RELATIONSHIP BETWEEN AGE AND ACTIVE RANGE OF KNEE FLEXION FOR THE PATIENTS WITH OSTEOARTHRITIS ATTENDED AT CRP

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We the under signed certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled

RELATIONSHIP BETWEEN AGE AND ACTIVE RANGE OF KNEE FLEXION FOR THE PATIENTS WITH OSTEOARTHRITIS ATTENDED AT CRP

Submitted by **A. N. M. Mashud Rana**, for the partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B.Sc.PT).

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Declaration

I declare that the work presented here is my own. All source used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that for any publication, presentation or dissemination of the study. I would be bound to take written consent from my supervisor.

Signature **Date**

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Abbreviations

ACL: Anterior Cruciate Ligament

ADL: Activity of daily living

BHPI: Bangladesh Health Professions Institute

BMI: Body mass index

CMC: Carpometacarpal

CRP: Center for the rehabilitation of the paralyzed

DIP: Distal interphalanges

DM: Diabetes mellitus

EOA: Erosive Osteoarthritis

HTN: Hypertension

MRI: Magnetic resonance imaging

NSAID: Non steroidal anti inflammatory drug

OA: Osteoarthritis

PIP: Proximal interphalanges

ROM: Range of motion

SPSS: Statistical Package of Social Science

TENS: Tanscuteneous Electrical Nerve Stimulator

VAS: Visual analog scale

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Abstract

Purpose: The purpose of the study was establishing the relationship between age and active range of motion of knee flexion patient with osteoarthritis attended at CRP. *Objective*: To measure ROM of knee among the patient attended at CRP with OA knee. And to find out relationship between age and ROM of knee, To evaluate the association between profession and ROM of knee, gender and ROM of knee, onset of OA and ROM of knee,severity of pain and ROM of knee. *Methodology:* A correlation study was conducted with a semi structured questionnaire to collect data from 57 participants, age ranging from 30-70 years. Data were numerically coded and captured in Microsoft Excel, using an SPSS 16.0 version software program. *Results:* The study found that the coefficient correlation is -1.040 and it is negative. That means that with one year increase in age, the active range of motion of knee flexion of an osteoarthritis patient decrease by 1.040 degree. The mean age of the participants is 51.95 years. Most of the participants were female it is about 81% and male were about 19%. As the majority of the participants were female so most of the participants were found as housewife. In this study not found any association between gender and active ROM of OA knee flexion, between occupation and active ROM of OA knee flexion. But researcher found association between duration of osteoarthritis and active ROM of OA knee flexion also between severity of pain and active ROM of OA knee flexion. *Conclusion:* As there is 1.040 degree ROM is decreases per year of an OA patient's active knee flexion, so clinicians should address importance on ROM consciously of OA patients. Awareness should be raised in functional activity. As women are more affected because of their life style and our culture so should give more emphasis on them to raised awareness.

Key words: Osteoarthritis, Range of Motion, Age.

CHAPTER: I INTRODUCTION

1.1 Background

With the Advancement of medical science all of us are benefited, which has occurred in the twentieth century because of improvements in imaging, medications, and surgical techniques and instruments, doctors can more effectively diagnose and treat illness. Despite these advances, Osteoarthritis (OA) is the most common form of arthritis, and the pain associated with OA is a major cause of activity limitation, functional disability and reduced health-related quality of life. Osteoarthritis is multifactorial disease involving firstly, systemic factors (e.g. age, sex, hormones, genetics and nutritional factors), secondly, intrinsic joint vulnerabilities (e.g. previous damage, bridging muscle weakness, malalignment and laxity) and finally, extrinsic factors acting on joints (e.g. specific injurious activities and obesity).

Osteoarthritis (OA) of the knee is a major cause of activity limitation among the aging population of the industrialized world. Osteoarthritis (OA) is perhaps the most common disabling joint affection in developed countries, and consequently a large burden to their health systems. Furthermore, it is a growing global problem due to increasing life expectancy as well as obesity and smoking, all identified as risk factors for developing knee OA and knee pain. The exact cause of knee pain in patients with OA remains difficult in known because hyaline cartilage does not contain pain fibers and as such cannot be the direct cause of pain in OA. Radiographs remain the usual means for assessment of osteoarthritic changes in the knee and their association with clinical features such as knee pain. The association between findings of OA on radiographs and clinical features however is poor Magnetic resonance (MR) imaging allows another perspective of the structural abnormalities associated with OA and MR imaging findings have been associated with clinical features, which include knee pain. Reported findings include the association between knee pain and MR imaging findings such as joint effusion and synovial thickening, bone marrow edema, osteophytes, minimal cartilaginous lesions, alterations in volume of patellar cartilage and periarticular lesions, which include bursitis and iliotibial band syndrome. Lots of study shows that knee pain is occurs only one structural problem(Kornaat et al, 2006).

1.2 Rationale

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. Women on average live longer than men in all countries, with the exception of Zimbabwe, Lesotho, Swaziland and Afghanistan (List of countries, 2012).In Bangladesh, Life expectancy at birth69.75 years male: 67.93 years female**:** 71.65 years (Bangladesh life expectancy, 2011).There is some degenerative diseases associated with age. Osteoarthritis is one of them. Osteoarthritis is a condition affects mainly old aged people and maximum old aged people are the sufferer by OA. Osteoarthritis (OA) is the most common joint disorder in all over the world. It occurs most in women of age over 45. It occurs in eighty percent of people over 55 years of age, twenty-three percent experience limitation of activities, Radiographic evidence of osteoarthritis is present in the majority of people over age 65; eighty percent of those over 75, Approximately eleven percent of those over 65 have symptomatic osteoarthritis of the knee. The prevalence of osteoarthritis increases with age over 65 years. There are many studies shows that heavy lifting and weight bearing activities are risk factors for developing osteoarthritis (Croft, 2005).

The knee has limited movement and is designed to move like a hinge. The Quadriceps Mechanism is made up of the patella (kneecap), patellar tendon, and the quadriceps muscles (thigh) on the front of the upper leg. The patella fits into the patellofemoral groove on the front of the femur and acts like a fulcrum to give the leg its power. The patella slides up and down the groove as the knee bends. When the quadriceps muscles contract they cause the knee to straighten. When they relax, the knee bends. In addition the hamstring and calf muscles help flex and support the knee. Our knee is the most complicated and largest joint in our body. It’s also the most vulnerable because it bears enormous weight and pressure loads while providing flexible movement. When we walk, our knees support 1.5 times our body weight; climbing stairs is about 3-4 times our body weight and squatting about 8 times. If the normal ROM of knee is reduced then it will affect the normal gait cycle. Because in heel strike we need extend our knee fully and at mid swing we need to flex our knee. Also for stair up and down we need flex and extend our knee. So if knee ROM is altered it

will affect in gait cycle, staring as well as in our normal ambulatory movement of lower extremity.

It is known that in OA knee joint ROM is limited particularly, more limitation of flexion occure than extension but how much it is reduced considering age is yet not to explore. Therefore, the study will explore the relationship between age and limitation of ROM of knee. That mean, how much the joint ROM is decrease with increasing of one year age.Also it will give details information to the patient about knee OA so that people can modify their life style regarding OA at knee and we can provide better treatment as well as essential advice to the patients. As a health professional it improves our knowledge. Research makes the profession strongest and this study can used as preventive measure for altering of ROM for OA patients. So there is no alternative option to do research as a professional to develop the profession.

1.3 Research Question

- What is the relation between age and active range of motion of knee patient with OA attended at CRP?

1.4 Objectives

1.4.1 General objective

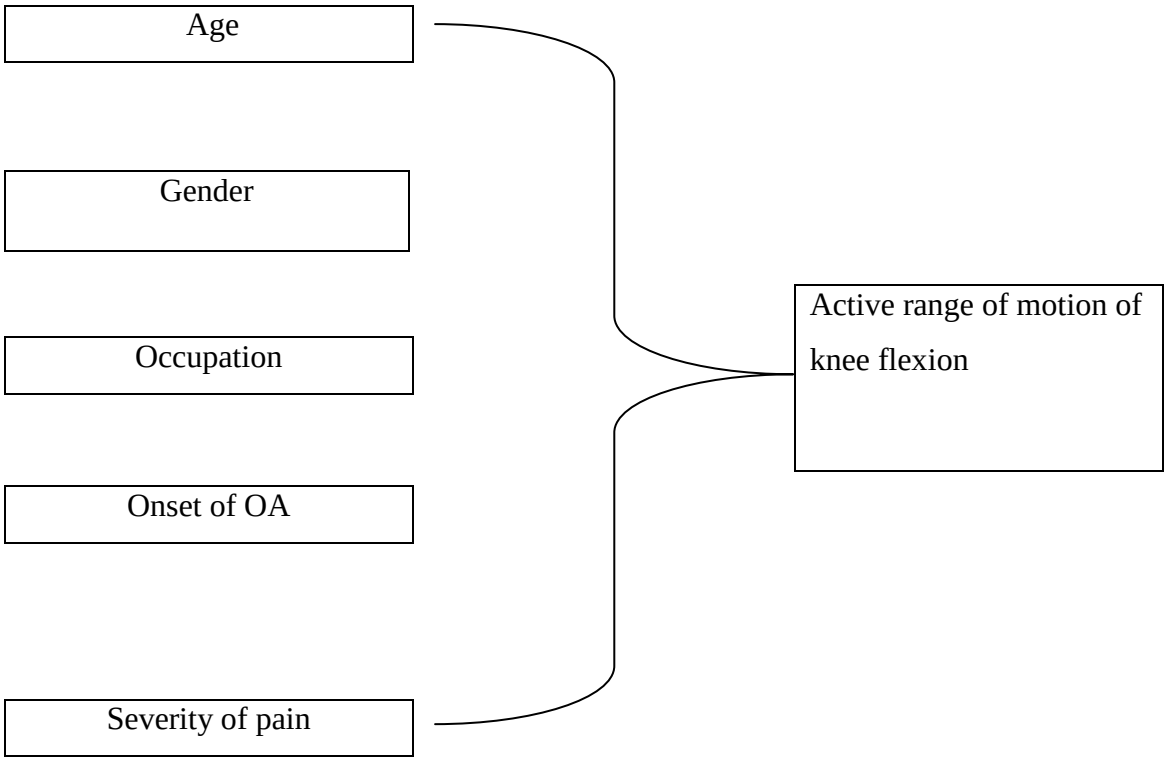
- To measure ROM of knee among the patient attended at CRP with OA knee.

1.4.2 Specific objectives

- To find out relationship between age and ROM of knee.
- To evaluate the association between profession and ROM of knee,gender and ROM of knee, onset of OA and ROM of knee, severity of pain and ROM of knee.

1.5 Conceptual Framework

Independent variable **Dependent variable**



1.6 Operational definition

Osteoarthritis

Cases identified through clinical diagnosis performed either by physician or physiotherapist on prescription.

Range of motion

How much patient bend his/her knee actively.

Family history

Participants are asked about his/her family history that they have any history of OA in their family.

Past trauma

Participants are asked about the number of trauma at knee or not.

Congenital deformity

Any deviation than normal from birth.

CHAPTER: II LITERETUREREVIEW

The knee joint connects the femur; it is the longest bone in the body, to the tibia which called shinbone and second longest bone. There are two joints in the knee—the tibiofemoral joint, which joins the tibia to the femur and the patellofemoral joint which joins the kneecap to the femur. These two joints work together to form a modified hinge joint that allows the knee to bend and straighten, but also to rotate slightly and from side to side. The knee is part of a chain that includes the pelvis, hip, and upper leg above, and the lower leg, ankle and foot below. All of these work together and depend on each other for function and movement. The knee joint bears most of the weight of the body. When we're sitting, the tibia and femur barely touch; standing they lock together to form a stable unit. Let's look at a normal knee joint to understand how the parts (anatomy) work together (function) and how knee problems can occur.

Anatomical terms allow us to describe the body clearly and precisely using planes, areas and lines. Instead of your doctor saying "his knee hurts" she can say "his knee hurts in the anterolateral region" and another doctor will know exactly what is meant. Below are some anatomic terms surgeon's uses as these terms apply to the knee: Anterior — facing the knee, this is the front of the knee. Posterior — facing the knee, this is the back of the knee, also used to describe the back of the kneecap, that is the side of the kneecap that is next to the femur. Medial — the side of the knee that is closest to the other knee, if you put your knees together, the medial side of each knee would touch. Lateral — the side of the knee that is farthest from the other knee (opposite of the medial side).

Structures often have their anatomical reference as part of their name, such as the medial meniscus or anterior cruciate ligament. The medial meniscus would refer to the meniscus on the inside of the knee; the anterior crucial ligament would be on the anterior side (front) of the knee. The main parts of the knee joint are bones, ligaments, tendons, cartilages and a joint capsule, all of which are made of collagen. Collagen is a fibrous tissue present throughout our body. As we age, collagen breaks down.

The adult skeleton is mainly made of bone and a little cartilage in places. Bone and cartilage are both connective tissues, with specialized cells called chondrocytes embedded in a gel-like matrix of collagen and elastic fibers. Cartilage can be hyaline, fibro cartilage and elastic and differ based on the proportions of collagen and elastic. Cartilage is a stiff but flexible tissue that is good with weight bearing which is why it is found in our joints. Cartilage has almost no blood vessels and is very bad at repairing itself. Bone is full of blood vessels and is very good at self repair. It is the high water content that makes cartilage flexible. The bones give strength, stability and flexibility in the knee.

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 patellofemoral 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 knee works similarly to a rounded surface sitting atop a flat surface. 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.

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 pair of collateral ligaments keeps the knee from moving too far side-to-side. The cruciate ligaments crisscross each other in the center of the knee. They allow the tibia to "swing" back and forth under the femur without the tibia sliding too far forward or backward under the femur. Working together, the 4 ligaments are the most important in structures in controlling stability of the knee. There is also a patellar ligament that attaches the kneecap to the tibia and aids in stability. A belt of fascia called the iliotibial band runs along the outside of the leg from the hip down to the knee and helps limit the lateral movement of the knee.

Tendons are elastic tissues that technically part of the muscle and connect muscles to bones. Many of the tendons serve to stabilize the knee. There are two major tendons in the knee—the quadriceps and patellar. The quadriceps tendonconnects the quadriceps muscles of the thigh to the kneecap and provides the power for straightening the knee. It also helps hold the patella in the patellofemoral groove in the femur. The patellar tendon connects the kneecap to the shinbone (tibia)—which means it's really a ligament.

The ends of bones that touch other bones—a joint—are covered with articular cartilage. Its gets its name "articular" because when bones move against each other they are said to "articulate." Articular cartilage is a white, smooth, fibrous connective tissue that covers the ends of bones and protects the bones as the joint moves. It also allows the bones to move more freely against each other. The articular cartilages of the knee cover the ends of the femur, the top of the tibia and the back of the patella. In the middle of the knee are menisci—disc shaped cushions that act as shock absorbers, medial meniscus—made of fibrous, crescent shaped cartilage and attached to the tibia lateral meniscus—made of fibrous, crescent shaped cartilage and attached to the tibia articular cartilage is on the ends of all bones in any joint—in the knee joint it covers the ends of the femur and tibia and the back of the patella. The articular cartilage is kept slippery by synovial fluid (which looks like egg white) made by the synovial

membrane (joint lining). Since the cartilage is smooth and slippery, the bones move against each other easily and without pain.

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.

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.

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 capsule is a thick, fibrous structure that wraps around the knee joint. Inside the capsule is the synovial membrane which is line by the synovium, a soft tissue that secretes synovial fluid when it gets inflamed and provides lubrication for the knee.

There are up to13 bursas of various sizes in around the knee. These fluid filled sacs cushion the joint and reduce friction between muscles, bones, tendons and ligaments. The prepatellar bursa is one of the most significant bursa and is located on the front of the knee.Plicae are folds in the synovium. Plicae rarely cause problems but sometimes they can get caught between the femur and kneecap and cause pain.

Range of motion (ROM) is the amount of motion that is available at a joint. The starting position for measuring all ROM, except rotation in the transverse plane, is the anatomical position. Three notations assistance have been used to define ROM: the 0-180 degree system, 180-0 degree system & the 360 degree system. In the 0-180 degree system, the upper and lower extremity joints are at 0 degrees for flexion-extension and abduction-adduction when the body is in the anatomical position. This 0-180 degree system of notation is used throughout the world. Two other systems of notation have been described. The 180-to 0-degree notation system defines anatomical position as 180 degrees. A range of motion begins at 180 degrees and proceeds in an arc toward 0 degrees. The 360-degree notation system also defines anatomical position as 180 degrees. The motion of flexion and abduction begin at 180 degrees and proceed in an arc toward 0 degrees. The motions of extension and adduction begin at 180 degrees and proceed in an arc toward 360 degrees. These two notation systems are more difficult to interpret than the 0- to 180-degree notation system and are rarely used (Norkin& Joyce, 1998).

"Osteoarthritis" is derived from the Greek word "osteo", meaning "of the bone", "arthro", meaning "joint", and "itis", meaning inflammation, although the "itis" of osteo arthritis is somewhat of a misnomer -- inflammation is not a conspicuous feature of the disease. Patients with OA most often presented with the involvement of knee (Wilkins et al, 1983).

Osteoarthritis (OA) is a degenerative joint disease, occurring primarily in older persons, characterized by erosion of the articular cartilage, hypertrophy of bone at the margins, subchondral sclerosis, and a range of biochemical and morphologic alterations of the synovial membrane and joint capsule. Pathologic changes in the late stages of OA include softening, ulceration, and focal disintegration of the articular cartilage; synovial inflammation also can occur."(Kornaat et al, 2006).

Osteoarthritis (OA) is the most common joint disorder in all over the world. Its 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 (Croft, 2005).

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).

Symptomatic knee OA occurs in 10% men and 13% in women aged 60 years or older (Zhang & Jordan 2008).In Malaysia, 14.4% complained of pain in the joints and/or musculoskeletal pain. The knee was responsible for 64.8% of all complaints pertaining to the joints, and more than half those examined with knee pain had clinical evidence of osteoarthritis (OA). The complaint rate increased with age, up to 53.4% in the group age > 65 years. The major disability encountered was the inability to squat (3.1%). Fibromyalgia, soft tissue lesions, and localized OA of the knees were the main clinical diagnoses (Veerapen et al, 2007).
Joint Distribution of OA are among all Osteoarthritis DIP joints affects in 40% case, PIP 15% case, CMC 30% case, Knee joint affects in 30-40% case and Hip joint affects in 10% cases. Osteoarthritis is classified as Primary OA and Secondary OA.

Radiological Classification of Osteoarthritis
Grade-0 (Normal) = No feature of OA, Minute osteophyte.
Grade-1 (Doubtful) = Doubtful significance.
Grade-2 (Mild) = Definite osteophyte. Normal joint space.
Grade-3 (Moderate) = Moderate joint space reduction.
Grade-4 (Severe) = Joint space greatly reduced, Subchondral sclerosis.

Arthroscopic classification of severity of OA
Grade-1 = Swelling and softening of cartilage. Oedema and cellular infiltrate.
Grade-2 = Superficial fibrillation.
Grade-3 = Deeper and large cartilage fibrillation.

Grade-4 = Visualisation of underlying subchondralbone (Ayral, 1993).

Primary OA is a type of OA is a chronic degenerative disorder related to but not caused by aging, as there are people well into their nineties who have no clinical or functional signs of the disease. As a person ages, the water content of the cartilage decreases as a result of a reduced proteoglycan content, thus causing the cartilage to be less resilient. Without the protective effects of the proteoglycans, the collagen fibers of the cartilage can become susceptible to degradation and thus exacerbate the degeneration. Inflammation of the surrounding joint capsule can also occur, though often mild (compared to that which occurs in rheumatoid arthritis). This can happen as breakdown products from the cartilage are released into the synovial space, and the cells lining the joint attempt to remove them. New bone outgrowths, called "spurs" or osteophytes, can form on the margins of the joints, possibly in an attempt to improve the congruence of the articular cartilage surfaces. These bone changes, together with the inflammation, can be both painful and debilitating (Solomon &Warkick, 2001).

A number of studies have shown that there is a greater prevalence of the disease between siblings and especially identical twins, indicating a hereditary basis. Up to 60% of OA cases are thought to result from genetic factors. Both primary generalized nodal OA and erosive OA (EOA also called inflammatory OA) are sub-sets of primary OA. EOA is a much less common and more aggressive inflammatory form of OA which often affects the DIPs and has characteristic changes on X-Ray (Peat et al, 2001).

Secondary OA is a type of OA is caused by other factors but the resulting pathology is the same as for primary OA: Congenital disorders of joints, Diabetes, Inflammatory diseases (such as Perthes' disease), (Lyme disease), and all chronic forms of arthritis (e.g. costochondritis, gout, and rheumatoid arthritis). In gout, uric acid crystals cause the cartilage to degenerate at a faster pace. Injury to joints, as a result of accident. Septic arthritis (infection of a joint), Ligamentous deterioration or instability may be a factor. Marfansyndrome,Obesity, Alkaptonuria, Hemochromatosis and Wilson's disease (Hassett et al, 2006).

Anatomical changes followed byOA 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 lteration 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 oedematous. Fibrous degeneration occurs in later stage andreduction 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 (Aigner & Kim, 2002)**.**

The characteristics of OA are described as osteoarthritis is brought about by the wear and tear of a joint. Injuries and the aging process are the most common culprits to the development of this problem. The usual symptoms of this condition include pain and stiffness of the joint. Sometimes joints enlargement or swelling present. In osteoarthritis, the stiffness or difficulty to move your knees or affected joints gets worse as the day progresses. The people who usually get this condition are older people and even athletes because of the wearing down of joints due to excessive use. Generally, osteoarthritis triggers pain in the larger joints, such as the knees and the hips (Martin, 2008).

Typical clinical Signs of Osteoarthritis are found like-Patient over age of 40(often over 60), Pain mainly related to movement and weight bearing which is relieved by rest, Usually only one or few joint painful, Restricted movement due to capsular thickening, blocking by osteophytes, Palpable, sometime audible, Coarse crepitus

(rough articular surface),Bony swelling around joint margins, Deformity without instability, Joint line or periarticular tenderness. Muscle weakness and wasting. No or only mild sinovitis (effusion, increased warmth) (Haslett et al, 1999).

Knee OA principally targets the patello-femoral and medial tibio-femoral compartments of the knee. It may be isolated or occur as part of nodal generalized OA. Most knees OA, particularly in women, is bilateral and symmetrical. Trauma is a more important risk factor in men and may result in unilateral OA. OA knee pain is usually localised to the anterior or medial aspect of the knee and upper tibia. Patello-femoral pain is usually worse going up and down stairs or inclines. Posterior knee pain suggests a complicating popliteal 'cyst'. Prolonged walking, rising from a chair, getting in or out of a car, or bending to put on shoes and socks may be difficult. A jerky, asymmetric antalgic gait (less time weight bearing on the painful side) present in the people with knee OA. A varus less commonly valgus, and/or fixed flexion deformity are seen among the knee OA patient. Joint-line and/or periarticular tenderness (secondary anserine bursitis and medial ligament enthesopathy are common, giving tenderness of the upper medial tibia). Due to less use weakness and wasting is present at the quadriceps muscle is present. Sometimes coarse crepitus with restricted flexion/extension at the knee.Bony swelling present at the knee joint line (Moore & Dalley, 2006).

Pain is around and through the joint. Pain may refer to the anterior aspect of the thigh or down to the ankle. Muscle spasm may present in hamstring so that flexion deformity present in most of the cases. Knee joint enlarged and Quadriceps muscle atrophy occurs due to less activity by the affected limbs (Kenneth, 2009).

Diagnosis of osteoarthritis focuses on two major goals. When diagnosing osteoarthritis, 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.

Typically, at the first appointment with doctor, patient will be asked to fill out an extensive questionnaire about medical history. Patient will also be asked about the symptomsthat patients are experiencing including when they commonly occur and what makes the symptoms worse or better (Eustice, 2009).

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.

Routine laboratory tests are usually normal so their value is in ruling out other types of arthritis, especially inflammatory types of arthritis, or establishing a baseline for monitoring treatment. Synovial fluid analysis also helps rule out other conditions.
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.

Laboratory findings which are useful to assessing knee osteoarthritis include sedimentation rate less than 40 mm/hour, rheumatoid factor less than 1:40, and synovial fluid examination showing clear, viscous fluid with a white blood cell count

less than 2,000/mm3.It is the doctor's job to be the diagnostician but it clearly is helpful if the patient understands why tests are being performed and what the results mean. If a patient understands the process from early symptoms to diagnosis to treatment plan, the patient will likely be more compliant and the outcome of treatment will likely be more successful (Eustice, 2009).

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; 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. Synvisc 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 Replacement Surgery is also called a unicompartmental knee replacement; this is replacement of one part of the knee. It is a surgical option for the treatment of limited knee arthritis (Cluett, 2011).

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, 1997).

Measures to relieve pain and muscle spasm: During the acute phase treatment should be continued with TENS, ultrasound, short-wave diathermy, hydrotherapy, cryotheraputic 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, 2003).

As the number of people who have osteoarthritis 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. Avoiding squatting and kneeling and carrying heavy loads during work have been associated with a reduction of 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. The Osteoarthritis Research Society International Group strongly recommends that patients with osteoarthritis lose weight and maintain weight at a lower level in overweight patients. 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 programmed for sports injury, especially ACL injury, have recently shown encouraging results. Norwegian studies showed that the prevention of ACL injuries was possible with the use of neuromuscular training programmed. Prevention of joint injuries would give an additional 14–25% reduction in the prevalence of osteoarthritis. Ten to thirty-eight percent OA occurs 60 years of age who are sports persons among them 19-29% soccer players, 14-20% runner and 31% weight lifter (Takeda et al, 2007).

CHAPTER:III METHODOLOGY

3.1 Study design

Correlational study design was used to identify the relationship between age and active range of knee flexion for the patients with osteoarthritis attended at CRP.

3.2 Study area

Data was collected from the outdoor and indoor Musculoskeletal Physiotherapy unit of Centre for the Rehabilitation of the Paralyzed (CRP). Besides this in CRP patient come from all sectors of Bangladesh from all economical condition so it reflexes the entire population.

3.3 Study population

The study populations were patient with OA of knee joint who attended in CRP for treatment.

3.4 Sample size

The equation of sample size calculation are given below-

$$n = \left\{\frac{Z(1-\frac{\alpha}{2})}{d}\right\}^2 \times pq$$

Here,

$Z(1-\frac{\alpha}{2})$= 1.96

P= 0.25 (Here P=Prevalence and P=25%)

q= 1-p

=1-0.25

=0.75

d= 0.05

According to this equation the sample should be more than 288 people but due to lack of opportunity the study was conducted with 57 patients attending at physiotherapy department selected randomly.

3.5 Subject inclusion criteria

- Both male and female were included.
- Medically diagnosed knee OA patient.

3.6 Subject exclusion criteria

- Traumatic injury around the soft tissues of knee.
- Other orthopedic condition like Ankylosing spondylitis, Septic arthritis etc.
- Patients who were medically unstable.
- Patients who are not diagnosed OA by physician.

3.7 Sampling technique

There are fifty-seven participants with knee OA were selected through simple random sampling technique from outdoor and outpatient musculoskeletal Physiotherapy unit of CRP. Participants were selected from CRP because they were easily accessible for the researcher. Researcher took data from the patients (medically diagnosed as knee OA) randomly who came at CRP to take Physiotherapy treatment or continuing their treatment. Bowling stated that, in simple random sampling the members of the population were numbered and a number of them were selected using random numbers by replacing them. Therefore each sample unit can only appear once in the sample (Bowling 1997). So the researcher chose simple random sampling for this study to get the appropriate sample and to maintain the standard of the study.

3.8 Data collection procedure and tools

All patients who diagnosed as OA at knee joint by the Physician and came at CRP for first time or continuing their Physiotherapy treatment was asked to participate in the study. The tools that needed for the study ware- Consent paper, questionnaire, goniometer, paper, pen, file, calculator, computer, and printer. There was a developed semi structured questionnaire according to pilot study findings. The pilot study found that maximum participants were female and their age range in between 40-60 years, most of participants occupation were housewife, onset of osteoarthritis was present in between 5-10 years and among them ROM of the affected knee was decreased near about 10 degree. After reviewing literature for asking to the participants. In the questionnaire participant's demographic information including age, sex, level of education, occupational history including types of job, health history including other injury and osteoarthritis related information was asked. Then patients ROM of knee were recorded in supine lying and also in side lying by full circle goniometer which is checked before applying on participants. Participants knee ROM is recorded in both actively and passively.

3.9 Data Analysis

Data was analyzed Microsoft office Excel 2007 using a SPSS 16 version software program. Data were represented by descriptive and inferential statistics.

3.10 Informed consent

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 (MS) unit of CRP. Information from this study

was anonymously coded to ensure confidentiality and was not personally identified in any publication containing the result of this study.

3.11 Ethical Consideration

A research proposal was submitted to local ethical review committee of Bangladesh Health Profession's Institute (BHPI) for being approval. At first the researcher was apply for official permission for the study from the head of the Physiotherapy Department of CRP. Then the head of the Physiotherapy Department of CRP permitted to collect data at musculoskeletal department of CRP, Savar. The ethical consideration was making sure by an informed consent letter to the participant. Consent was obtained by providing each participant a clear description of the study purpose, the procedure involves in the study and also informing them that if they wish they can withdraw themselves any time from the study.

Participant were explained about his/her role in the study and it was explained that there is no direct benefit from the study but in future, cases like these may be benefited from it. Participants are also advised that they are free to decline answering any questions during interview. The necessary information had been kept secure place to also ensure confidentiality. They were also assured that it would not cause any harm. Then they signed the consent form.

3.12 Limitation of the study

Though the expected sample size was >288 for this study but due to resource constrain researcher could manage just 57 sample which is very small to generalize the result for the wider population of knee OA. 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. The researcher was able to collect data only from CRP for a short period of time which will affect the result of the study to generalize for wider population. The questionnaire was developed only through searching sufficient literature but considering the context of the demography of the population a pilot study would substantial before developing questionnaire.

CHAPTER:IV RESULTS

In this study linear regression analysis procedure was used to identify the relationship between age and active range of knee flexion for the patients with osteoarthritis attended at CRP. Total number of participants was fifty-seven.

The equation is Y = a + bX. Here 'a' constant is called intercept and 'b' is coefficient of X.

4.1 Relationship between age and active ROM of knee flexion

Table-1

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.723	0.523	0.514	10.286

Table-2

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6379.518	1	6379.518	60.301	0.000
	Residual	5818.728	55	105.795		
	Total	12198.246	56			

Table-3

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	162.531	7.089		22.927	0.00
	Age of the participant	-1.040	0.134	-0.723	-7.765	0.00

- From the table-1 we see that R Square = 0.523, so about 52% of variation in objective measurement of ROM has been explained by age per year.
- Adjusted R Square = 0.514, loss of predicted power by using this model is 0.9% (0.523-0.514). That means it could be 0.9% less variance of population rather than sample.
- Constant = 162.531
- Slope = -1.040 (negative).

Therefore the regression line takes the following form.

Y = a + bX or, Y = 162.531 + {(-1.040)X} or, Y = 162.531 -1.040X

The coefficient of X is about -1.040 and it is negative. So the increase of one year of age of an OA patient there is 1.040 degree decrease in ROM. The p-value of age is 0.00 in table-3, which is significant therefore one can say that age has an effect on range of motion. More over B = -1.040, we say that with one year increase in age, the active range of motion of knee flexion decreases by 1.040 degree.

Curve Fit

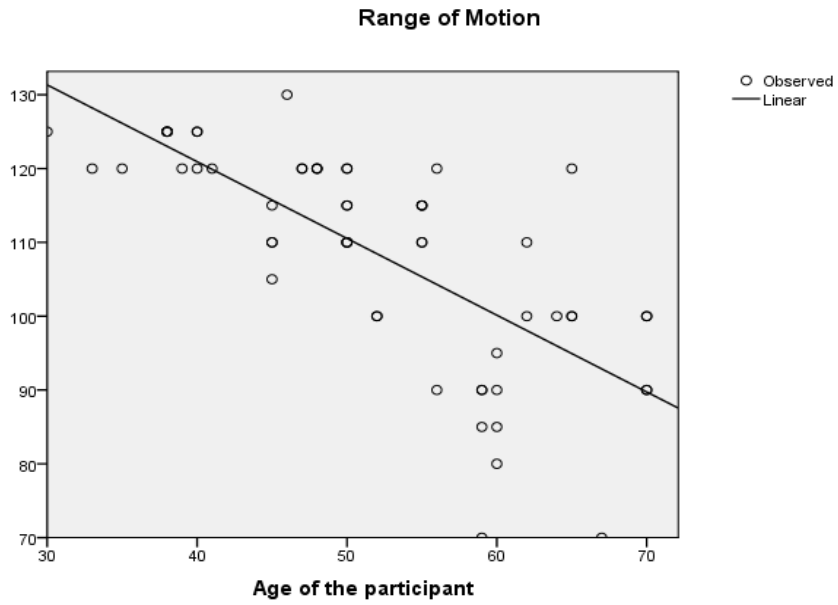


Figure-1: Curve fit of age and ROM of the participants.

This curve shows that (Figure-1) the slope is directed downwards, that means with the increases of age the active range of motion of OA knee flexion is decreases. And from the above discussion we found it with one year increase of age the active range of motion of OA knee flexion is decreaseby1.040 degree.

4.2 Association between gender of the participant and ROM

From the table no. 4 we see that the total number of participant is 57, among them the number of female is 46 in which 37 female participants have mild loss of ROM of active knee flexion and number of male is 11 in which 9 male participants have mild loss of ROM of active knee flexion. The chi square result is 1.6 and the p-value is 0.449, which means not significant because the significant p-value is <0.05. That means gender is not affect to active ROM of OA knee flexion. So there is no association between gender and active ROM of OA knee flexion.

Table-4

Gender of the participant	ROM Category			Total	x^2	P
	Severe Loss	Moderate Loss	Mild Loss			
Male	1	1	9	11	1.6	0.449
Female	1	8	37	46		
Total	2	9	46	57		

4.3 Association between occupation of the participant and ROM

From the table no. 5 we see that the total number of participant is 57, among them 46 number of participants is housewife in which 37 participants have mild loss of ROM of active knee flexion,6 participants is businessman among them 4 participants have mild loss 1 have moderate loss and 1 have severe loss of active range of motion of knee flexion, 4 participants is factory/garments worker all of them have mild loss of ROM of active knee flexion and number of unemployed participant is 1 who have mild loss of ROM of active knee flexion. The chi square result is 4.614 and the p-value is 0.594, which means not significant because the significant p-value is <0.05. That means occupation is not affect to active ROM of OA knee flexion. So there is no association between occupation and active ROM of OA knee flexion.

Table-5

Occupation of the participant	ROM Category			Total	x^2	P
	Severe Loss	Moderate Loss	Mild Loss			
Factory/garments worker	0	0	4	4	4.614	0.594
Businessman	1	1	4	6		
Unemployed	0	0	1	1		
Housewife	1	8	37	46		
Total	2	9	46	57		

4.4 Association between duration of OA of the participant and ROM

In the table no. 6we see that the total number of participant is 57, among them 23 number of participants duration of osteoarthritis is 5-10 years and in which 21 participants have mild loss 1 have moderate loss 1 have severe loss of ROM of active knee flexion, 20 participants onset of osteoarthritis duration is <5 years and in which 18 participants have mild loss 1 have moderate loss 1 have severe loss of ROM of active knee flexion, 14 participants onset of osteoarthritis duration is >10 years and in which 7 participants have mild loss 7 have moderate loss of ROM of active knee flexion. The chi square result is 16.593 and the p-value is 0.002, which means significant because the significant p-value is <0.05. That means duration of osteoarthritis is affect to active ROM of knee flexion. So there is association between duration of osteoarthritis and active ROM of OA knee flexion.

Table-6

Duration of osteoarthritis of the participant	ROM Category			Total	x^2	P
	Severe Loss	Moderate Loss	Mild Loss			
<5 years	1	1	18	20	16.593	0.002
5-10 years	1	1	21	23		
>10 years	0	7	7	14		
Total	2	9	46	57		

4.5 Association between severity of pain of the participant and ROM

From the table no. 6we see that the total number of participant is 57, among them 36 number of participants severity of pain is moderate and in which 32 participants have mild loss 4 have moderate loss of ROM of active knee flexion, 12 participants severity of pain is severe and in which 5 participants have mild loss 5 have moderate loss 2 have severe loss of ROM of active knee flexion, 9 participants severity of pain is mild and in which 9 participants have mild loss ROM of active knee flexion. The chi square result is 17.489 and the p-value is 0.002, which means significant because the significant p-value is <0.05. That means severity of pain is affect to active ROM of OA knee flexion. So there is association between severity of pain and active ROM of OA knee flexion.

Table-7

Severity of pain of the participant	ROM Category			Total	x^2	P
	Severe Loss	Moderate Loss	Mild Loss			
Mild	0	0	9	9	17.489	0.002
Moderate	0	4	32	36		
Severe	2	5	5	12		
Total	2	9	46	57		

4.6 Age of the participants

From this bar chart below (Figure-2) we see that 25% participants are in between (30-41) years, 20% participants are in between (45-48) years, 27.5% participants are in between (50-56) years and also in between (59-70) years.

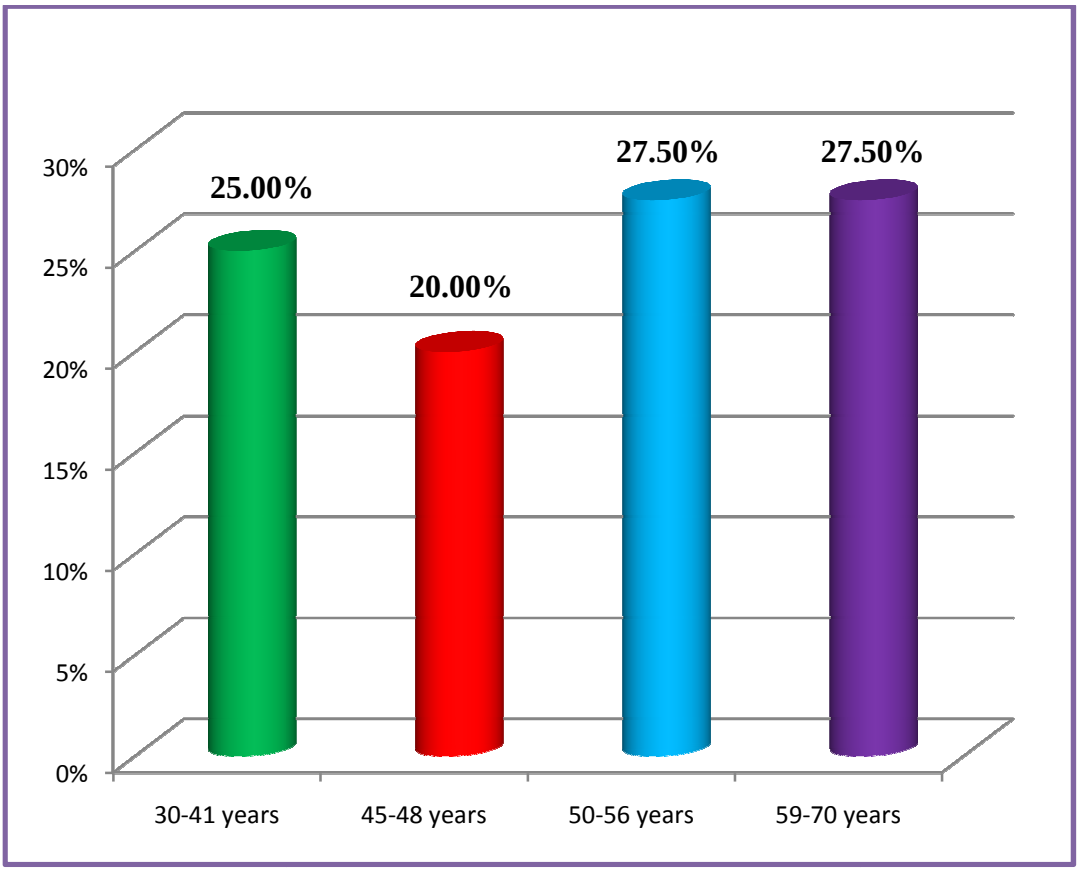


Figure-2: Age range of the participants.

4.7 Gender of the participants

The pie chart shows that most of the participants of this study are female and it is 80.70% and rests of 19.30% participants are male (Figure-3).

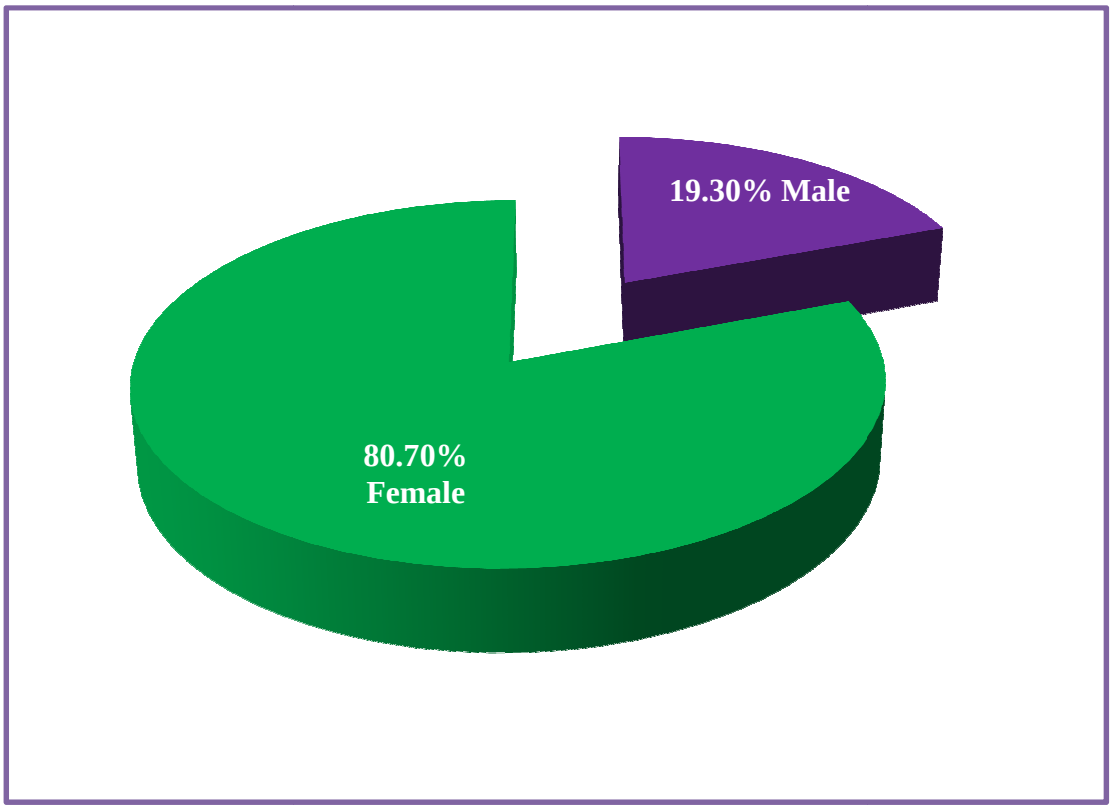


Figure-3: Gender of the participants.

4.8 Occupation of the participants

In this study 7.0% participants are factory/garments worker, 10.5% participants are businessman, 1.8% participants are unemployed and 80.7% participants are housewife (Figure-4).

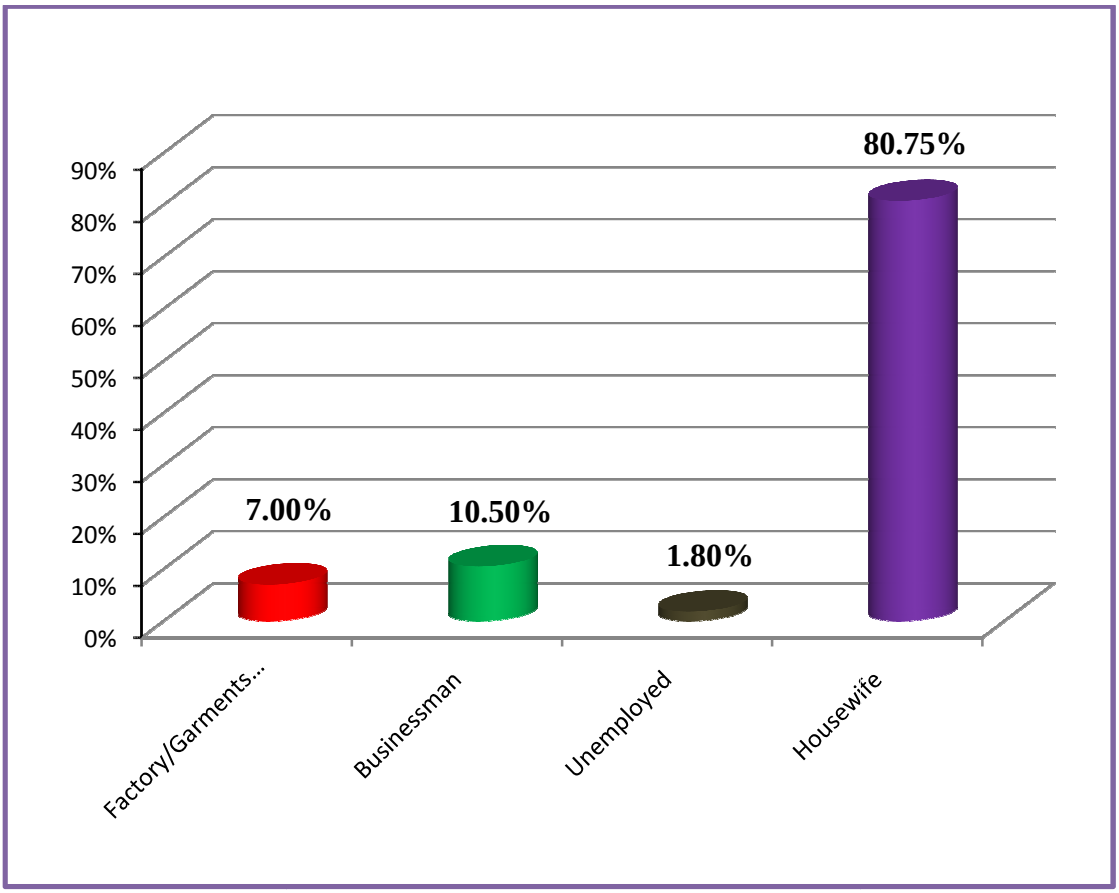


Figure-4: Occupation of the participants.

4.9 Onset of osteoarthritis of the participants

The bar chart shows that (Figure-5) in this study about 35.09% participant's onset of osteoarthritis duration is less than 5 years, approximately 40.35% participant's onset of osteoarthritis duration is 5-10 years and about 24.56% participant's onset of osteoarthritis duration is more than 10 years.

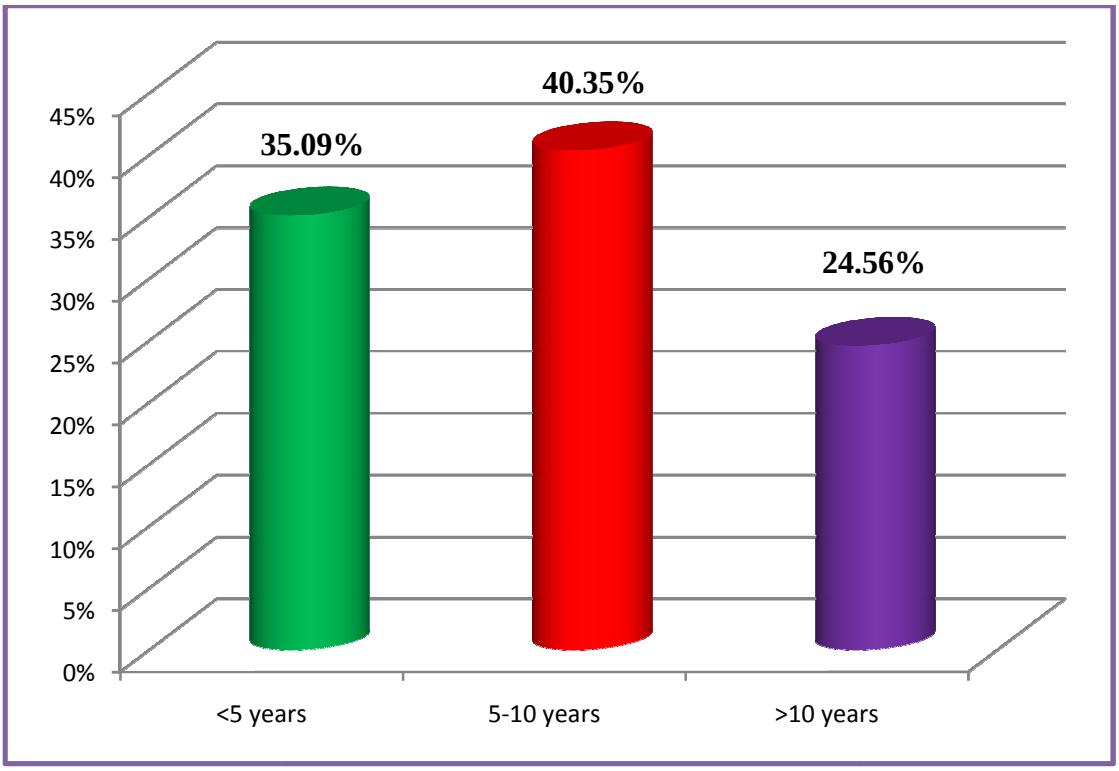


Figure-5: Onset of osteoarthritis of the participants.

4.10 Severity of pain of the participant

In this study the pie chart shows that (Figure-6) about 15.79% of total participants are have mild pain in their knee, approximately 63.16% of total participants are have moderate pain in their knee and about 21.05% of total participants are have severe pain in their knee.

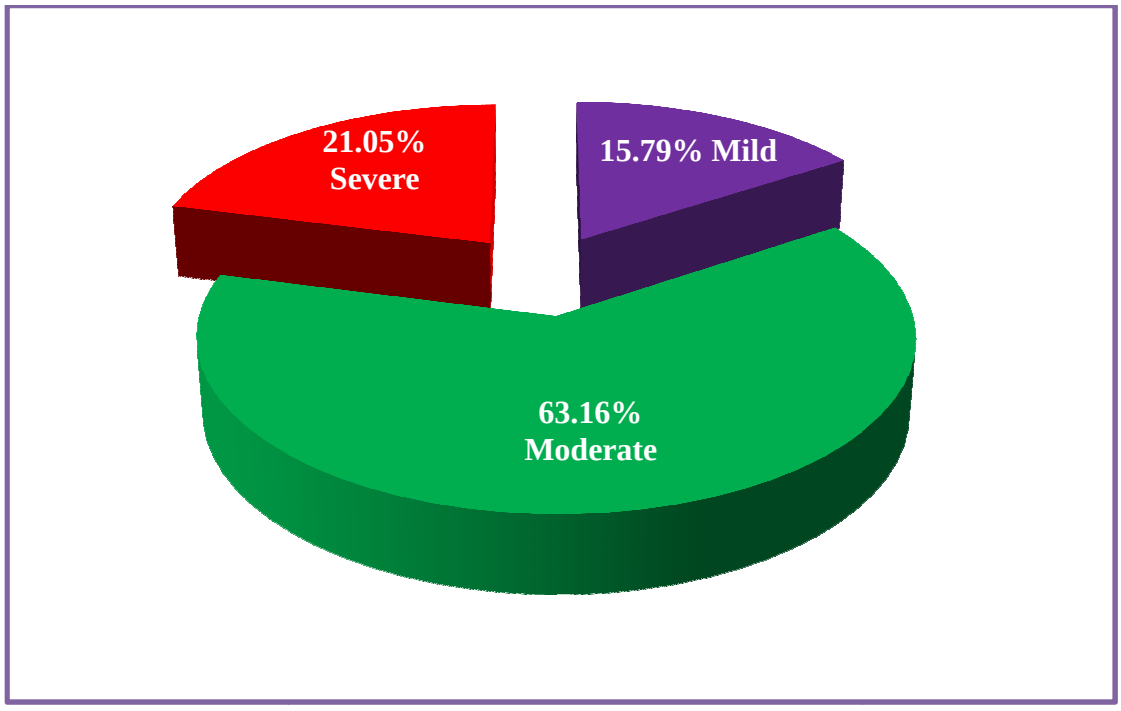


Figure-6: Severity of pain of the participants.

4.11 Involvement of knee joint of the participants

The bar chart shows that (Figure-7) in this study approximately 28.1% participant's osteoarthritis involve only right knee, about 12.3% participant's osteoarthritis involve only left knee and about 59.6% participant's osteoarthritis involve both knee.

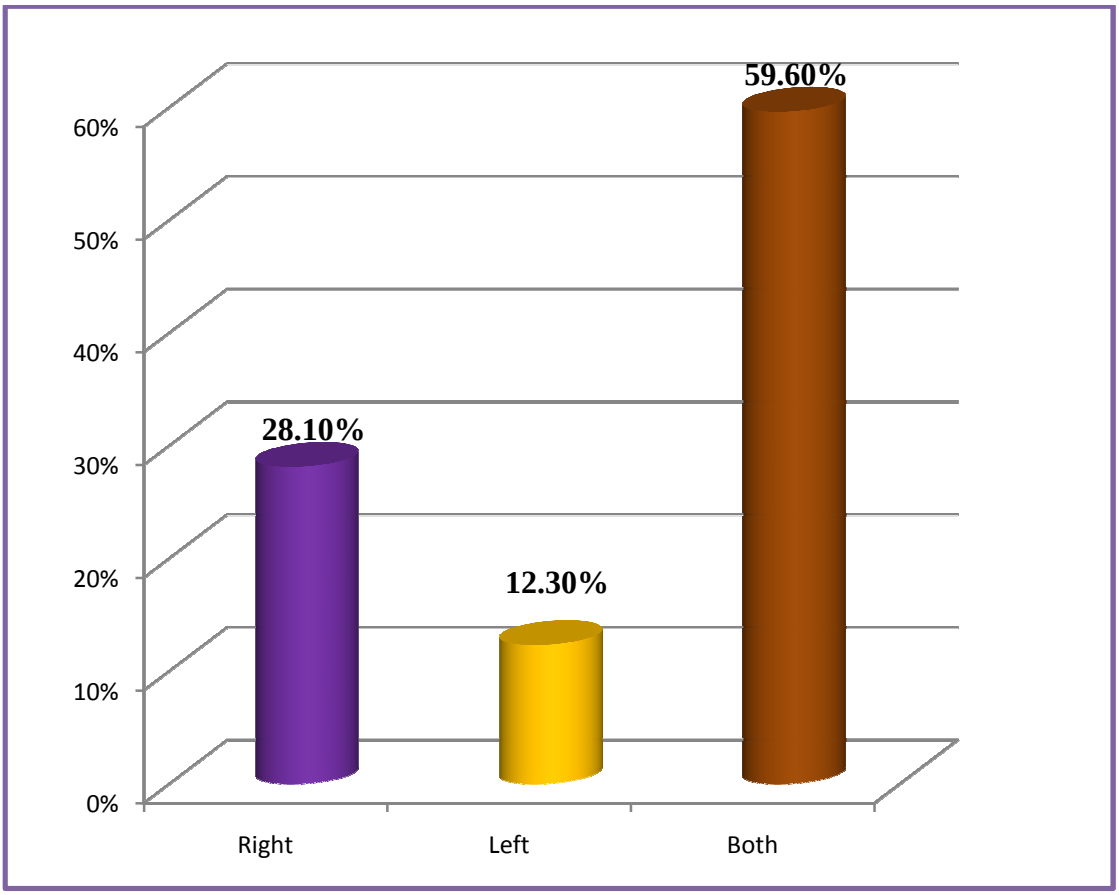


Figure-7: Involvement of knee joint of the participants.

CHAPTER:V DISCUSSION

Fifty-seven patients of OA knee were studied. Out of them, 46(80.70%) were female and 11(19.30%) were male. The male female ratio was 1:4.2. In a study in Chittagong, Bangladesh among 162 participants 96 (59.30 %) were males and 66 (40.70 %) were females. The male: female ratio was 1: 0.68 (Shakoor et al. 2009). In this study the most of the participants (27.5%) were age group 50-70 years. In United States a study about epidemiology of OA by Zhang and Jordan shows that the age standardized prevalence of radiographic knee OA in adults 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, approximately 37.00% of participants age >60 years or older had radiographic knee OA (Zhang and Jordan 2008).

In this study about 52% of variation in objective measurement of ROM has been explained by age per year because R Square is found in this study is 0.523.The p-value of age is 0.000 which is significant; therefore we can say that age has an effect on range of motion. Researcher does not found any research to see the relationship between age and range of motion anywhere. More over coefficient is found -1.040; we say that with one year increase in age, the active range of motion of knee flexion decreases by 1.040 degree. In this study 80.7% patients were house wife that means house wife are mostly affected by knee OA, this may be due to long time activity in knee bending position according to our culture and 7.0% participants are factory/garments worker, 10.5% participants are businessman, 1.8% participants are unemployed. A study about Clinical profile of patients with osteoarthritis of the knee A study of 162 cases in Chittagong, Bangladesh by MA Shakoor, MA Taslim, MS Ahmed and SA Hasan the doctors of BSMMU and Chittagong medical college found a majority of the patients were housewives (35.8%) followed by retired servicemen (19.1%) and those on government service (17.3%). Others were labourers (6.2%), salesmen (0.6%), businessmen (6.8%), field workers (1.2%), cultivators (4.9%), drivers (1.2%), teachers (3.1%), barbers (0.6%), defence servicemen (1.2%), imams (1.2%) and garment workers (0.6%) (Shakoor et al.2009).

In this study 28.1% patients were affected by right knee OA, 12.3 % patients were affected by left knee OA and 59.6% patients were affected by both knees OA. A study in Chittagong, Bangladesh shows that most of the study subjects were suffering from both sided knee OA (48.1%), 44 (27.2 %) patients were suffering from right sided knee OA and 40 (24.70 %) patients were suffering from left sided knee OA (Shakoor et al., 2009). The severity of pain among the participants was 15.79% patient's pain was mild, 63.16% patient's pain was moderate and 21.05% patient's pain was severe in VAS scale. A study about Incidence of musculoskeletal pain and rheumatic disorders in a Bangladeshi rural community by Syed Atiqul Haque, John Darmawan and Md. Nazrul Islam shows that among 440 participants 32 (7.3%) were suffering from mild pain, 232 (52.6%) were suffering from moderate pain and 176 (40.1%) were suffering from severe pain (Haque et al. 2008).

In this study the total number of participant is 57, among them 36 number of participants severity of pain is moderate and in which 32 participants have mild loss 4 have moderate loss of ROM of active knee flexion, 12 participants severity of pain is severe and in which 5 participants have mild loss 5 have moderate loss 2 have severe loss of ROM of active knee flexion, 9 participants severity of pain is mild and in which 9 participants have mild loss ROM of active knee flexion. The chi square result is 17.489 and the p-value is 0.002, which means significant because the significant p-value is <0.05. That means severity of pain is affect to active ROM of knee flexion. So there is association between severity of pain and active ROM of knee flexion. Also from 57 participant 23 number of participants onset of osteoarthritis duration is 5-10 years and in which 21 participants have mild loss 1 have moderate loss 1 have severe loss of ROM of active knee flexion, 20 participants onset of osteoarthritis duration is <5 years and in which 18 participants have mild loss 1 have moderate loss 1 have severe loss of ROM of active knee flexion, 14 participants onset of osteoarthritis duration is >10 years and in which 7 participants have mild loss 7 have moderate loss of ROM of active knee flexion. The chi square result is 16.593 and the p-value is 0.002, which means significant because the significant p-value is <0.05. That means onset of osteoarthritis is affect to active ROM of knee flexion. So there is association between onset of osteoarthritis and active ROM of knee flexion.

CHAPTER:VI CONCLUSION

From the study it can be concluded that with one year increase in age, the active range of motion of knee flexion decreases by 1.040 degree. For common understanding we multiply -1.040 by 5, which come out to be -5.2. This means that with 5 years increase in age active range of motion of knee flexion decreases by 5.2 degree. Female are more affected than male with OA household and bending activities are aggravating factors to develop knee OA and housewife are more affected group among all occupation. But there is no association between occupation and active ROM of OA knee flexion. The duration of OA and the severity of pain is affect to the active ROM of OA knee flexion. As there is 1.040 degree ROM is decreases per year of an OA patient's active knee flexion, so clinicians should address importance on ROM consciously of OA patients. Awareness should be raised in functional activity. Some physical exercise should be done regularly for maintain knee joint range of motion. As women are more affected because of their life style and our culture so should give more emphasis on them to raised awareness.

The results of the study demonstrate the relationship between age and active range of motion of knee patient with OA attended at CRP. But further research would need to be carried out considering proof of hypothesis in term of relationship between age and active ROM of OA hip or ankle or shoulder or elbow, age and knee ROM without having any pathology of knee or the same study can be done by cohort study etc. can further be included in such type of research.

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APPENDIX

সম্মতিপত্র / অনুমতিপত্র

চিকিৎসা কেন্দ্রঃ- পক্ষাঘাতগ্রস্থদের পুনর্বাসন কেন্দ্র (সি.আর.পি.)।

এই অধ্যায়ন হাঁটুতে বাতের কারণে এর জয়েন্ট রেঞ্জ এবং বয়সের সাথে এর সম্পর্ক সম্পর্কিত গবেষনা। গবেষক এ.এন.এম. মাসুদ রানা, বি.এইচ.পি.আই. এর ৪র্থ বর্ষ বি.এস.সি. ইন ফিজিওথেরাপি কোর্সের একজন ছাত্র এবং এই গবেষনা তার অধ্যায়নের অংশ। (নিম্নোক্ত তথ্যাদি পাঠ করার পর অধ্যায়নে অংশগ্রহনকারিগন অংশগ্রহন করার জন্য আমন্ত্রিত।)

এই অধ্যায়নের লক্ষ্য হল হাঁটুতে বাতের কারণে এর জয়েন্ট রেঞ্জ এবং বয়সের সাথে এর কোন সম্পর্ক আছে কিনা তা খুঁজে বের করা যা পরবর্তি সময়ে হাঁটুতে বাতের চিকিৎসার জন্য সহায়ক হবে। এই গবেষনা / অধ্যায়নের জন্য আপনাকে কিছু প্রশ্ন করা হবে. আপনি এর উত্তর করবেন এবং এতে প্রায় ২০ থেকে ৩০ মিনিট সময় লাগবে। এই গবেষনায় অংশগ্রহনের কারনে আপনার চিকিৎসার কোন রকমের অসুবিধা হবেনা এবং আপনার ব্যক্তিগত সমস্থ তথ্য গোপন রাখা হবে/ গবেষক গোপনিয়তা রক্ষা করবেন।

প্রশ্ন-উত্তর পর্বেও যেকোন মুহূর্তে আপনি সম্মতি প্রত্যাহার এবং কোন প্রশ্নের উত্তর প্রদানের অপারগতা প্রকাশের ব্যাপাওে আপনার সম্পূর্ন অধিকার রয়েছে। এই গবেষনায় প্রাপ্ত তথ্য সম্পূর্নভাবে গোপনীয় থাকবে এবং অংশগ্রহনকারিকে ব্যক্তিগতভাবে গবেষনার ফল প্রকাশের সময় চিহ্নিত করা হবে না।

আমি কি আপনার অনুমতি সাপেক্ষে শুরু করতে পারি?

হাঁ ☐ না ☐

গবেষকের সাক্ষর---------- তারিখঃ----------

রোগীর সাক্ষর---------- তারিখঃ----------

VERBAL CONSENT STATEMENT

(Please read out to the participant)

Assalamualaikum/Namasker, my name is A.N.M.Mashud Rana, I am conducting this study for a Bachelor project study titled “Relationship between age and active range of knee flexion for the patients with osteoarthritis attended at CRP.” from Bangladesh Health Professions Institute (BHPI), University of Dhaka. I would like to know about some personal and other related questions about Osteoarthritis. This will take approximately 20 - 30 minutes.

I would like to inform you that this is a purely academic study and will not be used for any other purpose. The researcher is not directly related with this area (Musculoskeletal), so your participation in the research will have no impact on your present or future treatment in this area (Musculoskeletal). All information provided by you will be treated as confidential and in the event of any report or publication it will be ensured that the source of information remains anonymous. Your participation in this study is voluntary and you may withdraw yourself at any time during this study without any negative consequences. You also have the right not to answer a particular question that you don’t like or do not want to answer during interview.

So may I have your consent to proceed with the interview?

YES ☐ NO ☐

Signature of the Interviewer_____Date_____

Signature of the researcher_____ Date_____

“Relationship between age and active range of motion of knee flexion patient with OA attended at CRP”

Identification number:	Date of Interview:
Start time:	End time:
Name of the Patient:	
Name of the Interviewer:	
Consent Taken : Yes No	
Name and signature of witness	

Questionnaire sheet

Title:-Relationship between age and active range of motion of knee flexion patient with OA attended at CRP.

Code no - Name -

Date -

Section 1: Sociodemographic Questions

QN	Questions and filters	Responses	Code
1	May I know your age please?	yrs	
2	Address and conduct number:		
3	What is your religion?	□ Islam □ Hindu □ Others	01 02 03
4	Your residential area?	□ Urban □ Rural	01 02
5	What is your education?	□ Never attended school □ Some primary education □ Completed primary education □ Some secondary education □ Completed secondary education □ Higher secondary □ Bachelor or above □ Other (Specify):----------	01 02 03 04 05 06 07 08
6	What is your profession (occupation)?	□ Factory/garments worker □ Businessman □ Day laborer □ Unemployed □ Housewife □ Teacher □ Other (Specify): _____	01 02 03 04 05 06 07

Section 2: Osteoarthritis related question:

QN	Questions and filters	Responses	Code
1	What is your dominant leg?	□ Right □ Left	01 02
2	Do you have any congenital deformity at knee?	□ Varus □ Valgus □ Normal □ Others	01 02 03 04
3	Onset of your Osteoarthritis?	□ <5 yrs □ 5-10 yrs □ >10 yrs	01 02 03
4	Number of involvement of knee joint?	□ Right □ Left □ Both	01 02 03
5	Severity of joint pain(knee joint)	□ Mild □ Moderate □ Severe	01 02 03
6	Have you feel pain in stair climbing?	□ Yes □ No	01 02
7	Active range of motion of right knee flexion		
8	Active range of motion ofleft knee flexion		
9	Active range of motion of right knee extension		
10	Active range of motion of left knee extension		
11	Have you feel pain at rest?	□ Yes □ No	01 02
12	Muscle power of right quards		
13	Muscle power of left quards		
14	Muscle power of left hamstring		
15	Muscle power of right hamstring		
16	History of surgery at knee?	□ Yes □ No	01 02
17	Do you use any assistive device for Knee?	□ Yes □ No	01 02

Permission Letter

June 26, 2012

To

The Head of the Physiotherapy department,

Center for the Rehabilitation of the Paralyzed,

Savar, Dhaka-1343

Subject: Prayer for seeking permission to collect data to conduct a research study.

Sir,

With due respect & humble submission to state that I am a student of 4th professional, B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (B.H.P.I). According to course curriculum, we have to conduct a research for the partial fulfillment of our degree. I have chosen a research title "Relationship between age and active range of knee flexion for the patients with osteoarthritis attended at CRP". For this reason, I need to permission for collect data from the musculoskeletal department of CRP, Savar.

Therefore, I pray & hope that you would be kind enough to grant my application & give me the permission for collect data from the musculoskeletal department of CRP, Savar.

Yours faithfully

A. N. M. Mashud Rana

A. N. M. Mashud Rana
4th year B.Sc in Physiotherapy
Session: 2006-2007.
BHPI, CRP, Savar, Dhaka-1343.

Accepted

Md. Sohrab Hossain
BPT, DU, D'Orthopaedics Cyriax (Belgium), MPH
Mechanical Diagnosis & Therapy A,B (UK)
Assistant Professor Physiotherapy, BHPI
Head of the Physiotherapy Department, CRP