are typically used to confirm the diagnosis of osteoarthritis. X-rays can reveal osteophytes at the joint margins, joint space narrowing, and subchondral bone sclerosis. Subchondral bone is the layer of bone which is just below the cartilage. While MRI (magnetic resonance imaging) is a more sensitive imaging method, it is used less often than x-rays due to cost and availability. MRI scans show cartilage, bone, and ligaments (Magee, 2013).

Treatment of knee arthritis should begin with the most basic steps and progress to the more involved, possibly including surgery. Not all treatments are appropriate for every patient, and he/she should have a discussion with doctor to determine which treatments are appropriate for him/her. Some treatment options are like weight Loss which is probably one of the most important, yet least commonly performed treatments. The less weight the joint has to carry, the less painful activities will be. Activity Modification which limiting certain activities may be necessary, and learning new exercise methods may be helpful, walking aids that is use of a cane or a single crutch is the hand opposite the affected knee will help decrease the demand placed on the arthritic joint(Fitzgerald et al., 2011).

Physical Therapy like strengthening of the muscles around the knee joint may help decrease the burden on the knee. Preventing atrophy of the muscles is an important part of maintaining functional use of the knee. Some anti-Inflammatory medications these are anti-inflammatory pain medications (NSAIDs) are prescription and nonprescription drugs that help treat pain and inflammation; Cortisone Injections may help to decrease inflammation and reduce pain within a joint(Barron& Rubin, 2007).
Synovisc may be effective against pain in some patients with knee arthritis and may delay the need for knee replacement surgery. Joint Supplements (Glucosamine) mainly glucosamine appears to be safe and might be effective for treatment of knee arthritis,

but research into these supplements has been limited, knee arthroscopy exactly how effective knee arthroscopy is for treatment of arthritis is debatable. For some specific symptoms, it may be helpful then knee Osteotomy- while most patients are not good candidates for this alternative to knee replacement, it can be effective for young patients with limited arthritis. Total Knee Replacement Surgery and by this procedure, the cartilage is removed and a metal & plastic implant is placed in the knee and lastly partial knee (Ostojic et al., 2007).

The aims of the physiotherapy management of Knee OA are, Relieve pain and muscle spasm, Strengthen muscles and Mobilize joints, Teach maintenance of joint range and muscle power, Improve coordination, Train to reduce postural stress and advise rest/activity relationship, Help to maintain function (Magee,2013).

Measures to relieve pain and muscle spasm - During the acute phase treatment should be continued with TENS, ultrasound, short-wave diathermy, hydrotherapy, cryotherapeutic and during the chronic phase deep heating should be introduced. Exercise regimen for OA of knee, strong isometric exercise for quadriceps and hamstring is necessary for the patient with knee OA. In case of active ROM exercises patient can easily perform and it improve the joint range of motion at the knee, with the improvement of joint range of motion it facilitates joint lubrication and thus joint get relaxation. On the other hand isokinetic exercise is a self-controlled exercise and it's also easy to perform frequently as well as active exercise which improves muscle strength. Straight leg rising gives stability to the knee during weight bearing exercise. Hamstring stretching exercise helps to prevent flexion deformity of the knee. By using assistive device like- orthotics, walkers, sticks etc. we can reduce compressive forces on the knees. Besides these patient can take some measure him/her selves like reduction of weight so that load on the knee joint comes down. Walking on level ground and avoid uneven surface and minimization of frequent standing & sitting (Ebnezar, 2011). As the number of people who have osteoarthritic disease is increasing, the prevention of osteoarthritis is important and necessary. Osteoarthritis has three strong risk factors (excessive musculoskeletal loading, high body mass index and previous knee injury) in which prevention may work (Blagojevic et al., 2010).

Avoiding squatting and kneeling and carrying heavy loads during work have been associated with a reduction of 15–30% in the prevalence of osteoarthritis in men.

Another study showed a significant exposure–response relationship between symptomatic knee osteoarthritis and squatting and kneeling .Overweight is a risk factor for knee osteoarthritis. Weight reduction reduces not only the symptoms and progression of osteoarthritis, but also the risk of acquiring osteoarthritis. Maintaining the body mass index at 25 kg/m_2 or below would reduce osteoarthritis in the population by 27–53%. As mentioned, knee injuries such as knee ligament tears, meniscal injuries and fractures involving the articular surfaces is a strong risk factor for knee osteoarthritis. Prevention of joint injuries would give an additional 14–25% reduction in the prevalence of osteoarthritis (Takeda et al., 2007).

CHAPTER-III METHODOLOGY

3.1 Study design

The study is a single blind Randomized Control Trail (RCT). From the Outpatient musculoskeletal unit, 20 patients with OA of knee were randomly selected and then 10 patients with OA of knee were randomly assigned to experimental group and 10 patients to the control group for this RCT study. The study has been conducted at musculoskeletal department of CRP, Savar.

A pre test (before intervention) and post test (after intervention) was 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 x o (experimental group)

r o o (control group)

3.2 Study Population

A population refers to the entire group of people or items that meet the criteria set by the researcher. The populations of this study were the knee OA Patients at outpatient department of CRP, Savar.

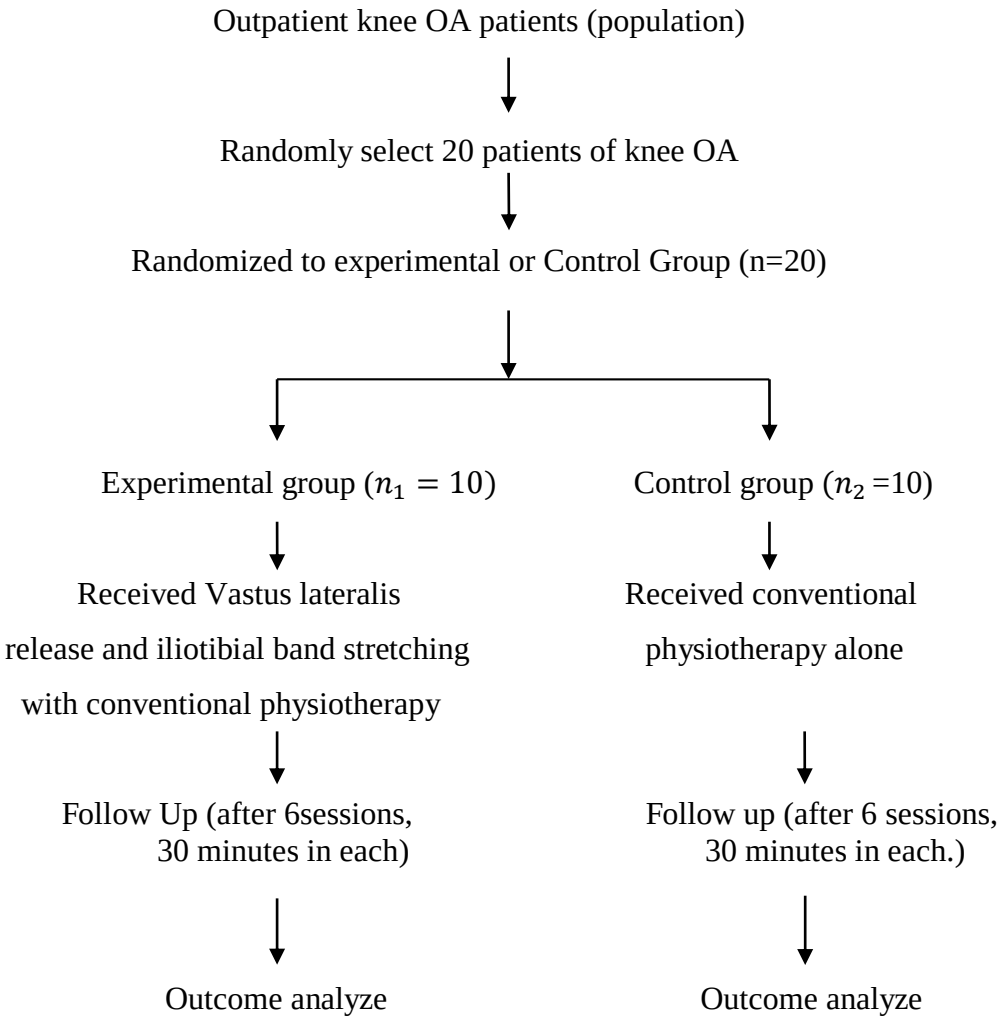
3.3 Sampling procedure

Subjects, who met the inclusion criteria, were taken as sampling frame in this study from Outpatient musculoskeletal physiotherapy department of CRP, Savar. Among them researcher selected 20patients with Knee OA randomly as sample and then 10 patients with Knee OA were randomly assigned to vastus lateralis release and iliotibial band stretching with conventional physiotherapy group and 10 patients to the only conventional physiotherapy group for this RCT study.

The study was a single blind study. When the samples were 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 C1, C2, C3 etc. for the control and E1, E2, E3 etc. for experimental group.

Total 20 samples included in this study, among them 10 patients were assigned for the experimental group (received vastus lateralis release and iliotibial band stretching with conventional physiotherapy) and rest 10 patients were assigned for control group (received conventional physiotherapy only).

Flowchart of the phases of randomized controlled trial



3.4. A Inclusion criteria

1. Age group(45-65 year)
2. Both sex
3. Both unilateral and bilateral knee OA.
4. Patients suffering from OA of knee joint.

3.4. B Exclusion criteria

1. Incomplete or unclear documents.
2. Patients who have OA in hip or others joint but not in knee joint.
3. Patient taking NSAID/ Steroid injection
4. Patient got surgery for knee OA

3.4. C List of confounding variables

1. NSAID
2. Steroid injection
3. Surgical intervention
4. Other causes of knee pain such as osteoporosis in elderly

3.4. D 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, oral NSAID, steroid injection or surgical treatment which could influence the result of the study. To control the confounding variables, researcher set the inclusion criteria as to include only those subjects who have no history of taking oral NSAID, steroid injection or surgical treatment.

3.5 Data collection method and materials

3.5.1 Data collection tools

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

3.5.2 Questionnaire

The questionnaire was developed under the advice and permission of the supervisor following certain guidelines. There are nine close ended questions with visual analogue scale (VAS) with some objective questions which were measured by examiner and each question was formulated to identify the change of pain with each activity.

3.5.3 Visual Analogue Scale (VAS)

In this study researcher will use visual analogue scale for measuring the intensity of pain. The VAS is a simple and accurate way of subjectively assess pain along a continuous visual spectrum. VAS consists of a straight line on which the individual being assessed by marking the level of pain. The end of the straight line is the extreme limit of pain with 0 representing no pain and 10 representing the worst pain ever experienced. VAS is a line of a defined length (10 cm), usually horizontal, anchored at each end by a descriptive word or phrase representing the extremes (e.g. worse, best).

3.5.4 Goniometer

In this study researcher used Goniometer for assessing a joint range of motion most commonly used is Double-armed Goniometer, with one arm stationary and another arm is movable. The pin or axis of the movable arm is placed directly over the center of the joint. The stationary arm is held in the line with the stationary segment of joint. Then the movement should perform. At the completion of movement the indicator show the number of degree through which the segment has moved.

3.5.5 Functional Independence measurement (FIM) Scale

Functional Independence Measurement (FIM) Scale was used by the researcher to assess functional ability of the patient. Functional Independence Measurement (FIM) Scale is a scale that consist number 1 to 7 where 7 indicates complete independence and 1 indicates total assistance.

3.5.6 Data collection procedure

The study procedure was conducted through assessing the patient, initial recording, treatment and final recording. After screening the patient at department, the patients were assessed by qualified physiotherapist. Four sessions of treatment was provided for every subject. Twenty subjects were chosen for data collection according to the inclusion criteria. The researcher divided all participants into two groups and coded C (10) for control group and E (10) for experimental group. Experimental group received conventional physiotherapy with vastus lateralis release and iliotibial band stretching and control group received only conventional physiotherapy.

Data was gathered through a pre-test, intervention and post-test and the data was collected by using a written questionnaire form which is formatted by the researcher. Pre test was performed before beginning the treatment and the intensity of pain and ROM of knee movements was noted with VAS score and degrees on questionnaire form. The same procedure was performed to take post-test at the end of six session of treatment. The researcher will collect the data both in experimental and control group in front of the qualified physiotherapist in order to reduce the biasness. At the end of the study, specific test was performed for statistical analysis.

3.6 Data analysis

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

All participants were coded according to group to maintain participant's confidentiality. All subjects of both experimental and control group score their pain intensity on visual analogue scale before starting treatment and after completing treatment. Reduction of pain intensity for both groups is the difference between pre-test and post-test score. ROM on Goniometer and functional independence on FIM scale were measured and scored before starting treatment and after completing treatment by the researcher.

Experimental studies with the different subject design where two groups are used and each tested in two different conditions and the data is interval or ratio should be analyzed with unrelated 't' test in case of parametric test or,Mann-Whitney 'U' test in case of non-parametric test (Hicks, 2009).

As it was experimental and had unmatched groups of different subjects, who was randomly assigned to conventional physiotherapy with vastus lateralis release and iliotibial band stretching and only conventional physiotherapy group and the measurement of the outcome came from collecting VAS score, ROM score and FIM score with considering interval or ratio data, so the parametric unrelated 't'test was used in this study to calculate the level of significance of ROM and FIM and non-parametric Mann-Whitney 'U' test to calculate the level of significance of VAS. When calculating the Mann-Whitney U test, we find the value called U which we then look up in the probability tables associated with the Mann-Whitney U test to find out whether the U value represents a significant difference between the results from two groups.

Now ‘t’ formula

$$t = \frac{\overline{X_1} - \overline{X_2}}{\left[\sqrt{\frac{\left(\sum X_1^2 - \frac{(\sum X_1)^2}{n_1}\right) + \left(\sum X_2^2 - \frac{(\sum X_2)^2}{n_2}\right)}{(n_1 - 1) + (n_2 - 1)}} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}\right]}$$

Where

$\overline{X_1}$= mean of scores from treatment group.

$\overline{X_2}$ = mean of scores from control group.

$\Sigma X1^2$= the square of the each individual score from treatment group totaled.

$\Sigma X2^2$= the square of the each individual score from control group totaled.

$(\sum X_1)^2$= the total of the individual score from treatment group squared.

$(\sum X_2)^2$= the total of the individual score from control group squared.

n1= number of subjects from treatment group.

n2= number of subjects from control group

The “U test” formula-

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

n_1 = the number of the subjects in trail group

n_2= the number of the subject in control group

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

T_x= the larger rank total

3.7 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.

Calculating the degree of freedom from the formula:

df = (n_1-1) + (n_2-1)

= (10 -1) + (10 - 1)

=18

Table no 01

Level of significance for one tailed hypothesis

For t test

df	.1	.05	.025	.01	.005	.0005
18	1.330	1.734	2.101	2.552	2.878	3.922

For U test

n_1/n_2	.05	.025	.01	.005
10	27	23	19	16

Where,

n_1/n_2= 10

3.8 Ethical consideration

Research proposal was submitted for approval to the administrative bodies of ethical committee of CRP. The study has been done following BMRC, IRB and WHO guidelines. Again before beginning the data collection, researcher will obtain the permission from the concerned authorities ensuring the safety of the participants. In order to eliminate ethical claims, the participants will set free to receive treatment for other purposes as usual. Each participant was informed about the study before beginning and given a written consent. Only the measurement of the initial and last session was compared for the study. The participants were informed about the study before the beginning and also were informed that they reserve the right to reject the study anytime.

The researcher obtained consent to participate from each subject. Written consent (appendix) was given to all participants prior to completion of the questionnaire. The researcher explained to the participants about his or her role in this study. The researcher received a written consent form every participants including signature. So the participant assured that they could understand about the consent form and their participation was on voluntary basis. The participants were informed clearly that their information would be kept confidential. The researcher assured the participants that the study would not be harmful to them. It was explained that there might not a direct benefit from the study for the participants but in the future cases like them might get benefit from it. The participants had the rights to withdraw consent and discontinue participation at any time without prejudice to present or future treatment at the musculoskeletal unit of CRP.

CHAPTER -IV RESULTS

Initially in the research, 20 patients were enrolled in the study. 10 in the vastus lateralis release and iliotibial band stretching with conventional treatment group (experimental group) and 10 in the only conventional treatment group (control group). The whole subject of both experimental and control group scored their pain on VAS scale and taken ROM measurement and FIM before and after completing treatment.

Pain measurement on VAS

Table no 02

Mean difference of reduction of pain intensity between pre-test and post-test in conventional physiotherapy with vastus lateralis release and Iliotibial band stretching and only conventional physiotherapy group.

Name of the variables	Experimental group	Control group
Resting condition	3.3	2.3
Knee bending	2.9	2.3
Knee extension	3.5	2.4
Long time sitting	3	2.3
Long time standing	2.9	1.6
During walking	3.9	3.1
During squatting	3.4	2.2

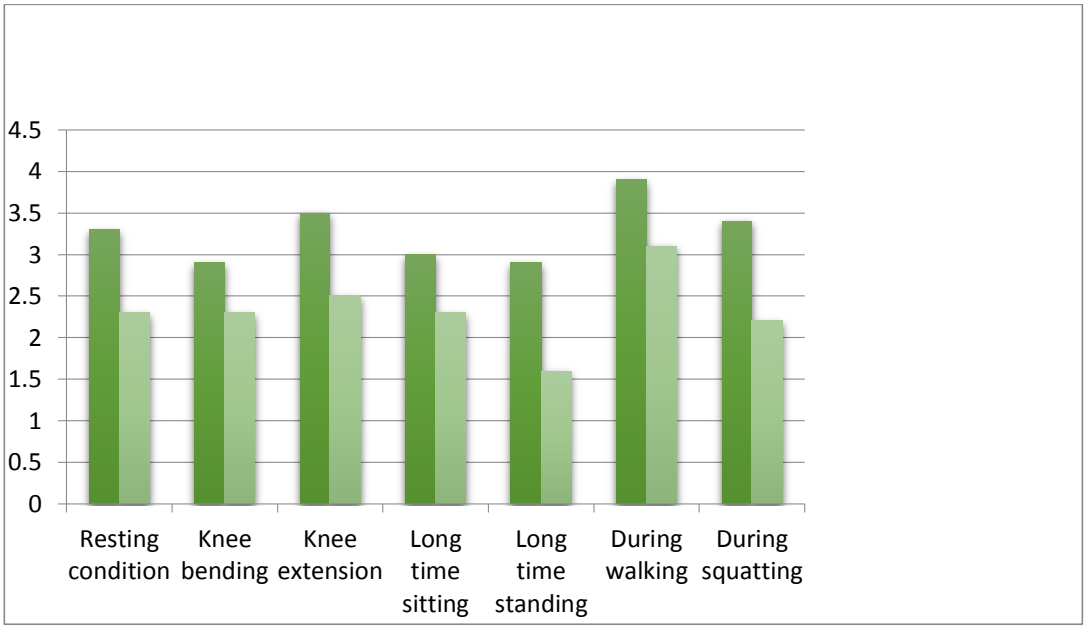


Figure 2 Mean difference of reduction of pain intensity between pre-test and post test in experimental and control group.

Table no 03

Pain at resting condition: Reduction of pain scores in conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and only conventional physiotherapy group in resting condition. Here are the differences between pre-test and post-test pain scores.

Experimental group			**Control group**		
Subjects	VAS score	Rank	Subjects	VAS score	Rank
E_1	3	13	C_1	5	20
E_2	3	13	C_2	3	13
E_3	3	13	C_3	2	4
E_4	2	4	C_4	2	4

E_5	3	13	C_5	2	4
E_6	2	4	C_6	3	13
E_7	3	13	C_7	3	13
E_8	3	13	C_8	3	13
E_9	2	4	C_9	4	19
E_{10}	3	13	C_{10}	2	4
Total	27	103		29	107

Now 'U' formula

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

$$U = 10 \times 10 + \frac{10(10 + 1)}{2} - 107$$

U= 48

Table no 04

Pain during knee bending:

Reduction of pain scores in conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and only conventional physiotherapy group. Here are the differences between pre-test and post-test pain scores.

Experimental group			**Control group**		
Subjects	VAS	Rank	Subjects	VAS	Rank
E_1	3	4	C_1	6	20

E_2	3	4	C_2	5	16.5
E_3	5	16.5	C_3	5	16.5
E_4	4	10	C_4	3	4
E_5	4	10	C_5	5	16.5
E_6	4	10	C_6	4	10
E_7	2	1	C_7	4	10
E_8	3	4	C_8	4	10
E_9	5	16.5	C_9	5	16.5
E_{10}	3	4	C_{10}	4	10
Total	36	80		45	130

Now 'U' formula

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

$$U = 10 \times 10 + \frac{10(10 + 1)}{2} - 130$$

U=25

Table no 05

Pain during knee extension:

Reduction of pain scores in conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and only conventional physiotherapy group. Here are the differences between pre-test and post-test pain scores

Experimental group			**Control group**		
Subjects	VAS	Rank	Subjects	VAS	Rank
E_1	3	14	C_1	3	14
E_2	5	20	C_2	3	14
E_3	2	5.5	C_3	3	14
E_4	2	5.5	C_4	2	5.5
E_5	2	5.5	C_5	4	18.5
E_6	2	5.5	C_6	2	5.5
E_7	2	5.5	C_7	3	14
E_8	2	5.5	C_8	3	14
E_9	4	18.5	C_9	3	14
E_{10}	2	5.5	C_{10}	2	5.5
Total	26	85		28	119

Now‘U’ formula

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

$$U = 10 \times 10 + \frac{10(10 + 1)}{2} - 119$$

U= 36

Table no 06

Pain during long time sitting

Reduction of pain scores in conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and only conventional physiotherapy group. Here are the differences between pre-test and post-test pain scores

Experimental group			**Control group**		
Subjects	VAS	Rank	Subjects	VAS	Rank
E_1	4	14	C_1	5	18
E_2	3	8	C_2	4	14
E_3	4	14	C_3	5	18
E_4	2	2.5	C_4	2	2.5
E_5	2	2.5	C_5	3	8
E_6	4	14	C_6	5	18
E_7	3	8	C_7	3	8
E_8	3	8	C_8	6	20
E_9	4	14	C_9	3	8
E_{10}	3	8	C_{10}	2	2.5
Total	32	103		38	117

Now ‘U’ formula

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

$$U = 10 \times 10 + \frac{10(10 + 1)}{2} - 117$$

U=38

Table no 07

Pain During long time standing

Reduction of pain scores in conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and only conventional physiotherapy group. Here are the differences between pre-test and post-test pain scores

Experimental group			**Control group**		
Subjects	VAS	Rank	Subjects	VAS	Rank
E_1	3	3	C_1	7	19.5
E_2	4	8.5	C_2	5	14
E_3	4	8.5	C_3	4	8.5
E_4	3	3	C_4	5	14
E_5	3	3	C_5	5	14
E_6	3	3	C_6	6	17.5
E_7	3	3	C_7	5	14
E_8	4	8.5	C_8	7	19.5
E_9	6	17.5	C_9	5	14
E_{10}	4	8.5	C_{10}	4	8.5

Total	37	65.5		53	143.5

Now ‘U’ formula

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

$$U = 10 \times 10 + \frac{10(10+1)}{2} - 143.5$$

$$U = 11.5$$

Table no 08

Pain during walking

Reduction of pain scores in conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and only conventional physiotherapy group. Here are the differences between pre-test and post-test pain scores

Experimental group			**Control group**		
Subjects	VAS	Rank	Subjects	VAS	Rank
E_1	4	11.5	C_1	4	11.5
E_2	2	1	C_2	5	17
E_3	5	17	C_3	5	17
E_4	3	5	C_4	3	5
E_5	3	5	C_5	4	11.5
E_6	3	5	C_6	5	17
E_7	5	17	C_7	3	5
E_8	3	5	C_8	6	20

E_9	4	11.5	C_9	4	11.5
E_{10}	3	5	C_{10}	4	11.5
Total	35	66		43	127

Now 'U' formula

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

$$U = 10 \times 10 + \frac{10(10 + 1)}{2} - 127$$

U=27

Table no 09

Pain during squatting

Reduction of pain scores in conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and only conventional physiotherapy group. Here are the differences between pre-test and post-test pain scores

Experimental group			**Control group**		
Subjects	VAS	Rank	Subjects	VAS	Rank
E_1	6	12.5	C_1	7	18
E_2	5	6.5	C_2	8	20
E_3	4	2.5	C_3	5	6.5
E_4	4	2.5	C_4	4	2.5
E_5	6	12.5	C_5	7	18
E_6	6	12.5	C_6	6	12.5
E_7	6	12.5	C_7	6	12.5

E_8	6	12.5	C_8	6	12.5
E_9	4	16	C_9	7	18
E_{10}	5	6.5	C_{10}	4	2.5
Total	53	87		60	123

Now 'U' formula,

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

$$U = 10 \times 10 + \frac{10(10 + 1)}{2} - 123$$

U=32

Table no 10

Significant level of pain reduction

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

No.	Variables	'U' value	'p' value
1.	Resting condition	48	> 0.05
2.	Knee bending	25	< 0.05
3.	Knee extension	36	> 0.05
4.	Long time sitting	38	> 0.05
5.	Long time standing	11.5	< 0.005
6.	During walking	27	= 0.05
7.	During squatting	32	> 0.05

Table no 11

Functional Independence Measurement

Mean difference of functional improvement between pre-test and post-test in conventional physiotherapy with vastus lateralis release and iliotibial band stretching and only conventional physiotherapy group.

Name of the variables	Experimental group	Control group
Walking	1.1	0.4
Prayer	0.8	0.4
Household activities	0.9	0.4
Travelling	0.8	0.3
Walking upstairs	1.5	0.5
Walking downstairs	1	0.4

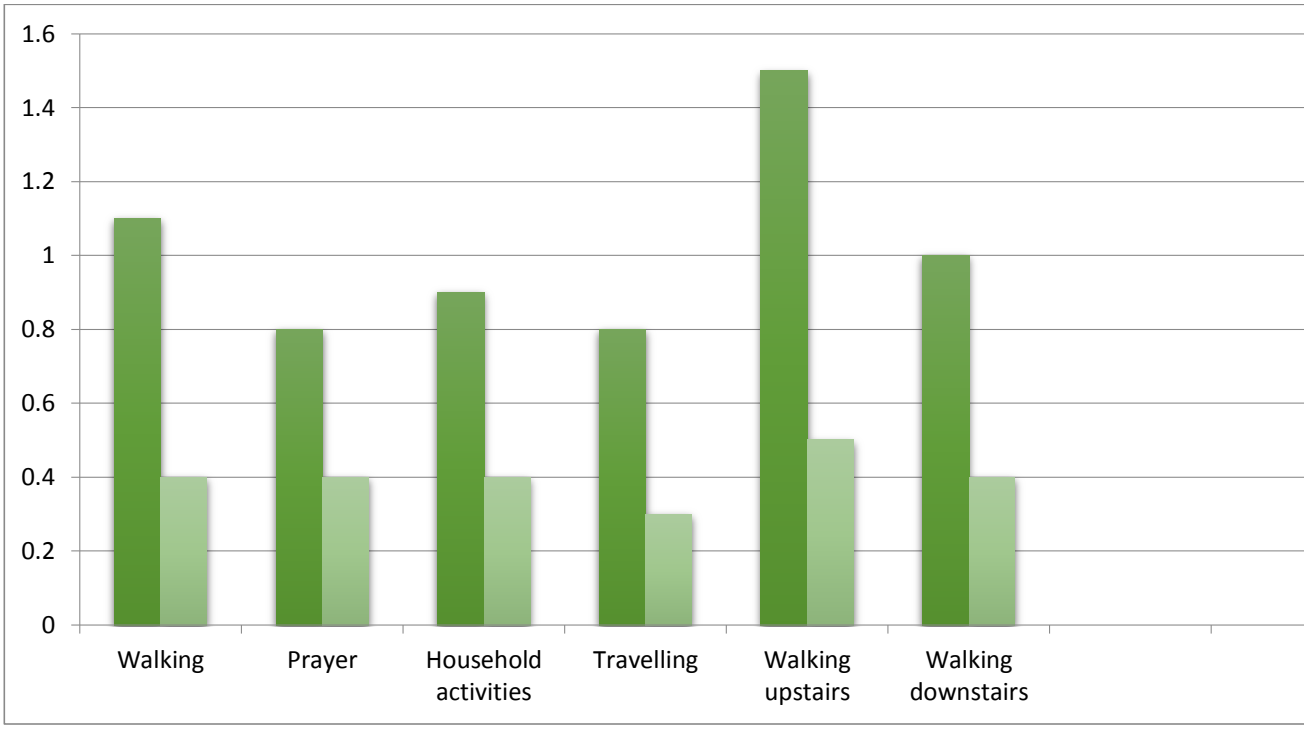


Figure 3 Mean difference of functional improvement

Table no 12

Change in walking

Improvement of function in FIM scores in conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and only conventional physiotherapy group. Here are the differences between pre-test and post-test FIM scores.

Experimental group			**Control group**		
Subjects	FIM scores (X_1)	X_1^2	Subjects	FIM scores (X_2)	X_2^2
E_1	1	1	C_1	0	0
E_2	1	1	C_2	0	0
E_3	1	1	C_3	1	1

E_4	1	1	C_4	0	0
E_5	2	4	C_5	1	1
E_6	1	1	C_6	0	0
E_7	1	1	C_7	0	0
E_8	1	1	C_8	1	1
E_9	1	1	C_9	0	0
E_{10}	1	1	C_{10}	1	1
	ΣX_1=11	ΣX_1^2=13		**ΣX_2=4**	ΣX_2^2=4

$\overline{X_1}$= 1.1 $\overline{X_2}$=0.4

ΣX_1= 11 ΣX_2=4

ΣX_1^2= 13 ΣX_2^2=4

$(\sum X_1)^2$ = 121 $(\sum X_2)^2$=16

Calculating the degree of freedom from the formula

df = (n_1-1) + (n_2-1)

= (10 -1) + (10 - 1) =18

Now't' formula

$$t = \frac{\overline{X_1} - \overline{X_2}}{\left[\sqrt{\frac{\left(\sum X_1^2 - \frac{(\sum X_1)^2}{n_1}\right) + \left(\sum X_2^2 - \frac{(\sum X_2)^2}{n_2}\right)}{(n_1 - 1) + (n_2 - 1)}} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}\right]}$$

$$t = \frac{1.1 - 0.4}{\left[\sqrt{\frac{\left(13 - \frac{121}{10}\right) + \left(4 - \frac{16}{10}\right)}{(10-1)+(10-1)}} \times \sqrt{\left(\frac{1}{10} + \frac{1}{10}\right)}\right]}$$

t = 3.66

Table no 13

Change during prayer

Improvement of function in FIM scores in conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and only conventional physiotherapy group. Here are the differences between pre-test and post-test FIM scores

Experimental group			**Control group**		
Subjects	FIM scores (X_1)	X_1^2	Subjects	FIM scores (X_2)	X_2^2
E_1	0	0	C_1	0	0
E_2	1	1	C_2	1	1
E_3	1	1	C_3	0	0
E_4	1	1	C_4	0	0
E_5	1	1	C_5	0	0
E_6	1	1	C_6	0	0
E_7	1	1	C_7	1	1
E_8	1	1	C_8	1	1
E_9	1	1	C_9	0	0
E_{10}	0	0	C_{10}	1	1

	ΣX_1**=8**	**Σ**X_1^2=8		**Σ**X_2**=4**	**Σ**X_2^2=4

$\overline{X_1}$= 0.8 $\overline{X_2}$=0.4

ΣX1= 8 ΣX2=4

ΣX_1^2= 8 ΣX_2^2=4

$(\sum X_1)^2$ = 64 $(\sum X_2)^2$=16

Calculating the degree of freedom from the formula

df = (n1-1) + (n2-1)

= (10 -1) + (10 - 1) =18

Now 't' formula

$$t = \frac{\overline{X_1} - \overline{X_2}}{\left[\sqrt{\frac{\left(\sum X_1^2 - \frac{(\sum X_1)^2}{n_1}\right) + \left(\sum X_2^2 - \frac{(\sum X_2)^2}{n_2}\right)}{(n_1 - 1) + (n_2 - 1)}} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}\right]}$$

$$t = \frac{0.8 - 0.4}{\left[\sqrt{\frac{\left(8 - \frac{64}{10}\right) + \left(4 - \frac{16}{10}\right)}{(10 - 1) + (10 - 1)}} \times \sqrt{\left(\frac{1}{10} + \frac{1}{10}\right)}\right]}$$

t =1.90

Table no 14

Change in household activities

Improvement of function in FIM scores in conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and only conventional physiotherapy group. Here are the differences between pre-test and post-test FIM scores

Experimental group			**Control group**		
Subjects	FIM scores (X_1)	X_1^2	Subjects	FIM scores (X_2)	X_2^2
E_1	1	1	C_1	1	1
E_2	1	1	C_2	0	0
E_3	2	4	C_3	0	0
E_4	0	0	C_4	0	0
E_5	1	1	C_5	1	1
E_6	1	1	C_6	0	0
E_7	1	1	C_7	0	0
E_8	1	1	C_8	1	1
E_9	1	1	C_9	0	0
E_{10}	0	0	C_{10}	1	1
	ΣX_1=9	ΣX_1^2=11		**ΣX_2=4**	ΣX_2^2=4

$\overline{X_1}$= 0.9 $\overline{X_2}$=0.4

ΣX_1= 9 ΣX_2=4

ΣX_1^2= 11 ΣX_2^2=4

$(\sum X_1)^2 =$ 81 $(\sum X_2)^2$=16

Calculating the degree of freedom from the formula
df = (n_1-1) + (n_2-1)
= (10 -1) + (10 - 1) =18

Now't' formula

$$t = \frac{\overline{X_1} - \overline{X_2}}{\left[\sqrt{\frac{\left(\sum X_1^2 - \frac{(\sum X_1)^2}{n_1}\right) + \left(\sum X_2^2 - \frac{(\sum X_2)^2}{n_2}\right)}{(n_1 - 1) + (n_2 - 1)}} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}\right]}$$

$$t = \frac{0.9 - 0.4}{\left[\sqrt{\frac{\left(11 - \frac{81}{10}\right) + \left(4 - \frac{16}{10}\right)}{(10 - 1) + (10 - 1)}} \times \sqrt{\left(\frac{1}{10} + \frac{1}{10}\right)}\right]}$$

t = 2.062

Table no 15

Change during travelling

Improvement of function in FIM scores in conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and only conventional physiotherapy group. Here are the differences between pre-test and post-test FIM scores.

Experimental group			**Control group**		
Subjects	FIM scores (X_1)	X_1^2	Subjects	FIM scores (X_2)	X_2^2

E_1	1	1	C_1	0	0
E_2	1	1	C_2	1	1
E_3	1	1	C_3	0	0
E_4	1	1	C_4	0	0
E_5	0	0	C_5	0	0
E_6	0	0	C_6	1	1
E_7	0	0	C_7	0	0
E_8	1	1	C_8	0	0
E_9	2	4	C_9	0	0
E_{10}	1	1	C_{10}	1	1
	$\Sigma X_1=8$	$\Sigma X_1^2=10$		$\Sigma X_2=3$	$\Sigma X_2^2=3$

$\overline{X_1}$= 0.8 $\overline{X_2}$=0.3

$\Sigma X_1=8$ $\Sigma X_2=3$

$\Sigma X_1^2= 10$ $\Sigma X_2^2=3$

$(\sum X_1)^2$ =64 $(\sum X_2)^2$=9

Calculating the degree of freedom from the formula

df = (n_1-1) + (n_2-1)

= (10 -1) + (10 - 1) =18

Now't' formula

$$t = \frac{\overline{X_1} - \overline{X_2}}{\left[\sqrt{\frac{\left(\sum X_1^2 - \frac{(\sum X_1)^2}{n_1}\right) + \left(\sum X_2^2 - \frac{(\sum X_2)^2}{n_2}\right)}{(n_1 - 1) + (n_2 - 1)}} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}\right]}$$

$$t = \frac{0.8 - 0.3}{\left[\sqrt{\frac{\left(10 - \frac{64}{10}\right) + \left(3 - \frac{9}{10}\right)}{(10 - 1) + (10 - 1)}} \times \sqrt{\left(\frac{1}{10} + \frac{1}{10}\right)}\right]}$$

$t = 2$

Table no 16

Changes during walking upstairs

Improvement of function in FIM scores in conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and only conventional physiotherapy group. Here are the differences between pre-test and post-test FIM scores

Experimental group			**Control group**		
Subjects	FIM scores (X_1)	X_1^2	Subjects	FIM scores (X_2)	X_2^2
E_1	2	4	C_1	1	1
E_2	1	1	C_2	0	0
E_3	2	4	C_3	0	0
E_4	2	4	C_4	0	0

E_5	2	4	C_5	1	1
E_6	1	1	C_6	1	1
E_7	0	0	C_7	0	0
E_8	1	1	C_8	0	0
E_9	2	4	C_9	0	0
E_{10}	2	4	C_{10}	2	4
	$\Sigma X_1=15$	$\Sigma X_1^2=27$		$\Sigma X_2=5$	$\Sigma X_2^2=7$

$\overline{X_1}$= 1.5 $\overline{X_2}$=0.5

ΣX_1= 15 ΣX_2=5

ΣX_1^2=27 ΣX_2^2=7

$(\sum X_1)^2$ =225 $(\sum X_2)^2$=25

Calculating the degree of freedom from the formula
df = (n_1-1) + (n_2-1)
= (10 -1) + (10 - 1) =18

Now‘t’ formula

$$t = \frac{\overline{X_1} - \overline{X_2}}{\left[\sqrt{\frac{\left(\sum X_1^2 - \frac{(\sum X_1)^2}{n_1}\right) + \left(\sum X_2^2 - \frac{(\sum X_2)^2}{n_2}\right)}{(n_1 - 1) + (n_2 - 1)}} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}\right]}$$

$$t = \frac{1.5 - 0.5}{\left[\sqrt{\frac{\left(27 - \frac{225}{10}\right) + \left(7 - \frac{25}{10}\right)}{(10 - 1) + (10 - 1)}} \times \sqrt{\left(\frac{1}{10} + \frac{1}{10}\right)}\right]}$$

t = 3.16

Table no 17

Changes during walking downstairs

Improvement of function in FIM scores in conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and only conventional physiotherapy group. Here are the differences between pre-test and post-test FIM scores

Experimental group			**Control group**		
Subjects	FIM scores (X_1)	X_1^2	Subjects	FIM scores (X_2)	X_2^2
E_1	1	1	C_1	0	0
E_2	1	1	C_2	0	0
E_3	1	1	C_3	1	1
E_4	0	0	C_4	0	0
E_5	1	1	C_5	0	0
E_6	2	4	C_6	1	1
E_7	1	1	C_7	0	0
E_8	1	1	C_8	1	1
E_9	1	1	C_9	0	0
E_{10}	1	1	C_{10}	1	1
	ΣX_1=10	ΣX_1^2=12		**ΣX_2=4**	ΣX_2^2=4

$\overline{X_1}$= 1

ΣX_1= 10

ΣX_1^2= 12

$\overline{X_2}$=0.4

ΣX_2=4

ΣX_2^2=4

$(\sum X_1)^2$ =100 $(\sum X_2)^2$=16

Calculating the degree of freedom from the formula
df = (n_1-1) + (n_2-1)
= (10 -1) + (10 - 1) =18

Now 't' formula

$$t = \frac{\overline{X_1} - \overline{X_2}}{\left[\sqrt{\frac{\left(\sum X_1^2 - \frac{(\sum X_1)^2}{n_1}\right) + \left(\sum X_2^2 - \frac{(\sum X_2)^2}{n_2}\right)}{(n_1 - 1) + (n_2 - 1)}} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}\right]}$$

$$t = \frac{1 - 0.4}{\left[\sqrt{\frac{\left(12 - \frac{100}{10}\right) + \left(4 - \frac{16}{10}\right)}{(10 - 1) + (10 - 1)}} \times \sqrt{\left(\frac{1}{10} + \frac{1}{10}\right)}\right]}$$

t = 2.71

Table no 18

Significant level of functional improvement

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

No.	Variables	Observed 't' value	Observed 'p' value
1.	Walking	3.66	0.005
2.	Prayer	1.90	0.05
3.	Household activities	2.0627	0.05
4.	Travelling	2	0.05

5.	Walking upstairs	3.16	0.005
6.	Walking downstairs	2.71	0.01

Table no 19

Range of motion

Mean difference of improvement of Range of motion between pre-test and post-test in experimental and control group

Name of the variables	**Experimental group**	**Control group**
Active flexion	17	12.5
Active extension	6	3.5
Passive flexion	15	9.5
Passive extension	7	4.5

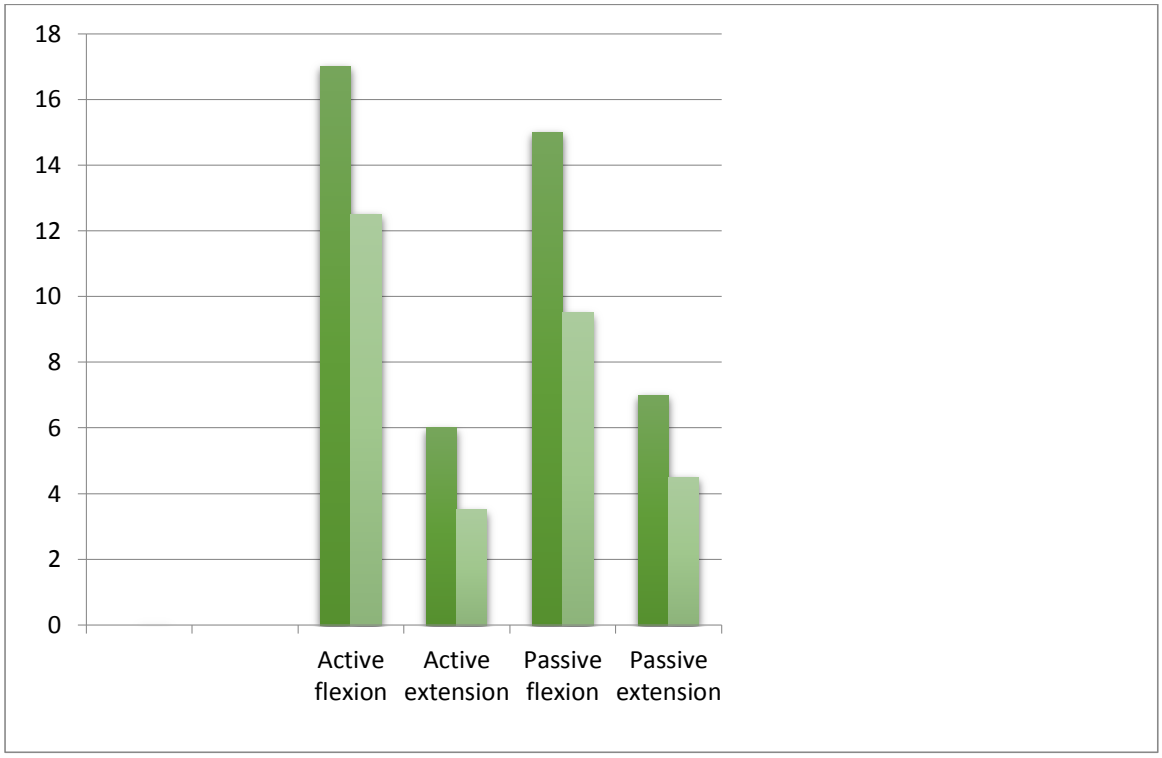


Figure4 Mean difference of improvement of Range of motion

Table no 20

Change in ROM during Active flexion

Experimental group			**Control group**		
Subjects	FIM scores (X_1)	X_1^2	Subjects	FIM scores (X_2)	X_2^2
E_1	20	400	C_1	15	225
E_2	15	225	C_2	15	225

E_3	15	225	C_3	10	100
E_4	20	400	C_4	15	225
E_5	15	225	C_5	15	225
E_6	20	400	C_6	10	100
E_7	10	100	C_7	5	25
E_8	15	225	C_8	15	225
E_9	20	400	C_9	10	100
E_{10}	20	400	C_{10}	15	225
	$\Sigma X_1=170$	$\Sigma X_1^2=3000$		$\Sigma X_2=125$	$\Sigma X_2^2=1675$

$\overline{X_1}$= 17 $\overline{X_2}$=12.5

ΣX_1= 170 ΣX_2=125

ΣX_1^2= 3000 ΣX_2^2=1675

$(\sum X_1)^2$ = 28900 $(\sum X_2)^2$=15625

Calculating the degree of freedom from the formula

df = (n_1-1) + (n_2-1)

= (10 -1) + (10 – 1) =18

Now ‘t’ formula

$$t = \frac{\overline{X_1} - \overline{X_2}}{\left[\sqrt{\frac{\left(\sum X_1^2 - \frac{(\sum X_1)^2}{n_1}\right) + \left(\sum X_2^2 - \frac{(\sum X_2)^2}{n_2}\right)}{(n_1 - 1) + (n_2 - 1)}} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}\right]}$$

$$t = \frac{17 - 12.5}{\left[\sqrt{\frac{\left(3000 - \frac{28900}{10}\right) + \left(1675 - \frac{15625}{10}\right)}{(10 - 1) + (10 - 1)}} \times \sqrt{\left(\frac{1}{10} + \frac{1}{10}\right)}\right]}$$

$t = 2.86$

Table no 21

Change in ROM during Active extension

Experimental group			**Control group**		
Subjects	ROM scores (X_1)	X_1^2	Subjects	ROM scores (X_2)	X_2^2
E_1	5	25	C_1	10	100
E_2	10	100	C_2	5	25
E_3	5	25	C_3	0	0
E_4	5	25	C_4	0	0
E_5	10	100	C_5	5	25

E_6	5	25	C_6	0	0
E_7	5	25	C_7	5	25
E_8	10	100	C_8	0	0
E_9	0	0	C_9	5	25
E_{10}	5	25	C_{10}	5	25
	$\Sigma X_1=60$	$\Sigma X_1^2=450$		$\Sigma X_2=35$	$\Sigma X_2^2=225$

$\overline{X_1}$= 6 $\overline{X_2}$=3.5

ΣX_1= 60 ΣX_2=35

ΣX_1^2= 450 ΣX_2^2=225

$(\sum X_1)^2$ = 3600 $(\sum X_2)^2$=1225

Calculating the degree of freedom from the formula

df = (n_1-1) + (n_2-1)

= (10 -1) + (10 - 1) =18

Now ‘t’ formula

$$t = \frac{\overline{X_1} - \overline{X_2}}{\left[\sqrt{\frac{\left(\sum X_1^2 - \frac{(\sum X_1)^2}{n_1}\right) + \left(\sum X_2^2 - \frac{(\sum X_2)^2}{n_2}\right)}{(n_1 - 1) + (n_2 - 1)}} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}\right]}$$

$$t = \frac{6 - 3.5}{\left[\sqrt{\frac{\left(450 - \frac{3600}{10}\right) + \left(225 - \frac{1225}{10}\right)}{(10 - 1) + (10 - 1)}} \times \sqrt{\left(\frac{1}{10} + \frac{1}{10}\right)}\right]}$$

t = 1.71

Table no 22

Change in ROM during Passive flexion

Experimental group			**Control group**		
Subjects	ROM scores (X_1)	X_1^2	Subjects	ROM scores (X_2)	X_2^2
E_1	15	225	C_1	10	100
E_2	10	100	C_2	10	100
E_3	20	400	C_3	5	25
E_4	15	225	C_4	10	100
E_5	15	225	C_5	10	100
E_6	10	100	C_6	15	225
E_7	20	400	C_7	10	100
E_8	20	400	C_8	5	25
E_9	15	225	C_9	10	100
E_{10}	10	100	C_{10}	10	100
	ΣX_1=150	ΣX_1^2=2400		ΣX_2=95	ΣX_2^2=975

$\overline{X_1}$= 15

ΣX_1= 150

ΣX_1^2= 2400

$(\sum X_1)^2$ = 22500

$\overline{X_2}$=9.5

ΣX_2=95

ΣX_2^2=975

$(\sum X_2)^2$=9025

Calculating the degree of freedom from the formula

df = (n_1-1) + (n_2-1)

= (10 -1) + (10 - 1) =18

Now't' formula

$$t = \frac{\overline{X_1} - \overline{X_2}}{\left[\sqrt{\frac{\left(\sum X_1^2 - \frac{(\sum X_1)^2}{n_1}\right) + \left(\sum X_2^2 - \frac{(\sum X_2)^2}{n_2}\right)}{(n_1 - 1) + (n_2 - 1)}} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}\right]}$$

$$t = \frac{15 - 9.5}{\left[\sqrt{\frac{\left(2400 - \frac{22500}{10}\right) + \left(975 - \frac{9025}{10}\right)}{(10 - 1) + (10 - 1)}} \times \sqrt{\left(\frac{1}{10} + \frac{1}{10}\right)}\right]}$$

t = 3.49

Table no 23

Change in ROM during Passive extension

Experimental group			**Control group**		
Subjects	ROM scores (X_1)	X_1^2	Subjects	ROM scores (X_2)	X_2^2
E_1	10	100	C_1	5	25

E_2	5	25	C_2	10	100
E_3	10	100	C_3	0	0
E_4	5	25	C_4	0	0
E_5	5	25	C_5	5	25
E_6	10	100	C_6	5	25
E_7	5	25	C_7	10	100
E_8	10	100	C_8	5	25
E_9	5	25	C_9	5	25
E_{10}	5	25	C_{10}	0	0
	$\Sigma X_1=70$	$\Sigma X_1^2=550$		$\Sigma X_2=45$	$\Sigma X_2^2=325$

$\overline{X_1}$= 7 $\overline{X_2}$=4.5

ΣX_1= 70 ΣX_2=45

ΣX_1^2= 550 ΣX_2^2=325

$(\sum X_1)^2$ = 4900 $(\sum X_2)^2$=2025

Calculating the degree of freedom from the formula

df = (n_1-1) + (n_2-1)

= (10 -1) + (10 - 1) =18

Now ‘t’ formula

$$t = \frac{\overline{X_1} - \overline{X_2}}{\left[\sqrt{\frac{\left(\sum X_1^2 - \frac{(\sum X_1)^2}{n_1}\right) + \left(\sum X_2^2 - \frac{(\sum X_2)^2}{n_2}\right)}{(n_1 - 1) + (n_2 - 1)}} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}\right]}$$

$$t = \frac{7 - 4.5}{\left[\sqrt{\frac{\left(550 - \frac{4900}{10}\right) + \left(325 - \frac{2025}{10}\right)}{(10 - 1) + (10 - 1)}} \times \sqrt{\left(\frac{1}{10} + \frac{1}{10}\right)}\right]}$$

t = 1.76

Table no 24

Significant level of ROM improvement

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

No.	Variables	Observed ‘t’ value	Observed ‘p’ value
1.	Active flexion	2.86	0.01
2.	Active extension	1.71	0.1
3.	Passive flexion	3.495	0.005
4.	Passive extension	1.76	0.05

CHAPTER-V DISCUSSION

The study was indicated a process that could be continuing to establish the result. Here the aim of this study could be achieved if the researcher could show effective support. The purpose of this study was to evaluate the effectiveness of vastus lateralis release and iliotibial band stretching with conventional physiotherapy compare to only conventional physiotherapy for knee osteoarthritis.

In this experimental study 20 patients with Knee OA were randomly selected for the outpatient department. Among them 10 patients were randomly assigned to the conventional physiotherapy with vastus lateralis release and iliotibial band stretching group and 10 patients to the only conventional physiotherapy group. The first group received conventional physiotherapy with vastus lateralis release and iliotibial band stretching and the second group received only conventional physiotherapy.

Each group attended for 6 sessions (each session for 30 minutes) of treatment within 3 weeks (2 sessions / week) in the musculoskeletal unit of physiotherapy Outpatient department of CRP, Savar. The outcome of pain intensity was measured by using VAS, Functional independence with FIM scale and range of motion by Goniometer.

The study found that the experimental group showed a high response significant improvement (in short duration) ($p<0.05$) in knee bending, pain in walking ($p=0.05$), pain in long time standing ($p<.005$). Improvement of functional activities were also significant walking ($p<0.005$), household activities ($p<0.05$), walking upstairs ($p<0.005$). Increasing ROM was also significant active flexion ($p<.01$), passive flexion ($p<0.005$), passive extension ($p<0.05$).

As the result was significant so vastus lateralis release and iliotibial band stretching can be used as conventional physiotherapy along with other conventional therapy to treat knee OA.

The main limitation of this study was its short duration. The patient of both experimental and control group received treatment for only 6 sessions. The study was conducted with 20 patients of knee OA, 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

research was carried out in CRP Savar such a small environment, so it was difficult to keep confidential the aims of the study for blinding procedure.

Therefore, single blinding method was used in this study. There are a few literatures about knee OA in the perspective of Bangladesh so it is difficult to compare the study with the other research.

CHAPTER-VI CONCLUSION & RECOMMENDATION

6.1 Conclusion

The results of the study have identified the effectiveness of conventional physiotherapy with vastus lateralis release and iliotibial band stretching was better than the conventional physiotherapy alone for knee osteoarthritis in short duration. The result of the current study indicates that the conventional physiotherapy with vastus lateralis release and iliotibial band stretching can be an effective therapeutic approach for patient with knee osteoarthritis. Participants in the conventional physiotherapy with vastus lateralis release and iliotibial band stretching group showed a greater benefit than those in the only conventional physiotherapy group. The result indicate that the significant changes in both groups are due to the selection of a well- defined population of knee osteoarthritis patients using specific inclusion and exclusion criteria. It may be helpful for patient with knee osteoarthritis to increase return to normal daily activities, work and to measure longer term effects to determine cost effectiveness of vastus lateralis release and iliotibial band stretching in conjunction with conventional physiotherapy as an intervention for knee osteoarthritis.

6.2 Recommendation

In this study, the researcher provided only 6 sessions of treatment to both groups and measured pain intensity, range of motion and functional ability. But the researcher could not estimate the long term effect due to time limitation if the treatment could be continued for more sessions it could estimate the long term effect.

As a consequence of the research it is recommended that with further well-controlled double blinding study include comparison of the conventional physiotherapy with experimental group with the conventional physiotherapy alone and assessing effects and efficacy of these treatments.

Therefore the researcher has collected only 10 patients in each group which also very small in number to generalize the result. So, it is also recommended to increase the number of participants for further studies.

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Appendix

Intervention

Duration 6 weeks

2 sessions per week

30 minutes per session

Vastus lateralis release

Starting position:

Patient is in supine lying

Therapist stand by the affected side

Fig 6 Vastuslateralis release (Left side)

Steps:

1. Therapist places both of his thumbs in between ITB and vastus lateralis muscle of the patient.
2. Give a firm pressure based on patient's tolerance and continue massage from down ward to upward in between ITB and VL.
3. Duration: 3-5 minutes.

Iliotibial band stretching

Starting position:

Patient is in standing position

Therapist instruct patient accordingly

Fig 7 Iliotibial Band stretching (Right side)

Steps:

1. Place the affected foot 1” behind the unaffected.
2. Keep the same hand on a table for support
3. Invert the foot of the affected side.
4. Flex the unaffected knee. Transmit the body weight and tilt the pelvis toward the affected side.
5. Hold the position for 10 seconds.
6. Avoid knee flexion on the affected side
7. Come back to standing
8. Repeat the activity 10 times in a set and 3 sets per day.

Conventional physiotherapy for knee OA

Conventional physiotherapy is a combination of different treatment approach which is used in the physiotherapy department at CRP outpatient department.

After analyzing 50 SOAP (S= subjective, O= objective, A= analysis, P= plan) note of knee OA in CRP Outpatient physiotherapy department researcher has found out, following conventional treatment are used traditionally.

1. Patellar mobilization
2. Isometric exercise of Quadriceps
3. Isometric exercise of Vastus medialis obliqus
4. Movement with mobilization on knee
5. Isotonic Strengthening exercise
6. Static Cycling
7. Ultrasound
8. IRR/ Hot compression

সম্মতি পত্র.

গবেষণার স্থান: পক্ষাঘাতগ্রস্থদের পূণর্বাসন কেন্দ্র, সাভার, ঢাকা।

গবেষণারশিরোনাম: "হাটুর সন্ধিবাতে ভাস্টাসল্যাটেরালিস রিলিস এবং ইলিওটিবিয়াল ব্যান্ড স্ট্রেচিং চিকিৎসার কার্যকারিতা"।

গবেষক নুসরাত নূর শ্রাবণী ঢাকা বিশ্ববিদ্যালয়ের চিকিৎসা অনুষদের অন্তর্ভূক্ত বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউটের বি.এস.সি. ইন ফিজিওথেরাপির ৪র্থ পেশাগত এর একজন ছাত্রী। অংশগ্রহণকারী কে নিম্নলিখিত তথ্য সমূহ পড়ার পর এই গবেষণায় অংশগ্রহণ করার অনুরোধ করা হচ্ছে।

এই গবেষণায় কোয়ান্টিটেটিভ রিসার্চ মেথড ব্যবহৃত হবে। এই গবেষণার কোন ব্যাবস্থাপনা অংশগ্রহণকারীর জন্য ঝুকির কারন হবে না। অংশগ্রহণকারী যে কোন সময় গবেষণা কার্যক্রম থেকে নিজেকে প্রত্যাহার করতে পারবেন। আশা করা যায় এ গবেষণার ফলাফল থেকে হাটুর সন্ধিবাত চিকিৎসার জন্য একটি প্রমাণসিদ্ধ ফিজিওথেরাপি চিকিৎসা ব্যাবস্থা প্রতিষ্ঠা করা যাবে, যা থেকে ভবিষ্যতে এ সমস্যার একটি ভাল ব্যাবস্থাপনা ফিজিওথেরাপিস্টগণ অনুসরন করতে পারবেন।

এ গবেষণা পত্র প্রকাশকালে অংশগ্রহণকারীর পরিচয় ও অন্যান্য তথ্য গোপনীয়তার সাথে রক্ষা করা হবে।

আমি ..... ঘোষণা দিচ্ছি যে, উপোরক্ত সকল তথ্য জানার পর এই গবেষণায় অংশগ্রহণ করার ইচ্ছা পোষন করছি।

অংশগ্রহণকারীর স্বাক্ষর: .....তারিখ : .....

গবেষকের স্বাক্ষর: .....তারিখ : .....

Inform consent

Clinical setting: "Outdoor Service, Physiotherapy Department, CRP, Savar, Dhaka"

The study entitled "Effectiveness of vastus lateralis release and iliotibial band stretching for knee osteoarthritis." The researcher Nusrat Noor Shraboni is a 4th Professional B.Sc. in physiotherapy student of Bangladesh Health Profession Institute under the University of Dhaka and it is a part of her study. The participants are requested to participate in the study after reading the following information. The study is conducted to establish evidence based treatment for knee osteoarthritis. The study will follow quantitative method. The study does not pose any potential risk for the participant.

The participants reserve the right to refuse the study at any time. The findings of the study will serve a great role to explore information about the evidence based quality management of the knee pain and will make worth physiotherapist to provide best service for the disorder.

The information obtained from the study would be kept secret and at the time of publishing the result of the study, personal identification of the participant would not be published.

I ---------- declare that, I am giving my consent to participating in the study after being informed about all the above information in details.

Sign of the participant …….. Date:

Sign of the researcher ……... Date:

তথ্য সংগ্রহ পত্র

কোড নং:

বয়স: …… লিঙ্গ……..

ঠিকানা: গ্রাম: …… পোস্ট: ……

থানা: …… জেলা: ……..

পেশা: …….. তারিখ: …….

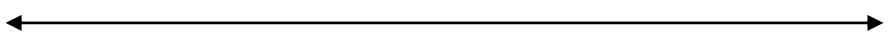
আপনার হাটুতে কতদিন যাবত ব্যথা হচ্ছে?

বছর…….. মাস…… সপ্তাহ……..

এই প্রশ্নপত্র হাটুর সন্ধিবাত রোগীদের জন্য তৈরী করা হয়েছে। প্রত্যেক প্রশ্নের সাথে একটি করে লম্বা দাগ দেয়া আছে। এই দাগটি ব্যথার অবস্থা নির্দেশ করে। সর্ববাম দিকটি নির্দেশ করে কোন ব্যথা নেই এবং সর্বডান দিকটি নির্দেশ করে ব্যথার সর্বোচ্চ প্রবণতা। পরীক্ষক রোগির ব্যথার প্রবণতাটি দাগের সঠিক জায়গায় একটি ক্রসচিহ্ন (×) দিয়ে নির্দেশ করবেন। অস্থিসন্ধি নড়াচড়ার পরিমাপটি পরীক্ষক একটি পরিমাপক যন্ত্র দ্বারা এবং দৈনন্দিন জীবনে সাভাবিক কাজকর্মের সমস্যার পরিমান FIM স্কেল দ্বারা নির্ণয় করবেন।

১/ বিশ্রামরত অবস্থায় আপনার ব্যথার প্রবণতা কত?

চিকিৎসার পূর্বে



০ ১০

চিকিৎসার পরে

০ ১০

(শূণ্য (০) অর্থাৎ ব্যথা নেই এবং দশ (১০) অর্থাৎ সর্বোচ্চ ব্যথা)

২/হাটু ভাঁজ করার সময় আপনার ব্যথার কতটুকু প্রবণতা থাকে?

চিকিৎসার পূর্বে

০ ১০

চিকিৎসার পরে

০ ১০

(শূণ্য (০) অর্থাৎ ব্যথা নেই এবং দশ (১০) অর্থাৎ সর্বোচ্চ ব্যথা)

৩/হাটু সোজা করার সময় আপনার ব্যথার কতটুকু প্রবণতা থাকে?

চিকিৎসার পূর্বে

০ ১০

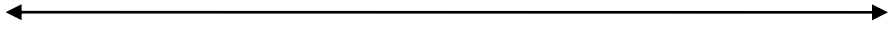
চিকিৎসার পরে

০ ১০

(শূণ্য (০) অর্থাৎ ব্যথা নেই এবং দশ (১০) অর্থাৎ সর্বোচ্চ ব্যথা)

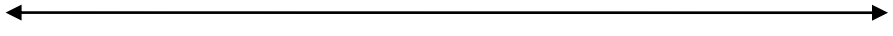
৪/ দীর্ঘক্ষণ (১ঘন্টা) বসে থাকলে আপনার হাটু ব্যথার মাত্রা কতটুকু থাকে?

চিকিৎসার পূর্বে



০ ১০

চিকিৎসার পরে

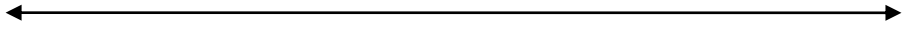


০ ১০

(শূণ্য (০) অর্থাৎ ব্যথা নেই এবং দশ (১০) অর্থাৎ সর্বোচ্চ ব্যথা)

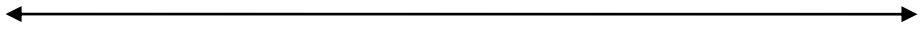
৫/ দীর্ঘক্ষণ (১ঘন্টা) দাঁড়িয়ে থাকলে আপনার ব্যথার মাত্রা কতটুকু থাকে?

চিকিৎসার পূর্বে



০ ১০

চিকিৎসার পরে

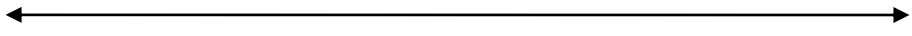


০ ১০

(শূণ্য (০) অর্থাৎ ব্যথা নেই এবং দশ (১০) অর্থাৎ সর্বোচ্চ ব্যথা)

৬/ হাঁটার সময় আপনার ব্যথার মাত্রা কতটুকু থাকে?

চিকিৎসার পূর্বে



০ ১০

চিকিৎসার পরে

০ ১০

(শূণ্য (০) অর্থাৎ ব্যথা নেই এবং দশ (১০) অর্থাৎ সর্বোচ্চ ব্যথা)

৭/ হাটু ভাঁজ করে বসলে আপনার ব্যথার মাত্রা কতটুকু থাকে?

চিকিৎসার পূর্বে

০ ১০

চিকিৎসার পরে

০ ১০

(শূণ্য (০) অর্থাৎ ব্যথা নেই এবং দশ (১০) অর্থাৎ সর্বোচ্চ ব্যথা)

৮/ আপনি কি দৈনন্দিন জীবনে সাভাবিক কাজকর্ম করতে কোন সমস্যা অনুভব করেন?

FIM Instrument Scoring Criteria:

FIM Instrument Scoring Criteria:	
No Helper Required	
Score	**Description**
7	Complete Independence
6	Modified Independence (patient requires use of a device, but no physical assistance)
Helper (Modified Dependence)	
Score	**Description**
5	Supervision or Setup
4	Minimal Contact Assistance (patient can perform 75% or more of task)
3	Moderate Assistance (patient can perform 50% to 74% of task)
Helper (Complete Dependence)	
Score	**Description**
2	Maximal Assistance (patient can perform 25% to 49% of tasks)
1	Total assistance (patient can perform less than 25% of the task or requires more than one person to assist)

চিকিৎসার পূর্বে

- হাটা
- গৃহস্থালির কাজ
- প্রার্থনা/নামায
- ভ্রমন
- সিড়ি দিয়ে ওঠা
- সিড়ি দিয়ে নামা

চিকিৎসার পরে

- হাটা
- গৃহস্থালির কাজ
- প্রার্থনা/নামায
- ভ্রমন
- সিড়ি দিয়ে ওঠা
- সিড়ি দিয়ে নামা

অস্থিসন্ধির নড়াচড়ার পরিমাপ:

তথ্য সংগ্রহ পত্রের এই অংশটি হাটু অস্থিসন্ধির নড়াচড়া পরিমাপ করার জন্য তৈরী করা হয়েছে। পরিমাপক যন্ত্র হিসেবে গোনিয়মিটার ব্যবহার করা হয়েছে।

মুভমেন্ট	**চিকিৎসার পূর্বে**	**চিকিৎসার পরে**
ফ্লেক্সন (এ্যাকটিভ)		
এক্সটেনসন (এ্যাকটিভ)		
ফ্লেক্সন (প্যাসিভ)		
এক্সটেনসন (প্যাসিভ)		

ধন্যবাদান্তে,

নুসরাত নূর শ্রাবণী

৪র্থ পেশাগত

বি.এস.সি. ইন ফিজিওথেরাপি

বি.এইচ.পি.আই., সি.আর.পি

ঢাকা বিশ্ববিদ্যালয়

সুপারভাইজারেরস্বাক্ষর:

তারিখ:

Questionnaire (English)

Code no:

Age: …….. Sex: ……...

Adders: Village: …… P.O.: …….

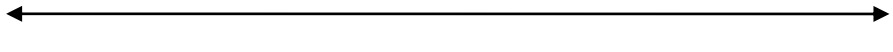
Thana: …… District: ……

Occupation: …… Date: ……

This questionnaire is designed for knee osteoarthritis patients. With each question there is a long line. The line represents pain situation. The left hand end represents no pain and right hand end represents severe pain. The point is marked (×) on the line where patient feel how much pain he/she have. The Range of motionis being enlisted by examiner by using Goniometer and Functional independence of daily activities by using FIM scale.

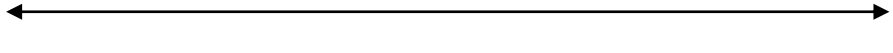
1. How severe your pain is at resting position?

   Pre test

   0 10

   Post test

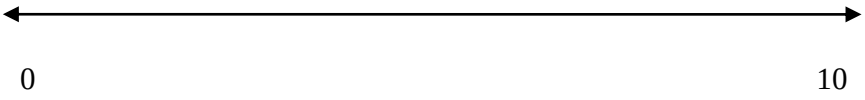
   

   0 10

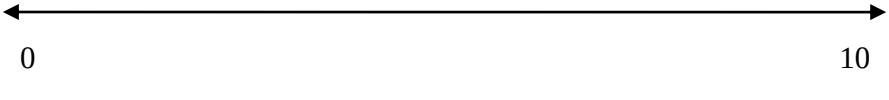
(A Zero (0) means no pain and Ten (10) means extreme pain)

2. How severe your pain is during knee bending?

Pre test



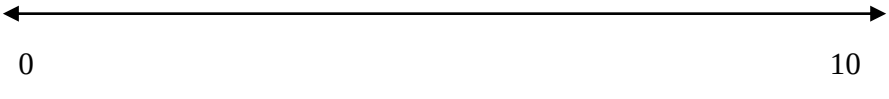
Post test



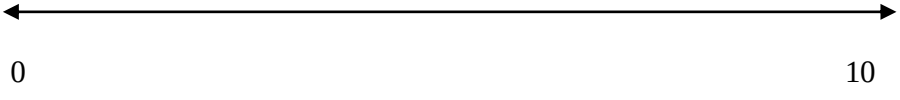
(A Zero (0) means no pain and Ten (10) means extreme pain)

3. How severe is your pain during knee extension?

Pre test



Post test

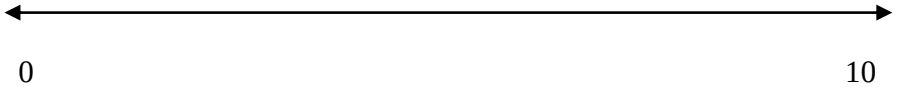


(A Zero (0) means no pain and Ten (10) means extreme pain)

4. How much pain increases in your knee during long time (1 hour) sitting?

Pre test

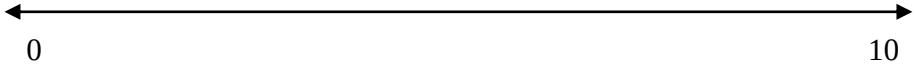
Post test



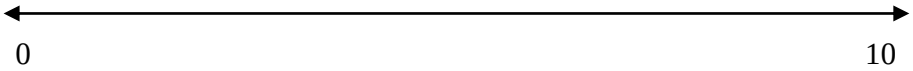
(A Zero (0) means no pain and Ten (10) means extreme pain)

5. How much pain increases in your knee during long time (1 hour) standing?

Pre test



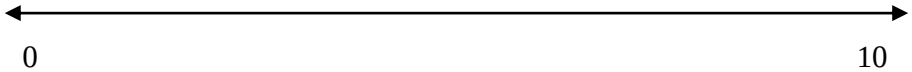
Post test



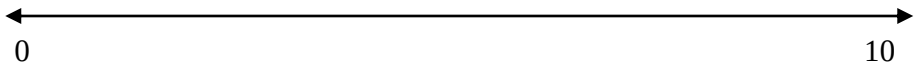
(A Zero (0) means no pain and Ten (10) means extreme pain)

6. How much pain increases during walking?

Pre test



Post test



(A Zero (0) means no pain and Ten (10) means extreme pain)

7. How much pain increases during squatting?

Pre test

0 10

Post test

0 10

(A Zero (0) means no pain and Ten (10) means extreme pain)

8. Do you feel any problem/pain in doing your normal activities of daily living?

FIM Instrument Scoring Criteria:

FIM Instrument Scoring Criteria:	
No Helper Required	
Score	**Description**
7	Complete Independence
6	Modified Independence (patient requires use of a device, but no physical assistance)
Helper (Modified Dependence)	
Score	**Description**
5	Supervision or Setup
4	Minimal Contact Assistance (patient can perform 75% or more of task)
3	Moderate Assistance (patient can perform 50% to 74% of task)
Helper (Complete Dependence)	
Score	**Description**
2	Maximal Assistance (patient can perform 25% to 49% of taks)
1	Total assistance (patient can perform less than 25% of the task or requires more than one person to assist)

Pre treatment:

- Walking
- Household activities
- Prayer
- Travelling
- Walking upstairs
- Walking downstairs

Post treatment:

- Walking
- Household activities
- Prayer
- Travelling
- Walking upstairs
- Walking downstairs

Range Of Motion:

This part of questionnaire is designed for knee range of motion measurement. Goniometer is used for taking measurement.

Movement	**Pre treatment**	**Post treatment**
Flexion (active)		
Extension (active)		
Flexion (Passive)		
Extension (Passive)		

Thanks,

Nusrat Noor Shraboni

4th Professional

B.Sc. in Physiotherapy

BHPI, CRP

University of Dhaka

Supervisor's sign:

Date:

To

The Head of the Physiotherapy Department,

Center for the Rehabilitation of the Paralyzed (C.R.P.),

Savar, Dhaka.

Subject: Prayer for permission of data collection for the research project.

Sir,

I beg most respectfully to state that, I am a student of B Sc in Physiotherapy in Bangladesh Health Profession Institute (BHPI) under University of Dhaka. As a part of my curriculum, I have to conduct a research project. The area of my research project is musculoskeletal physiotherapy and title is "Effectiveness of vastus lateralis release and iliotibial band stretching for knee osteoarthritis." The samples of my research project are patient with Knee pain. The setting of the project is outdoor service physiotherapy department CRP Savar Dhaka. So I need to collect data of those patients from your department. I will follow all the fact written in my consent form and will not do any harm for the patients.

I therefore, pray and hope that you would be kind enough to give me the permission to collect data and complete the research project successfully from your department.

Yours faithfully

Nusrat Noor Shraboni

Nusrat Noor Shraboni

4th professional B.Sc. in physiotherapy

BHPI.

CRP, Savar, Dhaka

Date:

Approved
cotact with mr
Shabbir and I saw
ac a counter part
& data collection
proceed

She maybe allowed for
data collection.

05/10/15

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

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

For being an experimental study, she will require minimum 1 month to collect data.

Nasirul Islam, Physiotherapist
Associate Professor
Bangladesh Health Professions Institute (BH
CRP-Chapain, Savar, Dhaka-1343

Forwarded for
Head of PT BHPI