Survey on Prevalence Risk Factors and Treatment Pattern of Osteoarthritis

A research paper is submitted to the Department of Pharmacy, East West University, in conformity with the requirements for the degree of bachelor of Pharmacy.

Submitted by

Salma Haque Sima

ID: 2013-1-70-048

Department of Pharmacy

East West University

Declaration by the Research Candidate

I, **Salma Haque Sima**, ID: 2013-1-70-048, hereby declare that the dissertation entitled- **"Survey on Prevalence, Risk Factors and Treatment Pattern of Osteoarthritis"** submitted by me to the Department of Pharmacy, East West University in partial fulfillment of the requirement for the award of the degree of Bachelor of Pharmacy is a record of research work under the supervision and guideline of **Marjana Khalil**, Lecturer, Department of Pharmacy, East West University, Dhaka.

.....

Salma Haque Sima
ID: 2013-70-048
Department of Pharmacy,
East West University

Certificate by the Supervisor

This is to certify that the thesis entitled- **"Survey on Prevalence, Risk Factors and Treatment Pattern of Osteoarthritis"** submitted to the Department of Pharmacy, East West University for the partial fulfillment of the requirement for the award of the degree of Bachelor of Pharmacy is a bona fide record of original and genuine research work carried out by **Salma Haque Sima**, ID: 2013-1-70-048 in 2016 of her research in the Department of Pharmacy, East West University, under the supervision and guideline of me.

.....

Marjana Khalil
Lecturer
Department of Pharmacy,
East West University

Certificate by the Chairperson

This is to certify that the thesis entitled- **"Survey on Prevalence, Risk Factors and Treatment Pattern of Osteoarthritis"** submitted to the Department of Pharmacy, East West University for the partial fulfillment of the requirement for the award of the degree of Bachelor of Pharmacy is a bona fide record of original and genuine research work carried out by **Salma Haque Sima**, ID: 2013-1-70-048 in 2016.

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Dr. Shamsun Nahar Khan
Associate Professor and Chairperson
Department of Pharmacy,
East West University

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Dedication

This Research paper is dedicated to

My beloved Parents,

Who are my Biggest Inspiration

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List of Abbreviations

OA	Osteoarthritis
USA	United States of America
UK	United Kingdom
MMP	Matrix Metalloproteases
TIMP	Tissue Inhibitor of Matrix Metalloproteases
UPA	Urokinase Plasminogen Activation
TNF	Tumor Necrosis Factor
LIF	Leukemic Inhibitor Factor
IL	Interleukin
NO	Nitrous Oxide
GP	General Practitioner
MRI	Magnetic Resonance Imaging
NSAID	Non-steroidal Inflammatory Drugs
OTC	Over-the-counter
PPI	Proton Pump Inhibitor
NICE	National Institute of Health and Clinical Excellence
NHS	National Health Service
TENS	Transcutaneous Electrical Nerve Stimulation
HANES	Health and Nutrition Examination Survey
NHANES	National Health and Nutrition Examination Survey

Abstract

Purpose: The purpose of the study was to explore the risk factor, prevalence and treatment pattern for osteoarthritis. **Objectives:** To explore the risk factor, prevalence and treatment pattern for patient with osteoarthritis, to explore the socio-demographic information of the patient, to compare the number of affected gender, to know their pain mode, difficulty mode, to know the percentage treatment pattern, to know the outcome of the treatment. **Methodology:** The study design was a non-experimental retrospective survey. Total number of sample was 200 osteoarthritis patient's documents. **Results:** Result shows that 30-64 years age group were most affected and female were mostly affected by osteoarthritis. Among them the rate of housewives was 39%. They are more vulnerable. Effectiveness of treatment and complementary and alternative therapy was good. Percentage of improvement or satisfied with the treatment was approximately 49%. In total achievement, approximately 17% aims of treatment are not satisfied due to some causes and 34% have no improvement since many of them are new patient. **Conclusion:** Osteoarthritis is a common physiotherapy related problem. Because it is not a curable disease but regular physical exercise, treatment can reduce the symptoms.

Key word: Outcomes of physiotherapy, Osteoarthritis, Treatment.

Chapter One: Introduction

1.1 Osteoarthritis:

Osteoarthritis, also known as degenerative arthritis degenerative joint disease, OA, or osteoarthrosis, is a form of arthritis caused by inflammation, breakdown, and the eventual loss of cartilage in the joints - the cartilage wears down over time.

Osteoarthritis is the most common type of arthritis. According to the National Health Service, UK, approximately 8.5 million people are affected by the condition. The Arthritis Foundation, USA, says that about 27 million Americans are affected.

Osteoarthritis is a progressive disease; signs and symptoms gradually worsen over time. There is no cure. However, available therapies may help with pain and swelling (inflammation), as well as keeping the patient mobile and active. Experts say that patients who take steps to actively manage their osteoarthritis are more likely to gain control over their symptoms.

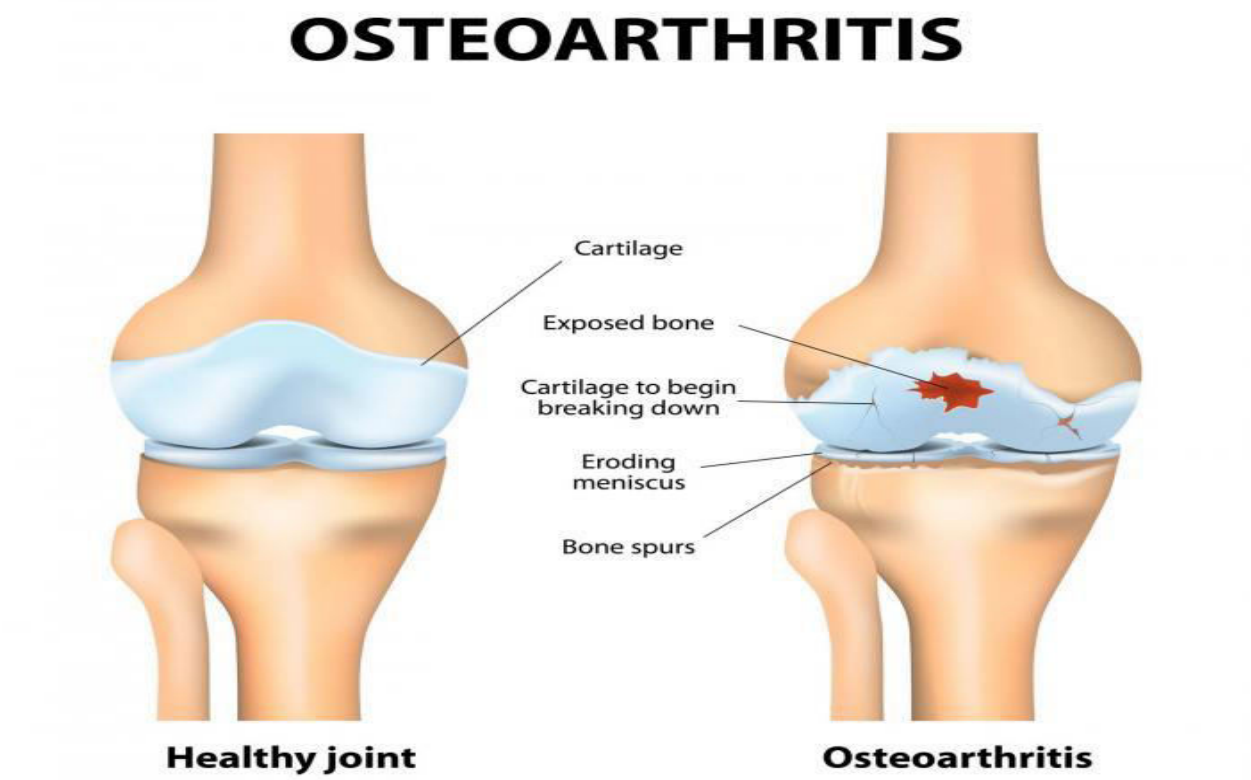


Figure 1.1: Osteoarthritis

Any joint in the body may be affected. However, osteoarthritis is most likely to affects the patient's:

- Hands
- Hips
- Knees
- Lower back
- Neck. (Christian Nordqvist, 2016)

1.2 Characteristics:

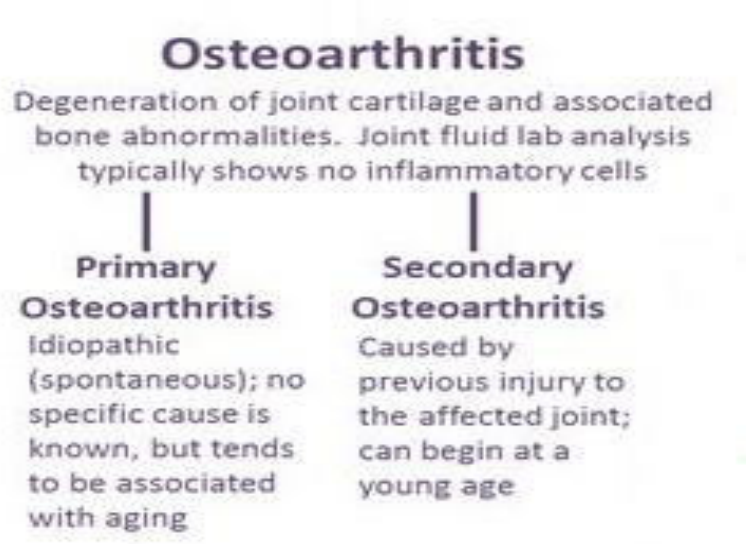
Osteoarthritis has three characteristics:

- Bony growths develop around the edge of joints.
- It damages cartilage - Cartilage is the part of the joint that cushions the ends of the bones and allows easy movement of joints.
- Synovitis - there is mild inflammation of the tissues around the joints.

Osteoarthritis is more common among females than males, especially after the age of 50 years. Most commonly, it develops in people aged over 40. Younger people may also be affected; usually after an injury or as a result of another joint condition.

Some people say that osteoarthritis is an inevitable part of ageing. This is untrue. There are people well into their nineties who have no clinical or functional signs of the disease. (Christian Nordqvist, 2016)

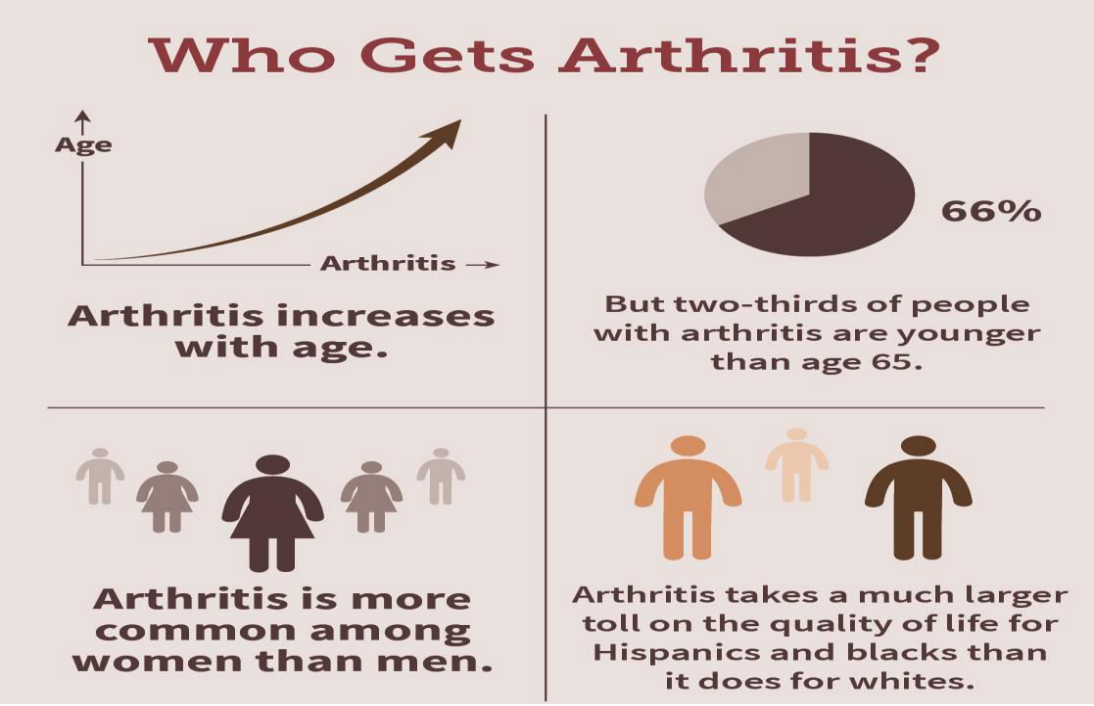
1.3Types of Osteoarthritis:



1.4 Who's Affected?

Although OA occurs in people of all ages, osteoarthritis is most common in people older than 65. Common risk factors include increasing age, obesity, previous joint injury, overuse of the joint, weak thigh muscles, and genes.

- One in two adults will develop symptoms of knee OA during their lives.
- One in four adults will development symptoms of hip OA by age 85.
- One in 12 people 60 years or older have hand OA.



1.5 Pathophysiology OF Osteoarthritis:

A normal cartilage is avascular, alymphatic and aneural and is smooth and resilient in turn allowing shearing and compressive forces to be dissipated uniformly along a joint. The cartilage matrix is made up of water and gel (ground substance), which normally provides a "give", proteoglycans, and collagen.

Metallo proteases: A great deal of attention has been focused on identifying the protease responsible for the initial occurrence of matrix digestion. Current knowledge indicates an involvement of matrix metalloproteases (MMP). Of this family, members from three groups in human articular tissues have been identified as being elevated in OA that is the collagenases, the

stromelysins and the gelatinases. Another group of MMP, localized at the cell membrane surface, has recently been discovered, and named membrane type MMP (MT-MMP), however the relevance of these enzymes to OA has yet to be determined. MMP biologic activity is controlled physiologically by specific tissue inhibitors of metallo-proteases (TIMP) or by their activation. Enzymes from the serine- and cysteine- dependent protease families, such as the plasminogen activation/plasmin system and cathepsin B respectively, has been proposed as activators, and enhanced levels of urokinase (uPA) and plasmin have been identified in human OA cartilage. Other enzymes that have been found to act as MMP activators, for example stromelysin-1, activates collagenase-1, collagenase-3, and gelatinase 92kD;collagenase-3 activates gelatinase-92kD,MT-MMP activates collagenase-3 and gelatinase-72kD potentiates the later activation; MTMMP also activates gelatinase 72kd.

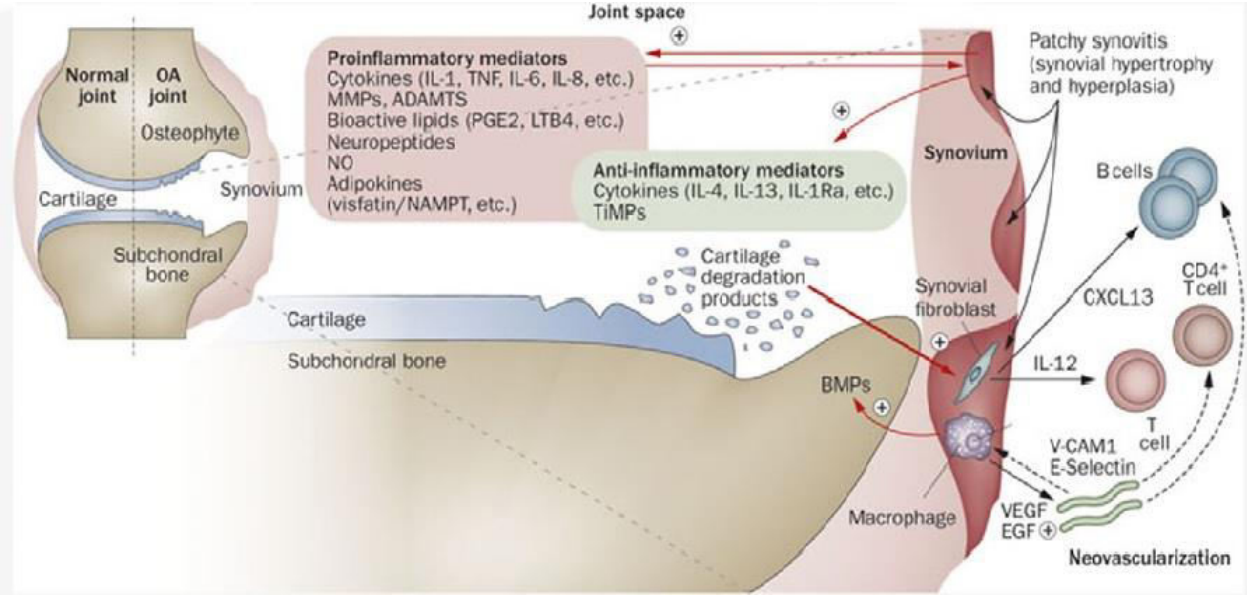


Figure 1.2: Pathophysiology of Osteoarthritis

Inflammatory cytokines: Current evidence suggests that proinflammatory cytokines are responsible for the catabolic process occurring in the pathological tissues. They appear to be first produced by the synovial membrane, and diffused into the cartilage through the synovial fluid, where they activate the chondrocytes to produce proinflammatory cytokines. In OA synovial membrane, it is the synovial lining cells that play a major role as inflammatory effectors of

which interleukin (IL)-1β, tumor necrosis factor (TNF)-α, IL-6, leukemic inhibitor factor (LIF) and IL-17 appear most relevant to the disease. Data strongly suggests the concept that IL-1β and perhaps TNF-α are the major catabolic systems involved in the destruction of joint tissues, and may constitute the in situ source of articular tissue damage and degradation. However it is not clear whether IL-1β and TNF-α act independently or in concert to induce the pathogenesis of OA, or if a functional hierarchy exists between these proinflammatory cytokines.

Nitrous Oxide: Inorganic free radical NO has also been suggested a factor that promotes cartilage catabolism in OA. A number of studies are going to understand the molecular mechanisms underlying NO signaling and their effects on the cartilage.

1.6 Symptoms of osteoarthritis

A symptom is something the patient feels and reports, while a sign is something other people, such as the doctor detect. For example, pain may be a symptom while a rash may be a sign.

1.6.1 Osteoarthritis has as its main symptoms:

- Pain
- Problems moving affected joints.
- Stiffness - more severe on waking up in the morning, and improves within 30 minutes when the individual starts moving about.

In some cases people with osteoarthritis may have no symptoms. Symptoms are usually only felt in either one joint, or a just a few at any one time. In many cases the symptoms come on slowly.

1.6.2 Other signs and symptoms may include:

- Affected joints are larger than usual
- After not moving the joint for a while pain and stiffness may worsen
- Joints are warm
- Loss of muscle bulk
- Tenderness in the affected joint
- The affected joints will have a limited range of movements
- The patient may experience a grating or crackling sound/sensation in the affected joint.

The knees, hips or hands are most commonly affected.

1.6.3 Osteoarthritis in the knees

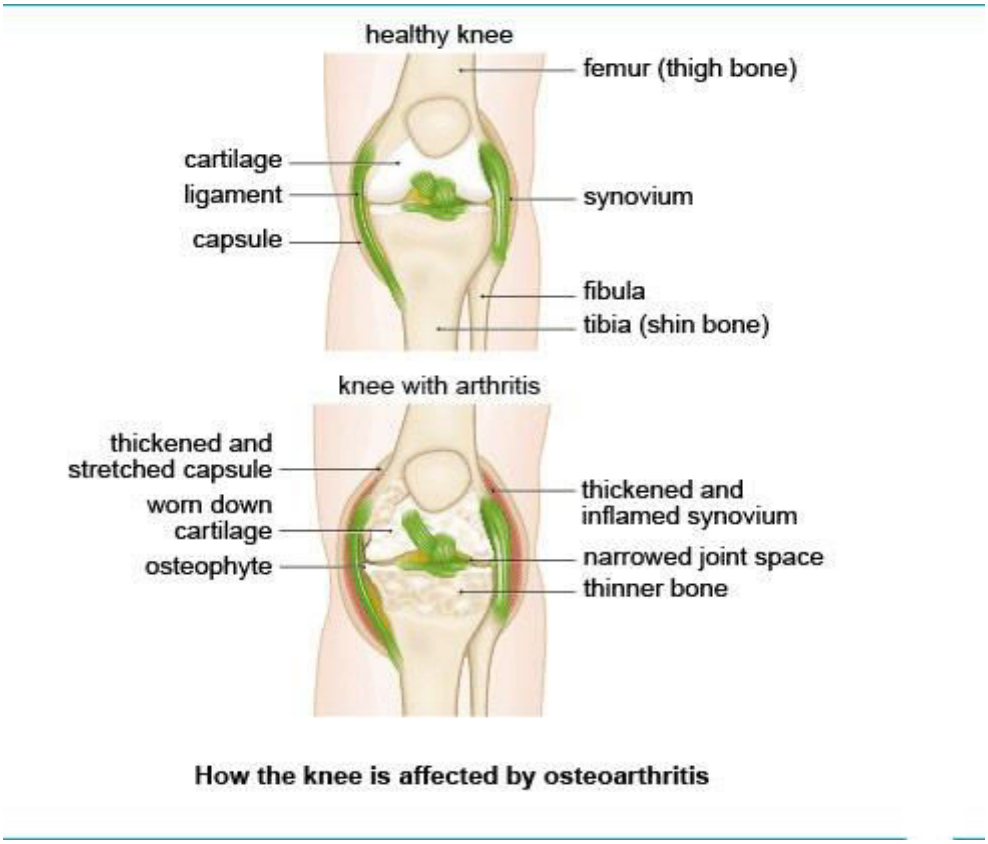


Figure 1.3: Pain and stiffness in the knee could be a symptom of osteoarthritis

In most cases both knees are affected, unless the osteoarthritis was caused by an injury (or another condition). The patient will experience pain when walking, especially uphill or upstairs. Knees may lock into position, making it much harder to straighten the leg. The knee may make a soft, grating sound when used.

1.6.4 Osteoarthritis in the hips

Anything that requires movement of the hip joint causes problems, such as getting in/out of a car, or putting on one's shoes and socks.

Although pain in the hip is common, some patients with osteoarthritis in the hips experience pain in their knee (and not their hip). Less commonly, pain may be felt in the thighs, ankles and buttocks.

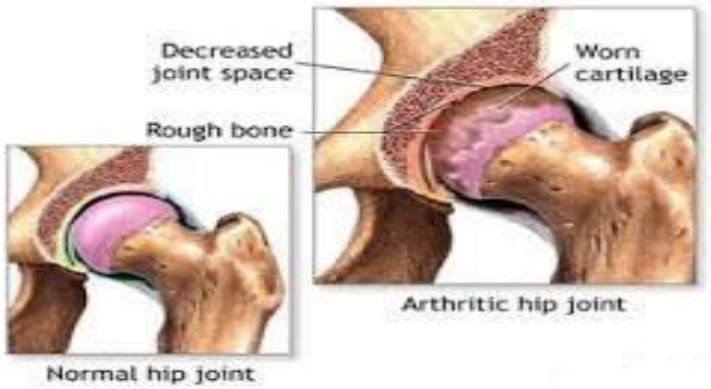


Figure 1.4: Osteoarthritis in Hip

Typically, pain is felt whilst walking. But some people are in pain even when resting.

1.6.5 Osteoarthritis in the hands

Three areas may be affected:

- The base of the thumb
- The top joint of the fingers (closest to the nail)
- The middle joint of the fingers.

Fingers may be stiff, swollen and painful. Sometimes bumps may develop on the finger joints. In some cases, finger pain decreases and eventually goes away, while the swelling and bumps remain.

At the affected joints the fingers may bend slightly sideways. Fluid-filled lumps (cysts) may develop on the backs of the fingers; they are often painful.

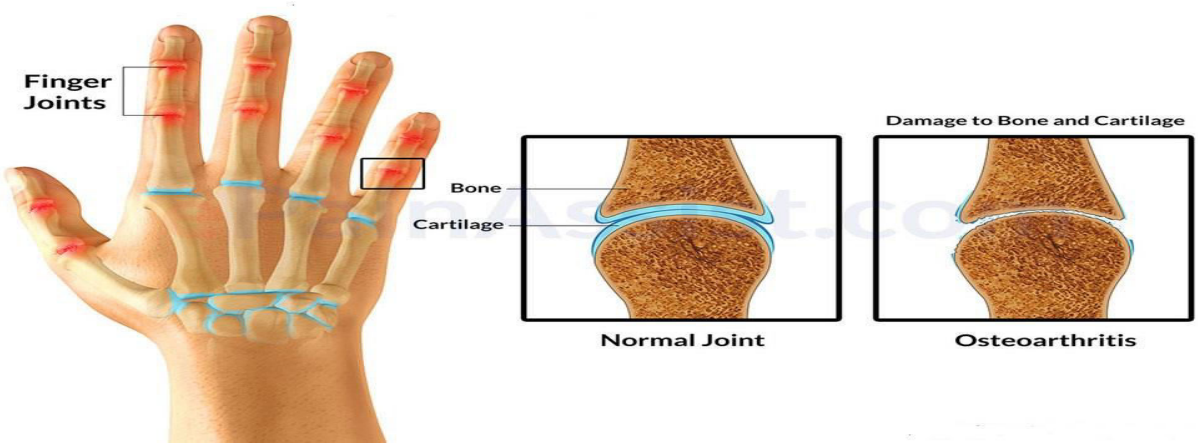


Figure 1.5: Osteoarthritis in Hand

A bump may develop where the base of the thumb joins the wrist. This may make writing, turning keys and opening jar-tops difficult and painful.

1.7 When to see a doctor

People who have joint stiffness and swelling that persist for more than a couple of weeks, they should see their doctor. Those already on osteoarthritis medications should contact a health care professional if they experience nausea, constipation, drowsiness, abdominal discomfort, or have black/tarry stools. (Christian Nordqvist, 2016)

1.8 Risk factors for osteoarthritis

A risk factor is something which increases the likelihood of developing a condition or disease. For example, obesity significantly raises the risk of developing diabetes type 2. Therefore, obesity is a risk factor for diabetes type 2.

- **Age** - Individuals under the age of 40 rarely develop osteoarthritis. It typically occurs in older adults. OA is directly connected to wear and tear on joints. It becomes more common as people get older. According to the Centers for Disease Control and Prevention, more than one-third of adults over the age of 65 have symptoms of OA.
- **Gender** - OA can affect both men and women. According to the National Institutes of Health, it's slightly more common in men until age 45. After that, it's more common in women. This may reflect the different joint stressors experienced by men and women at different ages. Females are more likely to develop osteoarthritis than males.
- **Deformities of the bone(s)** - patients born with defective joints or cartilage have a significantly higher risk of eventually developing osteoarthritis.
- **Injuries** - especially those resulting from an accident or some sports may raise the risk of developing osteoarthritis.
- **Obesity** - Obese people whose weight-bearing joints are under a greater strain have a higher risk of developing the condition, compared to people of normal weight. Being overweight or obese puts increased stress and strain on the body. This increases the risk of OA in the joints. Obese and overweight people are particularly susceptible to OA in the:
    - Knees
    - Hips

- spine

Figure 1.6: Spine osteoarthritis

However, obesity is also associated with OA in non-weight-bearing joints, such as those in the hands. This suggests that extra mechanical stress on the joints or weight alone may not increase OA risk.

- **Some jobs -** Especially those that involve repetitive movements that target stress on a particular joint may have a higher risk of developing osteoarthritis. Repetitive actions can put undue stress on joints. Occupations that include such repetitive actions can increase OA risk. Job tasks associated with an increased risk of OA include:
  - kneeling or squatting for more than an hour a day
  - lifting
  - climbing stairs
  - walking
  - people are subjected to mechanical vibration and repeated shocks (e.g. users of pneumatic drills, drivers of construction machinery, etc.)
  - perform repetitive movements such as data entry operators, pianists, seamstresses, etc.
  - Cases of knee osteoarthritis also frequently occur in people working in a kneeling position (e.g. tile layers).
- People with **other diseases and conditions** may have a higher risk of developing the condition. Examples include:
  - **Gout-** Abnormalities of certain metabolisms can lead to the deposit of microscopic crystals in the joints. This is the case of gout (made up of uric acid crystals) and chondrocalcinosis (calcium phosphate crystals).It is the repetition of inflammatory flare-ups triggered by these deposits that promotes the development of osteoarthritis in the joint in question.

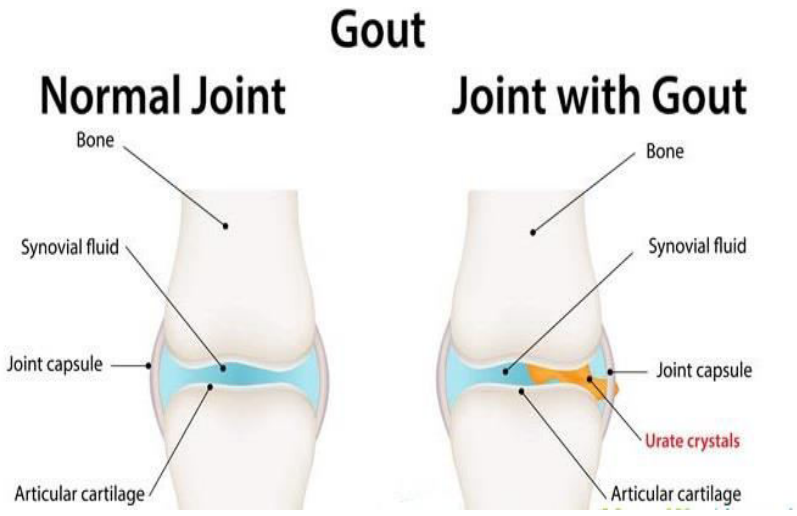


Figure 1.7: During gout

- Rheumatoid arthritis
- Paget's disease of the bone
- Septic arthritis

- **Genetics** – Osteoarthritis (OA) sometimes runs in families. If your parents or siblings have OA, you're more likely to as well. Doctors don't know why OA runs in families. No gene has yet been identified as the cause of OA. Yet, many genes may contribute to OA risk. It is estimated that approximately 40% to 60% of cases of hand, hip and knee osteoarthritis may have a genetic link. The genes have not yet been identified. In other words, osteoarthritis, or a predisposition to developing the condition may be inherited.
- **Poor Posture** –Sitting or standing improperly can strain your joints. This can increase OA risk.
- **Joint Trauma**-People who regularly participate in joint-intensive sports may also have an increased OA risk.
  - Joint fractures and severe sprains, especially those affecting the cruciate ligament of the knee, are often the cause of osteoarthritis whose symptoms first appear ten years later.
  - Excessive practice of a sport is a cause of early osteoarthritis, mainly because of repeated trauma (e.g. osteoarthritis of the hip in footballers).

- Complete removal of a meniscus of the knee (meniscectomy) is the cause of osteoarthritis occurring from 10 to 20 years later in one out of two cases.

That is why it is necessary to be as sparring as possible when proposing surgery on a meniscus.

- **The menopause**-In women, osteoarthritis is more common after the menopause. It is thought that sex hormones may be involved, but currently no hormonal treatment administered after the menopause has shown a protective effect against osteoarthritis.
- **Other Medical Conditions**

Medical conditions that affect joint health can affect your risk for OA. For example, bleeding disorders can cause bleeding in the joints. Conditions that affect blood flow or inflammation can also affect risk. Some medical conditions associated with OA include:

- Osteonecrosis
- Paget's disease of bone
- Diabetes
- Gout
- Underactive thyroid
- Other much rarer metabolic diseases may also be accompanied by osteoarthritis such as haemochromatosis, 11haracterized by an iron overload in the body or Wilson's disease due to a copper overload. (Healthline, 2005-2016)

1.8.1 Risk factors that can't change:

- Getting older. Age is not a direct cause of arthritis, but as you get older you're more likely to have symptoms. Still, not all older adults will have joint pain.
- A family history of arthritis.
- Loose or odd-shaped joints. Knees that bend outward (bowleg) or knees that bend toward each other (knock knees), for example, can cause an imbalance in the joints, because the cartilage wears down at an uneven rate.
- A previous infection of the joint.
- Other types of arthritis, such as rheumatoid arthritis or psoriatic arthritis.
- Metabolic or endocrine problems. These include a buildup of iron (hemochromatosis), copper (Wilson's disease), or calcium (hyperparathyroidism) in the blood and tissues of the body.

- Decreased nerve function. (WebMD, 2005-2016)

1.9 Causes of osteoarthritis

There are some common causes of osteoarthritis that are given below:

1.9.1 Process of wear and repair

Often inaccurately referred to as the *wear and tear arthritis*, osteoarthritis should more aptly be called the *wear and repair arthritis*, because the condition is a slow repair process that the body utilizes to mend joints that have gradually become damaged.

In most cases, the repair process presents no symptoms. However, if there is a particularly traumatic injury to a joint and the body's ability to carry out proper repairs is undermined, subsequent damage to the affected joint will continue and the patient will experience symptoms.

1.9.2 Damage to cartilage

When there is damage to cartilage – the protective surface that cushions the ends of bones in your joints and allows the joints to move smoothly – osteoarthritis occurs. The smooth surface of the cartilage becomes rough, causing irritation. If the cartilage wears down completely, the bone in the joint may be rubbing against another bone, causing damage and pain.

The joints may become knobbly where the bones start protruding, forming osteophytes (bony lumps). The bones gradually thicken and become broader, making the joints stiffer, less mobile, and painful. If fluid accumulates in the joints they will swell.

Experts are not sure why the repair process breaks down. They believe several contributory factors are involved:

- **Injury** – a joint may have been previously damaged because of an injury or surgical intervention.
- **Overuse** – a joint may have been overused after an injury or operation.
- **Rheumatoid arthritis** – if the joints of a patient with rheumatoid arthritis have been severely damaged, osteoarthritis can occur.

When osteoarthritis has developed because of damage or another condition, it is called *secondary osteoarthritis*. Secondary osteoarthritis signs and symptoms may take several years after the initial joint damage to appear.

1.9.3 Diagnosing osteoarthritis

A GP (general practitioner, primary care physician) will ask the patient about symptoms, as well as carrying out a physical examination. There is no current and definitive test that can diagnose osteoarthritis.

The following may help the doctor suspect osteoarthritis:

- There is joint stiffness first thing in the morning
- The joint stiffness first thing in the morning lasts no more than 30 minutes
- The pain is persistent
- The pain worsens when the affected joint is used
- The patient is over 40 to 45 years of age. (Christian Nordqvist, 2016)
- Description of the symptoms
- Details about when and how the pain or other symptoms began
- Details about other medical problems that exist
- Location of the pain, stiffness or other symptoms
- How the symptoms affect daily activities
- List of current medications

If symptoms differ slightly from those mentioned above the doctor may suspect that the patient has another type of arthritis. Patients with rheumatoid arthritis also have early morning stiffness, but it lasts longer than an hour.

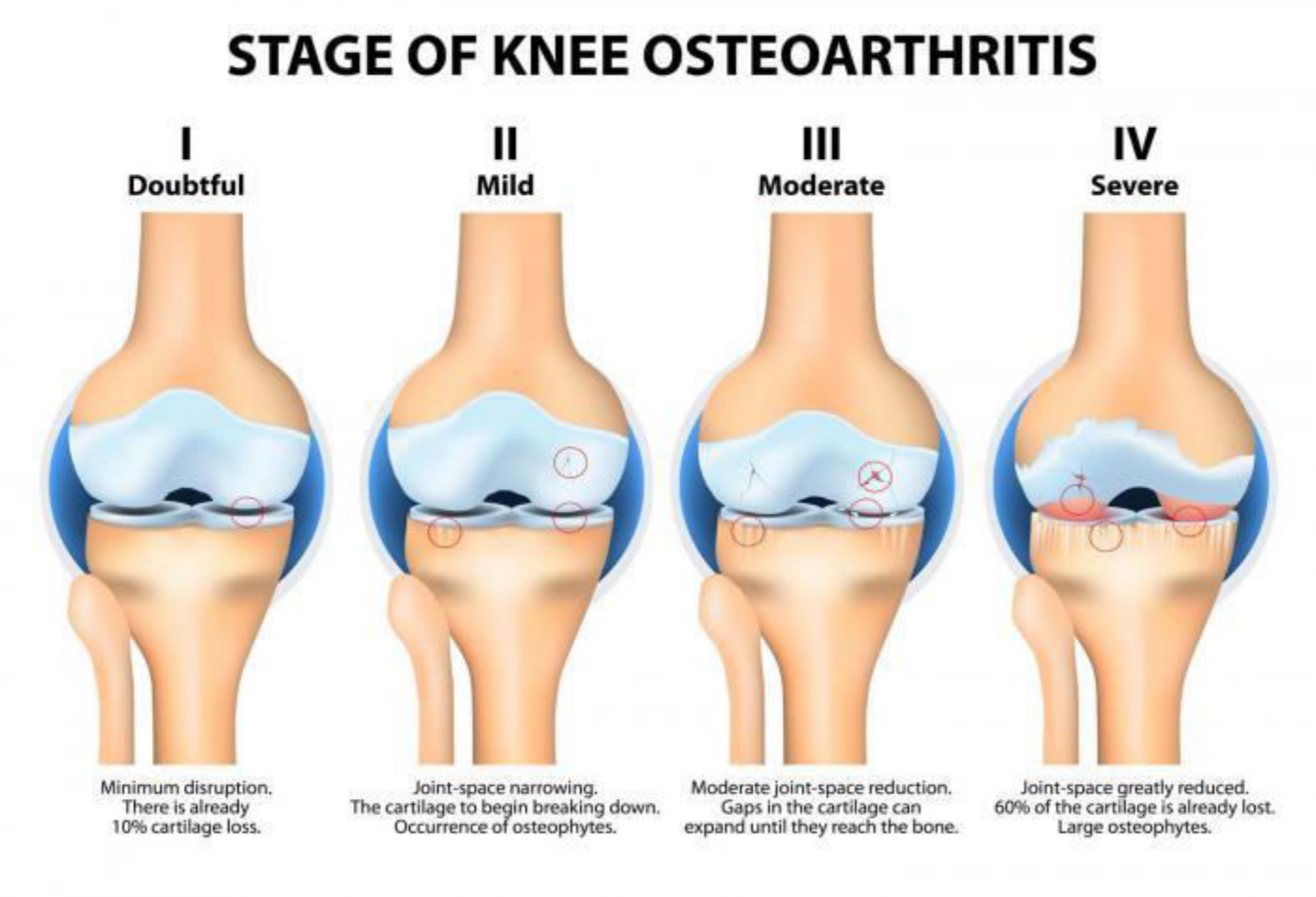


Figure 1.8: Stages of Knee Osteoarthritis

The GP will not usually order imaging or blood tests unless he/she wishes to rule out other conditions, such as another type of arthritis, or perhaps a fractured bone. Tests may include:

1.9.4 Physical Examination

During the exam, the doctor will examine the joints and test their range of motion (how well each joint moves through its full range). He will be looking for areas that are tender, painful or swollen as well as signs of joint damage. The doctor will examine the position and alignment of the neck and spine.

1.9.5 X-rays

Images may show that the cartilage is breaking down, if a narrowing space within a joint is detected. Bone spurs around a joint may also be revealed. It is not uncommon for people with no osteoarthritis symptoms to have X-ray signs of the condition.

1.9.6 MRI scans

A magnetic resonance imaging (MRI) scan uses a magnetic field and radio waves to create detailed images of the inside of the body, including bone and bone cartilage. An MRI scan can help the doctor determine what is causing pain.

1.9.7 Blood tests

Blood tests are usually performed in order to rule out other conditions, especially rheumatoid arthritis.

1.9.8 Joint fluid analysis (arthrocentesis)

A sterile needle is used to withdraw (aspirate) fluid from an inflamed joint and then sent to the lab. If uric acid crystals are present it is more likely the patient has gout. This test can also determine whether there is inflammation or an infection.

1.10 Treatments for osteoarthritis

There is no cure for osteoarthritis. Treatment consists of exercise, manual therapy, lifestyle modification, medication and other interventions to alleviate pain and maintain joint movement.

1.10.1 Medications

- Acetimophen (paracetamol)

Although this medication does not reduce inflammation, it does relieve pain, especially among patients with mild to moderate symptoms. As high doses can cause liver damage, especially if the patient regularly consumes alcohol, it is important to stay within the recommended dosage. As acetaminophen may affect how some other medications work, it is important that the patient informs the doctor if he/she is taking it.

- NSAIDs (non-steroidal anti-inflammatory drugs)

If acetimophen is not effective in controlling pain, the doctor may prescribe a stronger painkiller, which may include ibuprofen, aspirin or diclofenac.

Some topical NSAIDs can be applied directly onto the affected joints (on the skin). Some OTC (over-the-counter, no prescription required) topical NSAIDs are very effective if the osteoarthritis affects the knees or hands. Not only do they ease pain, but also help reduce swelling in the joints.

Patients with asthma or peptic ulcers may not be able to take NSAIDs. Patients should check with their doctor about NSAID suitability.

Children under the age of 16 years should not take aspirin.

If an oral NSAID is prescribed, the doctor may also prescribe a PPI (proton pump inhibitor) to be taken at the same time. NSAIDs can break down the lining of the stomach - the lining of the stomach protects against stomach acid. PPIs reduce the amount of acid by blocking the pumps (tiny ducts) in the stomach that produce it, resulting in a significantly lower risk of damage to the stomach lining. Other NSAID side effects may include tinnitus (ringing in the ears), cardiovascular problems, and liver and/or kidney damage. The risk of side effects are greater if the dose is high, or if the medication is taken long-term.

- Tramadol

This is a prescription centrally acting analgesic which has no anti-inflammatory effect (does not reduce swelling). However, it provides effective pain relief with fewer side effects, compared to NSAIDs. Patients may experience nausea and/or constipation. Tramadol is typically used for short-term acute flare ups. Sometimes the doctor may prescribe tramadol alongside acetaminophen for more powerful pain relief.

- Esomeprazole

This is a PPI that suppressesgastric acid section by inhibiting H+/K+ATPase in the gastric parietal cell. These are given with NSAID to avoid heartburn, peptic ulcer disease. Side effects may sometimes include muscular weakness, bone fracture, depression. So, use of this drug should be according to their need.

- Capsaicin cream

Patients with osteoarthritis in their hands or knees who did not respond well to topical NSAIDs may be prescribed capsaicin cream. The medication blocks the nerves that send pain messages. However, the drug's effects may not be noticeable for a while; pain relief should be noticed

within a couple of weeks, but this medication's full effect may not be appreciated for up to a month.

A tiny amount of capsaicin cream should be applied to the affected joints four times daily (no more than once every four hours). Do not apply it to broken or inflamed skin.

After use it is important to wash one's hands thoroughly. Capsaicin cream is made from chillies. If any of it gets into the patients eyes, mouth, nose or genitals it is likely to cause pain (without damage).

When first applying capsaicin cream onto the skin there may be a burning sensation, this is normal. After some use that sensation goes away. Avoid having a hot bath or shower before or after applying the cream.

- Intra-articular injections (cortisone shots)

In some cases pain symptoms may be so severe that analgesics (painkillers) are not enough. In such cases the medication may be injected directly into the site of the joint. Usually, these will be injections of corticosteroids. Corticosteroids are effective for pain relief and to reduce swelling. The National Institute of Health and Clinical Excellence (NICE), UK, which decides on approved treatments for the National Health Service (NHS), does not recommend intra-articular injections of hyaluronic acid for osteoarthritis.

Each joint should not be treated in this way more than three times a year. Too many intra-articular injections can damage the joint.

1.10.2 Treatment with a physical therapist

- **TENS (transcutaneous electrical nerve stimulation)** - this is the application of electrical current through the skin for pain control. A TENS unit is usually connected to the skin using two or more electrodes. It works by numbing the nerves endings in the spinal cord that control pain.
- **Thermotherapy** - warm and cold temperatures are used to help reduce pain and stiffness in the joints. For example, a hot water bottle is filled with either hot or cold water and applied to the affected area. Some patients find this therapy helps with pain. Alternatively, hot and cold packs may be used - they are either cooled in the freezer or heated up in a microwave oven.

- **Manual therapy** - this treatment is performed by a physical therapist who uses stretching techniques to keep the joints flexible and supple. If the patient is not using the affected joint the muscle may weaken, further worsening osteoarthritis stiffness. (Christian Nordqvist, 2016)

1.10.3 Assistive devices

In some cases osteoarthritis may cause problems with mobility. The patient may find everyday tasks difficult to do. There several devices which may help. Most doctors refer their patient to either an occupational therapist, a physical therapist, or both. Knee supports may be helpful for some people to stabilize the ligaments and tendons and decrease pain. Canes or crutches may be helpful to take pressure off certain joints.

In addition to pain relief, assistive devices improve function and prevent falls. A licensed physical therapist or other health care professional is needed to recommend what devices are best for you. There are also many available devices to help you perform routine daily activities that may be difficult, such as housework or cooking. Ask your doctor about talking to an occupational therapist to give ideas about which devices may help.

1.10.4 Problems with the lower limbs

People whose hips, knees or feet are affected may benefit from wearing special footwear, or shoe-insoles. Some shock-absorbing soles can reduce the pressure on the joints. Special insoles may help distribute bodyweight more evenly. Some patients may find that leg braces help.

Holding a stick or cane on the opposite side of the body to the affected leg may help.

If the patient needs to rest a painful joint a splint may help. A splint is a piece of rigid material that provides joint or bone support.

1.10.5 Hand problems

Special devices, such as tap-turners can make everyday tasks easier. An occupational therapist is trained to help people carry out their everyday tasks more easily at home and in the workplace.

1.10.6 Surgery

This may sometimes help patients with osteoarthritis that affects their hips, knees, joints, and at the base of their thumbs. However, in most cases surgery is not needed, and is only usually recommended if other therapies have been ineffective, or if one of the joints is severely damaged.

The doctor will refer the patient to an orthopedic surgeon before symptoms become too severe, or before the osteoarthritis causes to much permanent damage. Examples of surgery include:

- **Arthroplasty (joint replacement)** - total replacement of the joint. The damaged parts are surgically removed and a prosthesis (artificial joint) made of metal and plastic is inserted. The most commonly replaced joints are the hip and knee joints. However, implants can currently replace the joints in the shoulder, finger, ankle and elbow. Arthroplasty is usually very effective, allowing the patient to use the joint actively and painlessly. Arthroplasty of the hand joints can help their appearance, as well as their function. There is a small risk of infection and bleeding. Sometimes they may come loose or wear down, and may need to be replaced (eventually).
- **Arthrodesis (joint fushion)** - if a joint replacement is not an option, the joint may be surgically fixed to promote a bone fusion; the joint is realigned or stabilized. Also called artificial ankylosis, syndesis. This increases stability and reduces pain. If the joint in the ankle is fused the patient will be able to bear weight on it painlessly - however, it will have no flexibility.
- **Osteotomy** - the surgeon adds or removes a small section of bone either above or below the knee joint to realign the leg so that the patient's weight is no longer focused on the damaged part of the joint. This procedure may be used if the patient is too young for knee replacement surgery (arthroplasty). Although this procedure helps relieve symptoms significantly, there may be a need for knee replacement surgery later on.
- **Arthroscopy** -to clean out the damaged cartilage or repair tissues. It is most commonly performed on the knee and shoulder. Recent evidence has questioned its effectiveness for osteoarthritis. (Christian Nordqvist, 2016)

1.10.7 Alternative Treatments

While recent research has questioned their usefulness, some medical research has shown that the supplements glucosamine and chondroitin may relieve pain in some people with osteoarthritis, especially in the knee. There is no evidence that glucosamine can help rebuild cartilage. SAMe is another supplement with potential benefits for osteoarthritis. In fact, some research has shown it may be as effective an anti-inflammatory drugs. Remember to always let your doctor know about any supplements you're taking, because they can have side effects and interact with medications.

Acupuncture has also been shown to provide significant and immediate pain relief in some people with osteoarthritis.

1.11 Osteoarthritis self-help

There are several things patients can do to help ease the symptoms of osteoarthritis. A doctor or physical therapist should be able to offer useful advice on lifestyle changes. Some patients may only need the changes listed below to keep their symptoms under control:

1.11.1 Exercise

Even though the idea of doing exercise when a patient's joints are stiff and painful may seem odd, exercise is a key part of osteoarthritis treatment. Exercise helps:

- Keep the patient active and mobile
- Build up muscle, resulting in stronger joints
- Relieve mental and emotional stress
- Help achieve body weight control
- Improve posture.

All the above-mentioned benefits of exercise help reduce osteoarthritis symptoms.

Patients who have a good doctor or physical therapist should be able to devise an effective and suitable exercise program, which can be done at home or at the local gym. Many gyms today are geared up to help people with arthritis. The patient needs to follow the program carefully, and make sure he/she does not do the wrong exercises or do the exercises incorrectly, which may cause damage.

An exercise plan will probably focus on improving the patient's:

- **Flexibility** - to help with the range of movement. This will involve gently stretching the joints, making them suppler.
- **Strength** - to improve muscle tone and strength.
- **Fitness** - to improve stamina. This may involve swimming, walking or cycling.

1.11.2 Weight control

The more overweight/obese patients are, the worse their osteoarthritis symptoms will be, simply because there is much more weight bearing down on the joints, especially if the affected joints are in the lower limbs.

Losing weight, and maintaining ideal body weight involves eating properly, doing exercise, and sleeping at least 7.5 hours each day. Patients should consult with a doctor, physical therapist or nutritionist before embarking on any exercise program or special diet. (Christian Nordqvist, 2016)

1.11.3 Self- Management Program

People with osteoarthritis find that self-management programs help them:

- Understand the disease
- Reduce pain while staying active
- Cope with their body, mind, and emotions
- Have more control over the disease
- Live an active, independent life.

1.11.4 "Good-Health Attitude''

People with a good-health attitude:

- Focus on what they can do, not what they can't do
- Focus on their strengths, not their weaknesses
- Break down activities into small tasks that are easy to manage
- Build fitness and healthy eating into their daily routines
- Develop ways to lower and manage stress
- Balance rest with activity
- Develop a support system of family, friends, and health care providers. (NIH, 2014)

1.12 Possible complications of osteoarthritis

- **Mobility** - some patients may find it hard to move around. There is a greater risk of trips and falls, and their subsequent injuries.
- **Disability** - it is not true that osteoarthritis eventually leads to disability. In the majority of cases the condition does cause pain and discomfort, but no permanent disability. In some cases though, it can sometimes eventually leave the patient disabled.
- **Work** - some patients may find that osteoarthritis symptoms interfere with their ability to work properly. This can result in frustration, irritability and depression. Patients who experience psychological problems should tell their GP or occupational therapist. Talking to one's employer often helps too.
- **Septic arthritis** - this is joint inflammation caused by bacteria infecting the joint. Patients who undergo arthroplasty (joint replacement surgery) run a small risk of infection. Septic arthritis is a medical emergency, and the patient needs to be hospitalized. Treatment involves antibiotic medication and drainage of the infected joint fluid from the joint. (Christian Nordqvist, 2016)

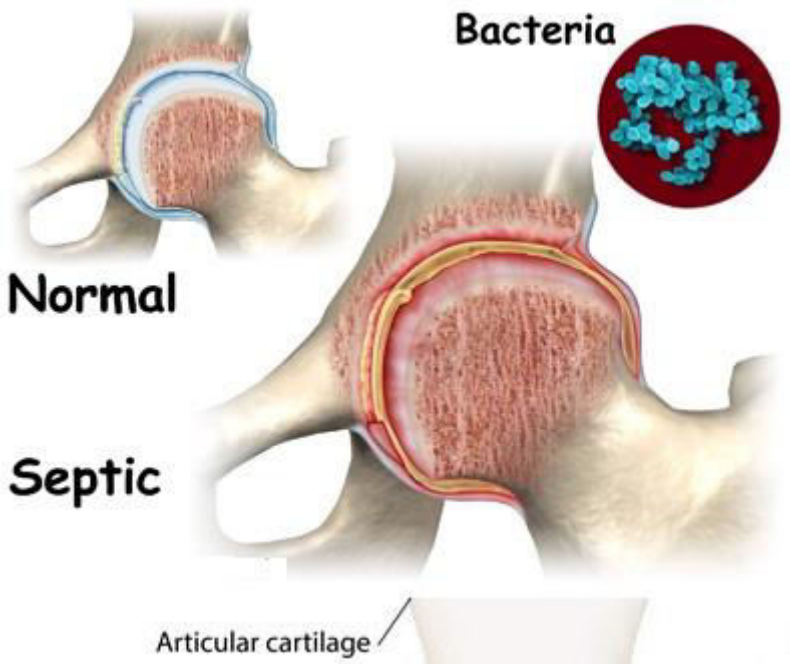


Figure 1.9: Septic Arthritis

Chapter Two: Aim and Objective

2.1 Aim and Objectives:

Osteoarthritis is one of the burden musculoskeletal conditions all over the world. It is the major problem of musculoskeletal condition and causes pain in the limb. Osteoarthritis usually develops after many years of use. It affects middle-aged or older people. Other risk factors for osteoarthritis include obesity, previous injury to the affected joint, and family history of osteoarthritis.

We want to survey this prevalence, risk factor and treatment pattern of osteoarthritis among the population of Dhaka City. This survey was conducted at Center for Rehabilitation for Paralized, Trauma Center, BSM Medical College, Holy Family Red Crescent Hospital and Dhaka Community Medical College and Hospital, under National Health Care Network. Almost 200 patients with Osteoarthritis were interviewed to find out their association with disease.

The main objectives of this study were-

- To evaluate the association of Osteoarthritis.
- To identify the risk factors associated with Osteoarthritis.
- To find out the frequency of doctor visits regarding Osteoarthritis.
- To evaluate the treatment pattern of Osteoarthritis.
- To determine the disease level among the male and female patients of Osteoarthritis.
- To establish some correlations between risk factors and the presence of Osteoarthritis.

Chapter Three: Literature Review

3.1 Epidemiology of osteoarthritis: Zoetermeer survey. Comparison of radiological osteoarthritis in a Dutch population with that in 10 other populations.

The prevalence of mild and severe radiological osteoarthritis was investigated in a random sample of 6585 inhabitants of a Dutch village. Radiographs were graded 0-4 according to the criteria.The prevalence of radiological osteoarthritis increased strongly with age. It was highest for cervical spine (peak: men 84.8%, women 84.3%), lumbar spine (peak: 71.9%, women 67.3%), and distal interphalangeal joints of the hands (peak: men 64.4%, women 76%). It has been seen that prevalence did not exceed 10% in sacroiliac joints, lateral carpometacarpal joints, and tarsometatarsal joints. Severe radiological osteoarthritis (grade 3 or grade 4) was uncommon under age 45; in elderly persons the prevalence did not exceed 20% except for the cervical and lumbar spine, distal interphalangeal joints of the hands and, in women only, metacarpophalangeal joints, first carpometacarpal joints, first metatarsophalangeal joints, and knees. Overall, differences between men and women were small except for hips and knees. But severe radiological osteoarthritis was found in a higher proportion in most of the joints in women. The data were compared with data from similar population surveys. The slope between joint involvement and age was strikingly constant for most of the joints. (JL Van et al, 1989)

3.2 Prevalence of symptomatic hip and knee osteoarthritis: a two-phase population-based survey.

Osteoarthritis (OA) epidemiologic data are rare in Europe. This survey was done to estimate the prevalence of symptomatic knee and hip OA in a multiregional sample in France. A two-phase population-based survey was conducted in six regions in 2007–2009. Subjects 40–75 years old were screened with a validated questionnaire. Subjects who were screened positive were invited for physical examination and hip and/or knee radiography (Kellgren–Lawrence grade≥2). Of 63,232 homes contacted, 27,632 were eligible, 9621 subjects screened positive, 3707 participated fully in the ascertainment phase, and 1010 had symptomatic OA: 317 hip, 756 knee. Hip OA prevalence according to age class ranged from 0.9% to 3.9% for men and 0.7–5.1% for women. Knee OA ranged from 2.1% to 10.1% for men and 1.6–14.9% for women. Both differed by

geographical region. The hip and knee standardized prevalence was 1.9% and 4.7% for men and 2.5% and 6.6% for women, respectively. In France, it increases with age and is greater among women above the age of 50. The geographical disparity of hip and knee OA parallels the distribution of obesity. (F Guillemin et al ,2011)

3.3 Osteoarthritis prevalence and modifiable factors: a population study

The reasons for this study were to investigate the prevalence of self-reported knee and hip osteoarthritis (OA) stratified by age and sex and to examine the association of modifiable factors with knee and hip OA prevalence. The study was conducted using randomly sampled data gathered from four communities in the province of Alberta, Canada. About 4733 of individuals ≥18 years were selected. Health-related information was collected through telephone interviews, community measurement clinics where 1808 people attended. Participants self-reported OA during telephone interviews. Clinic interviews further assessed if the diagnosis was made by a health care professional. Overall prevalence of self-reported OA in the total sample was 14.8 %, where 10.5 % of individuals reported having knee OA and 8.5 % reported having hip OA. Differences in prevalence were found for males and females across age categories for both knee and hip OA. In terms of modifiable factors, being obese (BMI >30 kg/m2) was significantly associated with the prevalence of knee (OR: 4.37; 95 % CI: 2.08,9.20) and hip (OR: 2.52; 95 % CI: 1.17,5.43) OA. Individuals who stand or walk a lot, but do not carry or lift things during their occupational activities were 2.0 times less likely to have hip OA (OR: 0.50; 95 % CI: 0.26,0.96). Individuals who usually lift or carry light loads or have to climb stairs or hills were 2.2 times less likely to have hip OA (OR: 0.45; 95 % CI: 0.21,0.95). The odds of having hip OA were 1.9 times lower in individuals consuming recommended or higher vitamin C intake (OR: 0.52; 95 % CI: 0.29,0.96). Significant differences in prevalence were found for both males and females across age categories. According to the study females have greater knee OA prevalence and a greater proportion of women have mobility limitations as well as hip and knee pain. (Plotnikoff R et al,2015)

3.4 The prevalence of knee osteoarthritis in the elderly. the framingham osteoarthritis study

To investigate the prevalence of osteoarthritis (OA) of the knee in elderly subjects, a study was conducted in the Framingham Heart Study cohort, a population-based group. During the eighteenth biennial examination, it was evaluated that the group members for OA of the knee by use of medical history, physical examination, and anteroposterior (standing) radiograph of the knees. Radiographs were obtained on 1,424 of the 1,805 subjects (79%). Their ages ranged from 63–94 years (mean 73). 0–4 scale was described by Kellgren and Lawrence. OA was defined as grade 2 changes (definite osteophytes) or higher in either knee. Radiographic evidence of OA increased with age, from 27% in younger than age 70, to 44% in subjects age 80 or older. There was a slightly higher prevalence of radiographic changes of OA in women than in men (34% versus 31%). It was shown that the prevalence of knee OA increases with age throughout the elderly years. (Felson D et al, 1987)

3.5 Factors associated with osteoarthritis of the knee in the first National Health and Nutrition Examination Survey (NHNES I) evidence for an association with overweight, race, and physical demands of work

The authors used data from the United States first national Health and Nutrition Examination Survey of 1971–1975 (HANES I) to explore the cross-sectional associations between radiographic osteoarthritis of the knee and a variety of putative risk factors. A total of 5,193 black and white study participants aged 35– 74 years, 315 of whom had x-ray-diagnosed osteoarthritis of the knee, were available for analysis. The authors found significant associations of knee osteoarthritis with overweight, race, and occupation, all of which have been suggested by smaller cross-sectional studies. They then focused specifically on those factors. For overweight, they found a strong association between current obesity and osteoarthritis of the knee. This association was also seen for self-reported minimum adult weight, a proxy for long-term obesity, and was present in persons with asymptomatic osteoarthritis of the knee. These findings strongly suggest that obesity is causative. HANES I was the first study in which racial differences in osteoarthritis of the knee could be assessed within the same country. The black women who were studied had an increased risk of disease (odds ratio (OR) = 2.12, 95% confidence interval (Cl) =

1.39−3.23) after controlling for age and weight, although the black men did not. Finally, the authors used the US Department of Labor Dictionary of Occupational Titles to obtain characterizations of the physical demands and knee-bending stress associated with occupations and to study the relation between physical demands of jobs and osteoarthritis of the knee. They found for persons aged 55–64 years an association between knee-bending demands and osteoarthritis of the knee (men, OR = 2.45, 95% CI = 1.21−4.97; women, OR = 3.49, 95% CI = 1.22−10.52). Since such occupational physical demands are common, the authors conclude that they may be associated with a substantial proportion of osteoarthritis of the knee. (Andersion J and Felson D, 1987)

3.6 Factors Associated with Hip Osteoarthritis: Data from the First National Health and Nutrition Examination Survey (NHANES-1)

Factors associated with hip osteoarthritis were studied in 2,490 subjects aged 55–74 years using data from the First National Health and Nutrition Examination Survey (NHANES-1). Pelvic radiographs were read for hip osteoarthritis using Kellgren-Lawrence scales. Cases were defined by grade ≥2 changes.. Crude and adjusted odds ratios and 95% confidence intervals (Cls) were estimated from logistic regression analyses. Overall, the crude prevalence of hip osteoarthritis was 3.1% (73 of 2,358); 42 cases were unilateral, and 31 cases were bilateral. Age was significantly associated with hip osteoarthritis (adjusted odds ratios = 1.30 (95% CI 0.60–2.81), 1.69 (95% CI 0.83–3.44), and 2.38 (95% CI 1.15–4.92) for ages 60–64, 65–69, and 70–74, respectively). Other sociodemographic factors, obesity, and fat distribution were not associated with hip osteoarthritis. Age and hip trauma were strongly associated with hip osteoarthritis among men; however, among women, no factors were significantly associated with hip osteoarthritis. Hip trauma was significantly associated with unilateral but not bilateral hip osteoarthritis but obesity was associated with bilateral but not unilateral hip osteoarthritis. These data suggest that etiologic factors associated with hip osteoarthritis may differ for males and females and for unilateral and bilateral hip osteoarthritis. (Tepper s and Hochberg M, 1992)

3.7 Osteoarthritis: Epidemiology

Osteoarthritis (OA) is the most common joint disorder in the world. In Western populations it is one of the most frequent causes of pain, loss of function and disability in adults. Radiographic evidence of OA occurs in the majority of people by 65 years of age and in about 80% of those aged over 75 years. In the US it is second only to ischaemic heart disease as a cause of work disability in men over 50 years of age, and accounts for more hospitalizations than rheumatoid arthritis (RA) each year. Despite this public health impact, OA remains an enigmatic condition to the epidemiologist. (Arden N and Nevitt M,2006)

3.8 Osteoarthritis: New Insights. Part 1: The Disease and Its Risk Factors

Osteoarthritis is the most common form of arthritis, affecting millions of people in the United States. It is a complex disease. Evidence is growing to show the role of systemic factors like genetics, dietary intake, estrogen use, and bone density) and local biomechanical factors such as muscle weakness, obesity, and joint laxity. These risk factors are particularly important in weight-bearing joints. Modifying them may present opportunities for prevention of osteoarthritis-related pain and disability. Major advances in management to reduce pain and disability are yielding a panoply of available treatments ranging from nutriceuticals to chondrocyte transplantation, new oral anti-inflammatory medications, and health education. This article is summary of a National Institutes of Health conference. The conference brought together experts on osteoarthritis from diverse backgrounds and provided a multidisciplinary and comprehensive summary of recent advances in the prevention of osteoarthritis onset, progression, and disability. It concludes with a discussion of the impact of osteoarthritis on disability. (Felson D et al,2000)

3.9 Risk of osteoarthritis associated with long-term weight-bearing sports: A radiologic survey of the hips and knees in female ex-athletes and population controls

The objective is to estimate the risk of osteoarthritis (OA) of the hip and knee due to long-term weight-bearing sports activity in ex–elite athletes and the general population. A group study was conducted of 81 female ex–elite athletes (67 middle- and long-distance runners, and 14 tennis players), currently ages 40–65 taken from the age–sex register of the offices of a group general

practice in Chingford, Northeast London, England. Compared with controls of similar age, the ex-athletes had greater rates of radiologic OA at all sites. This association increased further after adjustment for height and weight differences, and was strongest for the presence of osteophytes at the TF joints (odds ratio [OR] 3.57, 95% confidence interval [95% CI] 1.89–6.71), at the PF joints (OR 3.50, 95% CI 1.80–6.81), narrowing at the PF joints (OR 2.97, 95% CI 1.15–7.67), femoral osteophytes (OR 2.52, 95% CI 1.01–6.26), and hip joint narrowing (OR 1.60, 95% CI 0.73–3.48), and was weakest for narrowing at the TF joints (OR 1.17, 95% CI 0.71–1.94). No clear risk factors were seen within the ex-athlete groups, although the tennis players tended to have more osteophytes at the TF joints and hip, but the runners had more PF joint disease. Within the control group, a small subgroup of 22 women who reported long-term vigorous weight-bearing exercise had risks of OA similar to those of the ex-athletes. Ex-athletes had similar rates of symptom reporting but higher pain thresholds than controls, as measured by calibrated dolorimeter. Weight-bearing sports activity in women is associated with a 2–3-fold increased risk of radiologic OA (particularly the presence of osteophytes) of the knees and hips. The risk was similar in ex–elite athletes and in a subgroup from the general population who reported long-term sports activity, suggesting that duration rather than frequency of training is important. (Spector T et al,1996)

3.10 Hip dysplasia: a significant risk factor for the development of hip osteoarthritis. A cross-sectional survey

The aim of this cross-sectional survey of 2232 women and 1336 men (age range 20–91 year) was to investigate individual risk factors for hip joint osteoarthritis (OA). Radiographic findings were correlated to general health and lifestyle information obtained at baseline examinations and questionnaires. The study focused on age; self-reported hip pain, occupational exposure to repeated daily lifting, body mass index, smoking and hip dysplasia.Hip dysplasia (HD) prevalence ranged from 5.4–12.8% depending on the radiographic index applied. Hip OA prevalence was 1.0–2.5% in subjects <60 yr of age and 4.4–5.3% in subjects ≥60 yr of age. Of factors entered into logistic regression analyses, only age ($P<0.001$ for right hips and $P<0.001$ for left hips) and hip dysplasia ($P<0.001$ for right hips and $P = 0.004$ for left hips) were significantly associated with hip OA prevalence in women. In men, only hip dysplasia was associated with hip

OA prevalence, P<0.001 in right hips and P = 0.001 in left hips. Of the individual risk factors investigated in this study, only age and hip dysplasia were associated with the development of hip osteoarthritis. (Jacobsen S and Sonne-Holm S, 2004)

3.11 The epidemiology of knee osteoarthritis: Results from the framingham osteoarthritis study

The Framingham Knee Osteoarthritis study is a population-based study of independently living elderly examining the prevalence of radiographic and symptomatic knee Osteoarthritis. This group was assessed in the early 1980s at which time they had been observed for over 35 years and many risk factors for Osteoarthritis had been ascertained. Results from this study suggest that knee osteoarthritis increases in prevalence throughout the elderly years, more so in women than in men. Also, studies of risk factors have shown that obesity precedes and increases the risk of knee osteoarthritis, especially in women. Other risk factors documented by the Framingham osteoarthritis study to be important as risk factors for disease include knee injury, chondrocalcinosis, and occupational knee bending and physical labor. Radiographie knee Osteoarthritis was negatively associated with smoking. No clearcut relationship of osteoarthritis with estrogen use in women was found. In terms of disability, lower extremity dysfunction is common in patients with knee osteoarthritis, but upper extremity dysfunction is not, and symptoms and severe degrees of radiographic Osteoarthritis are associated with higher risks of dysfunction. (Felson D,1990)

3.12 Risk factors for incident radiographic knee osteoarthritis in the elderly. The framingham study

Knee osteoarthritis (OA) is highly prevalent, especially in the elderly. Preventive strategies require a knowledge of risk factors that precede disease onset. The present study was conducted to determine the longitudinal risk factors for knee OA in an elderly population. A longitudinal study of knee OA involving members of the Framingham Study cohort was performed. Weight-bearing knee radiographs were obtained in 1983–1985 (baseline) and again in 1992–1993. Of 598 patients without knee OA at baseline (mean age 70.5 years, 63.7% women), 93 (15.6%) developed OA. After adjustment for multiple risk factors, women had a higher risk of OA than

did men (adjusted odds ratio [OR] = 1.8, 95% confidence interval [95% CI] 1.1–3.1). Higher baseline body mass index increased the risk of OA (OR = 1.6 per 5-unit increase, 95% CI 1.2–2.2), and weight change was directly correlated with the risk of OA (OR = 1.4 per 10-lb change in weight, 95% CI 1.1–1.8). Physical activity increased the risk of OA (for those in the highest quartile, OR = 3.3, 95% CI 1.4–7.5). Smokers had a lower risk than did nonsmokers (for those who smoked an average of ⩾10 cigarettes/day, OR = 0.4, 95% CI 0.2–0.8). Factors not associated with the risk of OA included chondrocalcinosis and a history of hand OA. Weight-related factors affected the risk of OA only in women.Elderly persons at high risk of developing radiographic knee OA included obese persons, nonsmokers, and those who were physically active. The direction of weight change correlated directly with the risk of developing OA. (Felson D et al,1997)

3.13 Knee pain and osteoarthritis in older adults: a review of community burden and current use of primary health care

Osteoarthritis is the single most common cause of disability in older adults, and most patients with the condition will be managed in the community and primary care. AIM To discuss case definition of knee osteoarthritis for primary care and to summarise the burden of the condition in the community and related use of primary health care in the United Kingdom. A literature search identified studies of incidence and prevalence of knee pain, disability, and radiographic osteoarthritis in the general population, and data related to primary care consultations. Findings from UK studies were summarised with reference to European and international studies.During a one year period 25% of people over 55 years have a persistent episode of knee pain, of whom about one in six in the UK and the Netherlands consult their general practitioner about it in the same time period. The prevalence of painful disabling knee osteoarthritis in people over 55 years is 10%, of whom one quarter are severely disabled.Knee osteoarthritis sufficiently severe to consider joint replacement represents a minority of all knee pain and disability suffered by older people. Healthcare provision in primary care needs to focus on this broader group to impact on community levels of pain and disability. (Peat G et al, 2001)

3.14 Factors associated with osteoarthritis of the knee in the first National Health and Nutrition Examination Survey (HANES I) evidence for an association with overweight, race, and physical demands of work

The authors used data from the United States first national Health and Nutrition Examination Survey of 1971–1975 (HANES I) to explore the cross-sectional associations between radiographic osteoarthritis of the knee and a variety of putative risk factors. A total of 5,193 black and white study participants aged 35– 74 years, 315 of whom had x-ray-diagnosed osteoarthritis of the knee, were available for analysis. After controlling for confounders, the authors found significant associations of knee osteoarthritis with overweight, race, and occupation, all of which have been suggested by smaller cross-sectional studies. They then focused specifically on those factors. For overweight, they found a strong association between current obesity and osteoarthritis of the knee, with a dose-response effect not previously assessed. This association was also seen for self-reported minimum adult weight, a proxy for long-term obesity, and was present in persons with asymptomatic osteoarthritis of the knee. These findings strongly suggest that obesity is causative. HANES I was the first study in which racial differences in osteoarthritis of the knee could be assessed within the same country. The black women who were studied had an increased risk of disease (odds ratio (OR) = 2.12, 95% confidence interval (Cl) = 1.39−3.23) after controlling for age and weight, although the black men did not. Finally, the authors used the US Department of Labor Dictionary of Occupational Titles to obtain characterizations of the physical demands and knee-bending stress associated with occupations and to study the relation between physical demands of jobs and osteoarthritis of the knee. They found for persons aged 55–64 years an association between knee-bending demands and osteoarthritis of the knee (men, OR = 2.45, 95% CI = 1.21−4.97; women, OR = 3.49, 95% CI = 1.22−10.52). Since such occupational physical demands are common, the authors conclude that they may be associated with a substantial proportion of osteoarthritis of the knee. (Anderson J and Felson D, 1987)

Chapter Four: Materials & Method

4.1 Materials and Method:

Present study protocol:

1. Number of study center: 05

2. Number of patients: 200

3. Site of study: 5

Study center 1: NHN Dhamalcoat, Mirpur-14, Dhaka

Study center 2: NHN Shamoli, Mirpur road, Dhaka

Study center 3: NHN Shahbag, Dhaka

Study center 4: NHN 1, Eskaton Road, Dhaka-1217

Study center 5: NHN Boro Moghbazar, Wireless Rail Gate, Dhaka

4. Duration of study: 6 months

Inclusive criteria

In this cross sectional study, medical records of patients of osteoarthritis in those hospital were studied during the time period. Demographic data, clinical method, treatment pattern and related complications were extracted from the patient's medical files or by interviewing. In some patients diagonosis of osteoarthritis disease was recorded in their medical files and they were given medication. About 200 patient's information data was collected for this research work. In this study, Center for Rehabilitation for Paralized, Trauma Center, BSM Medical College and Dhaka Community Medical College and Hospital were preferred because a good number of osteoarthritis patients visit here, many of them are middle-aged people. The research data was collected by interviewing individual patients and the researcher directly communicated with the patients by questioning the patient as per the following questionnaire.

4.2 Questionnaires

Data Collection Form

(1) Identification:

1.1 Name: .....

1.2 Sex: ☐ Male ☐ Female

1.3 Age (Years): ☐ ≤20 ☐ 20 – 44 ☐ 45 – 64 ☐ ≥65

(2) Personal History :

2.1 Area of residence:

☐ Rural ☐ Urban ☐ Sub-urban ☐ Others

2.2 Occupation:

2.3 Impression about social class:

(3) Biophysical characteristics: Weight = _____ Kg Height = _____

BMI: Weight in kg/ (Height in meter)^2 = _____

(4) Patient case:

☐ New ☐ Old

4.1 How long you are diagnosed with arthritis.....

(5) How much pain have you had:

5.1 When walking on a flat surface:

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

5.2 When going up or down stairs:

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

5.3 At night while in bed:

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

5.4 While sitting or lying down:

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

5.5 While standing:

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

(6) Stiffness :

6.1 Morning stiffness:

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

6.2 Stiffness occurring later in the day:

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

6.3 While sitting or lying down?

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

(7) How much difficulty have you had:

7.1 When going down the stairs?

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

7.2 When going up the stairs?

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

7.3 When getting up from a sitting position?

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

7.4 While standing?

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

7.5 When walking on a flat surface?

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

7.6 While sitting?

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

7.7 While doing heavy household chores?

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

(8) Treatment Pattern:

8.1 Exercise

☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Extremely

8.2 Weight Control ☐ Yes ☐ No

8.3 Rest and joint care ☐ Yes ☐ No

8.4 Medicines: ☐ None ☐ Yes

Name of Medicine:

8.5 Surgery: ☐ Done ☐ Not Done ☐ Recommended

8.6 Complementary and alternative therapies:

8.7 Out came of treatment: ☐ Satisfied ☐ Non Satisfied ☐ No improvement

Chapter Five: Results

Result and Discussion:

From the survey conducted, there are some findings which may have vital implication which can show that there is some link among osteoarthritis with age, sex etc.

Major findings are shown here as per the following:

5.1 Gender Distribution:

Table 5.1: Gender distribution among survey populations

Gender	No.	Prevalence (%)
Male	87	43
Female	113	57

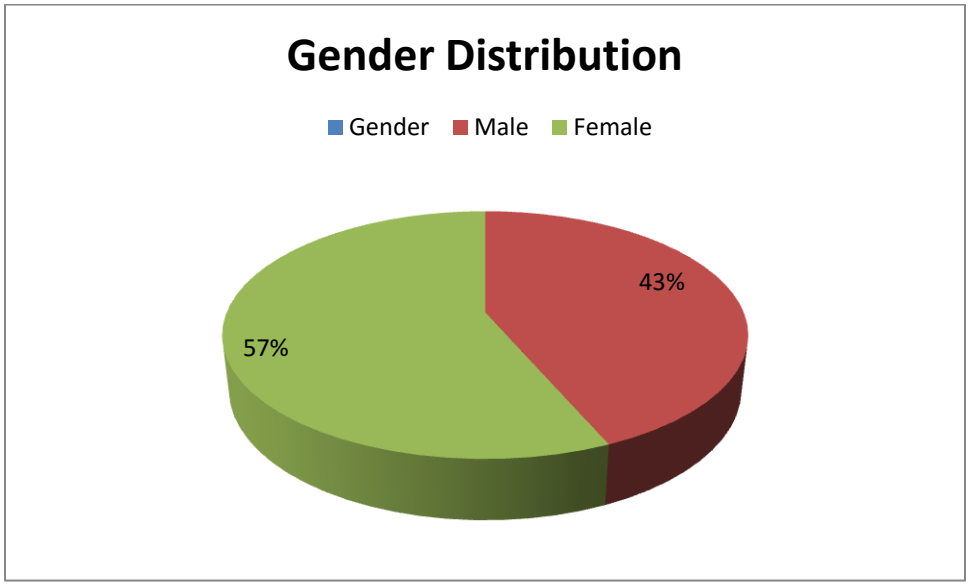


Figure 5.1: Gender distribution

From the Figure 5.1 and Table 5.1, it is observed that, majority of the survey population were female which contributes around 57% of the population.

5.2 Age Distribution:

Table 5.2: Age distribution of patients

Age Range	Number of cases out of 200 samples	Prevalence (%)
≤20	0	0
20-44	49	24
45-64	136	68
≥65	15	8

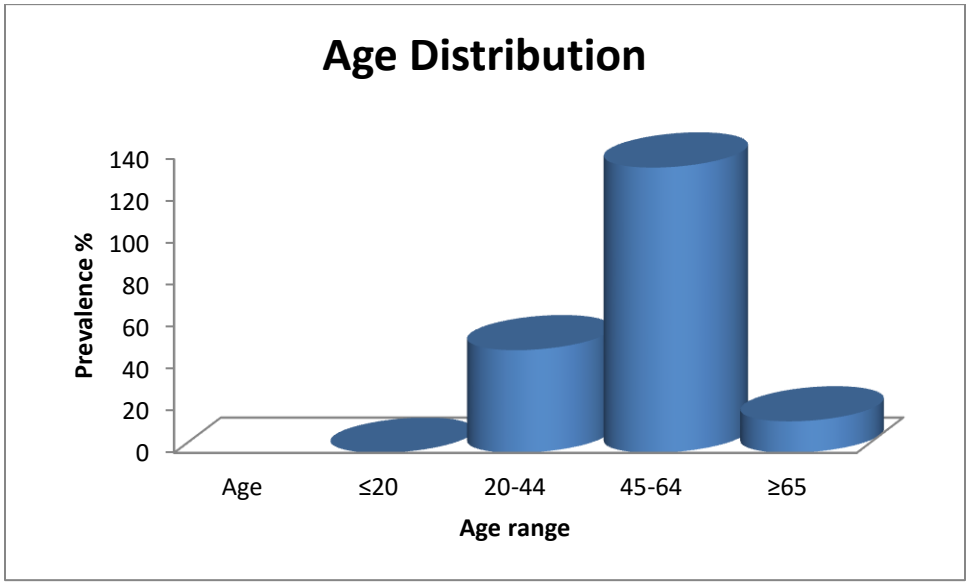


Figure 5.2: Age distribution of patients

Here we observed that, patients aged from 45 to 64, highly suffers from osteoarthritis and the prevalence is around 68%. The second highest group of patients was aged within 20-44 and the remaining 8% patient group came from the age above 65.

5.3 Residence area distribution:

Table 5.3: Residence area distribution of patients

Residence Area	Number of Patients	Prevalence (%)
Rural	61	30
Urban	121	60

Sub-urban	15	8
Others	3	2

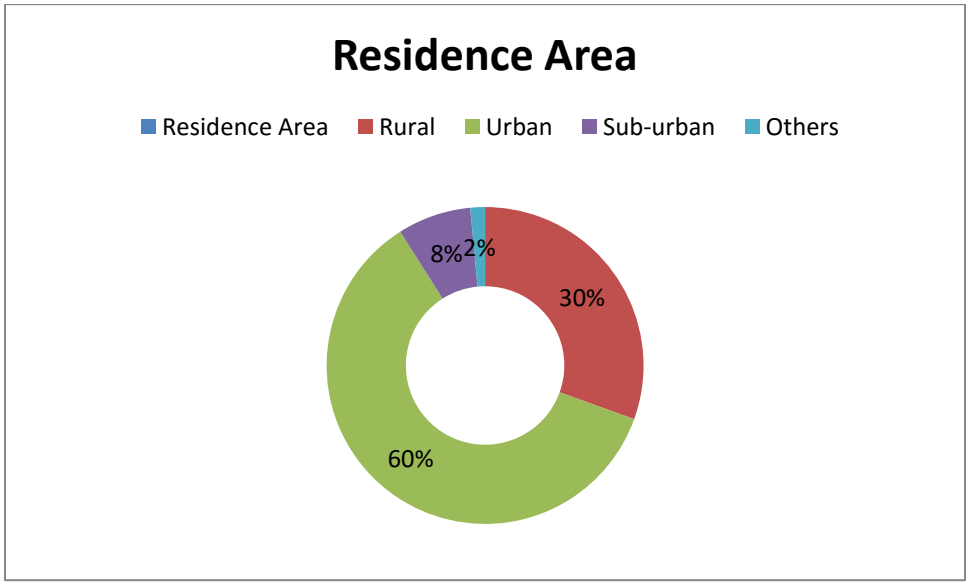


Figure 5.3: Residence area distribution of patients

Here we observed that, patients from urban area are highly suffered from osteoarthritis and the prevalence is around 60%. The second highest group of patients was from rural and the remaining 8% and 2% patient group came from sub-urban and others.

5.4 Occupation of the Patients:

Table 5.4: Occupation of the patients

Occupation	Number of Patients	Prevalence (%)
Banker	13	6
Business	43	21
Engineer	8	4
Farmer	7	3
Freedom fighter	1	-1
Housewife	77	39
Immigrant	3	2

Nurse	1	1
Professional trainer	2	1
Retired	2	1
Service holder	8	4
Student	13	7
Teacher	22	11

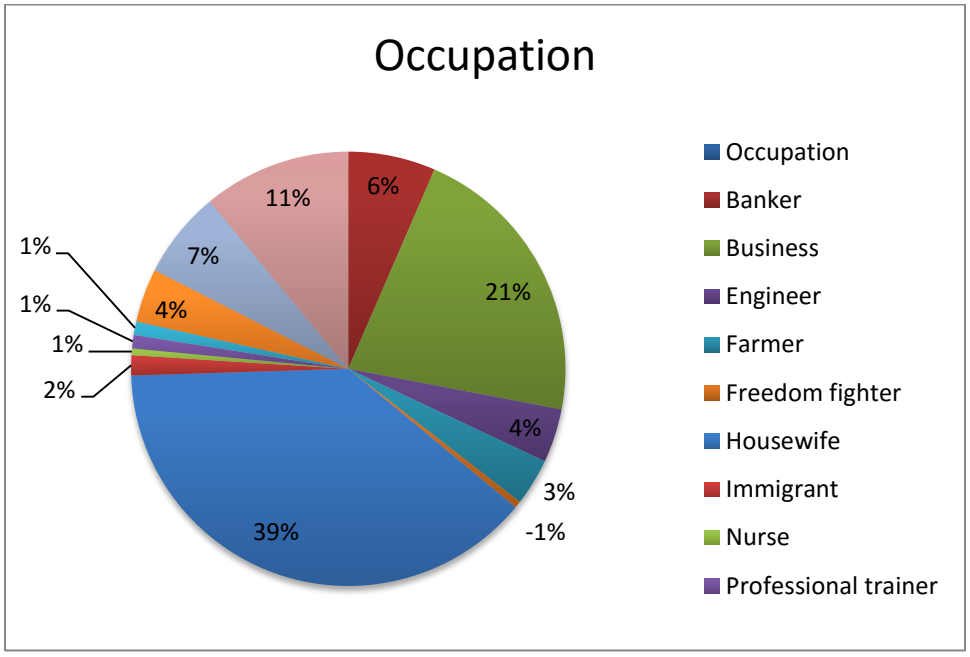


Figure 5.4: Occupation of the patients

Here we observed that, patients highly suffered from osteoarthritis are housewife and the prevalence is around 39% from the data. There are many people with different occupations and for this the prevalence also different and less.

5.5 Socio-economical condition:

Table 5.5: Socio-economical condition of osteoarthritis patients

Socio-economical status	Numbers of Patient Suffering	Prevalence(%)
Elite class	12	6
High middle class	13	6

Middle class	158	79
Low middle class	12	6
Poor class	5	3

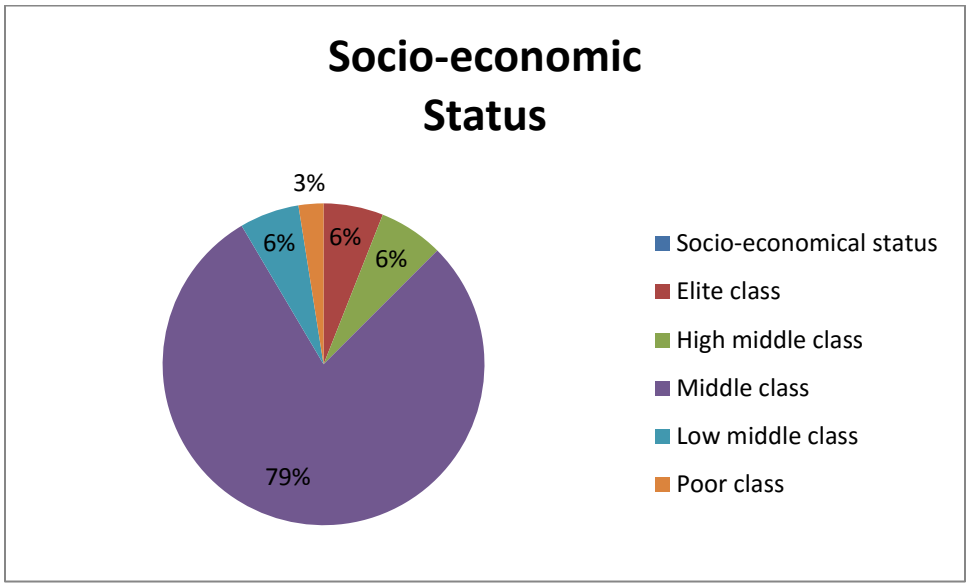


Figure 5.5: Socio-economical condition of osteoarthritis patients

In case of socio-economical condition of osteoarthritis, it is observed in Figure 5.3 and Table 5.3 that 79% patients were from middle class, 12% people were from total upper-middle class, and remaining 6% and 3% were from low-middle class and poor economical status out of 200 samples.

5.6 Patient Case in Osteoarthritis:

Table 5.6: Patient Case in osteoarthritis patients

Patient Case	Numbers of Patient Suffering	Prevalence (%)
New	168	84
Old	32	16

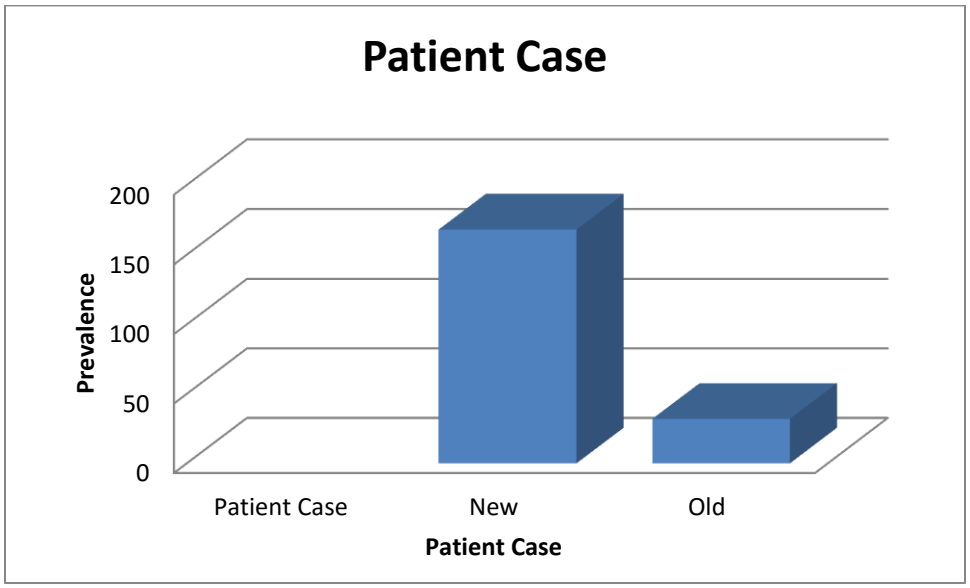


Figure 5.6: Patient Case in osteoarthritis patients

Here we observed that, 84% patients were new and remaining 16% patients were old and they were suffered osteoarthritis for long time.

5.7 Level of Pain among the Osteoarthritis Patients during Different Positions:

Table 5.7: Level of Pain in osteoarthritis patients

Pain Mode	Walking on a flat surface	Going up or down stairs	In bed at night	Sitting up or lying down	Standing
None	1	0	69	32	7
Mild	69	140	124	162	132
Moderate	111	55	7	6	56
Severe	19	5	0	0	4
Extremely	0	0	0	0	1

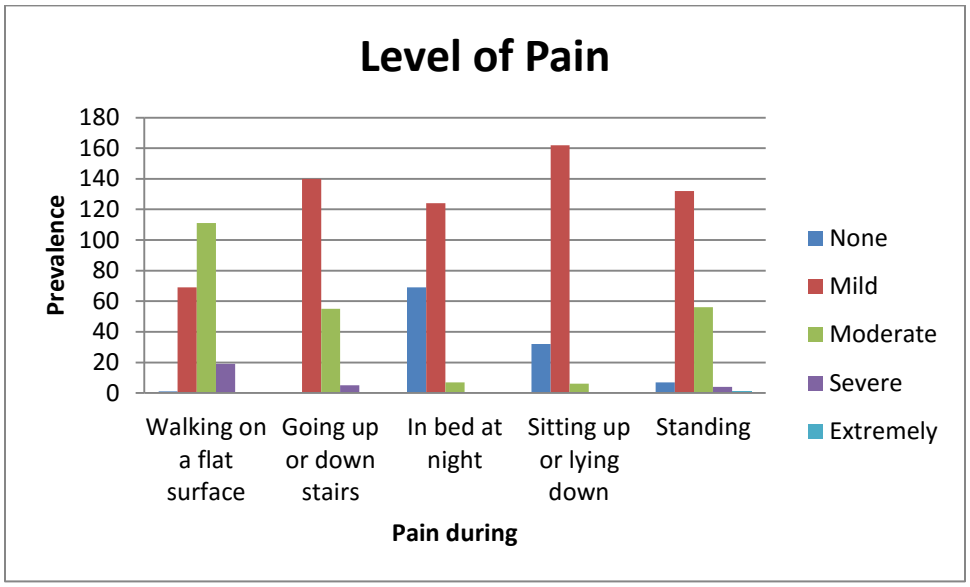


Figure 5.7: Level of Pain in osteoarthritis patients

Here we observed the pain mode in different stages. Most of the people suffered mild pain according to the data.

5.8 Level of Stiffness among the patients during different time:

Table 5.8: Stiffness among the osteoarthritis patients

Stiffness	Morning Stiffness	Stiffness occuring later in the day	Sitting or lying down
None	163	165	177
Mild	32	19	21
Moderate	4	12	1
Severe	1	4	1
Extremely	0	0	0

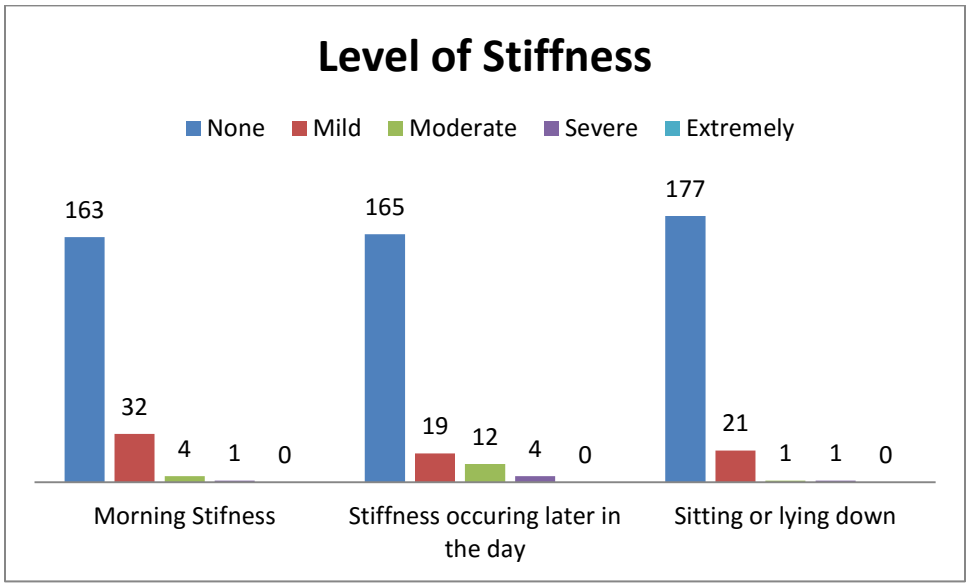


Figure 5.8: Level of Stiffness among the osteoarthritis patients

Here we observed the stiffness among patients suffered from osteoarthritis. Most of the patients had no stiffness according to the acquired data.

5.9 Level of Difficulty in osteoarthritis patients during different household activities:

Table 5.9: Level of Difficulty among the osteoarthritis patients

Difficulty Mode	Going down the stairs	Going up the stairs	Getting up from a sitting position	Standing	Walking on a flat surface	Sitting	Doing heavy household chores
None	3	0	7	8	2	43	4
Mild	161	93	163	150	65	153	138
Moderate	36	103	28	41	116	4	57
Severe	0	3	2	2	17	0	1
Extremely	0	1	0	0	0	0	0

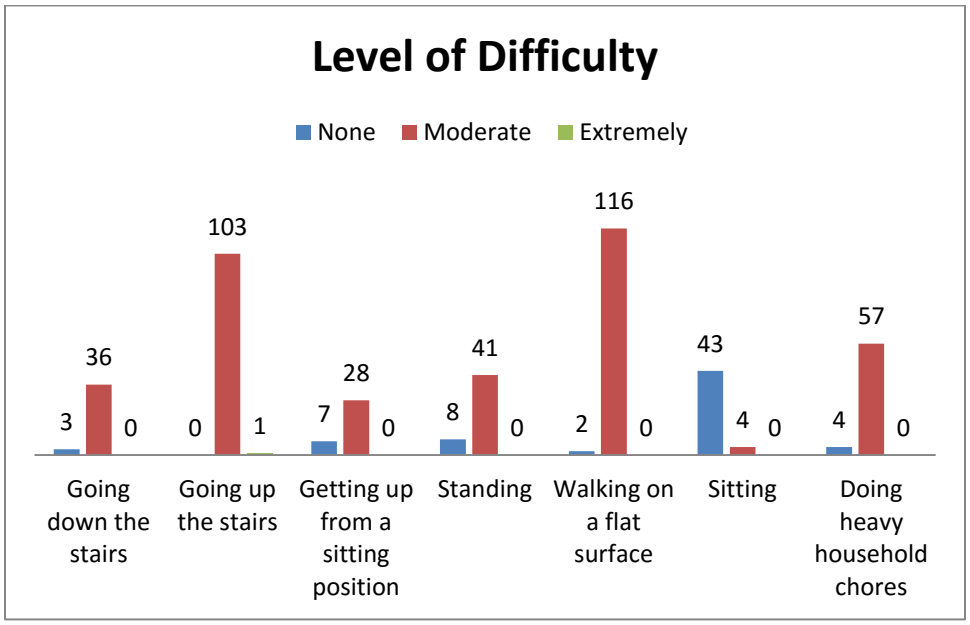


Figure 5.9: Level of Difficulty among the osteoarthritis patients

Here we observed the difficulty amount among patients. Most of the patient had moderate difficulty but not extreme level according to the data.

5.10 Treatment Pattern:

5.10.1 Exercise:

Table 5.10: Exercise given as treatment in the osteoarthritis patients

Exercise	Number of Patients	Prevalence (%)
None	41	20
Mild	124	62
Moderate	29	15
Severe	6	3
Extremely	0	0

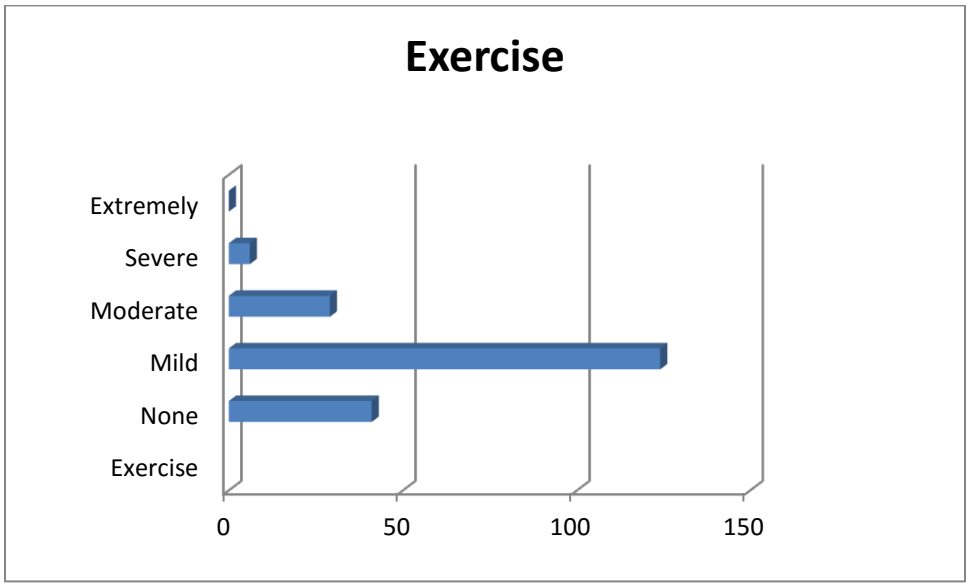


Figure 5.10: Exercise as treatment

Here we observed that, exercise was given mild as treatment among the patients by understanding their joint condition.

5.10.2 Weight Control, Rest and Joint Care, Medicine:

Table 5.11: Weight Control, Rest and Joint Care, Medicine as treatment in the osteoarthritis patients

Treatment Pattern	Weight Control	Rest and joint care	Medicine
Yes	179	197	196
No	21	3	4

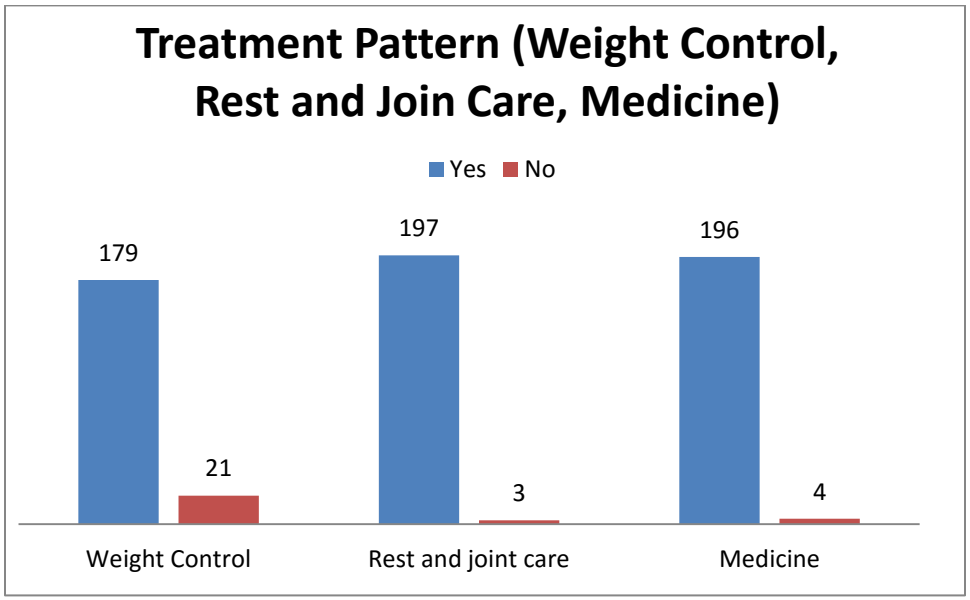


Figure 5.11: Weight Control, Rest and Joint Care, Medicine as treatment

Here we observed that, patients were also given to control weight, rest and joint care and medicine as a part of their treatment. Here we also observed that in some cases patients were not given medicine.

5.10.3 Medicine:

Table 5.12: Medicine as treatment in the osteoarthritis patients

Medicine	No.	Prevalence (%)
Sulindac	1	0
Calcium+Vitamin D3	170	25
Ketorolac Tromethamine	34	5
Esomeprazole Magnesium Trihydrate BP	78	12
Calcium carbonate	2	0
Omeprazole	60	9
Chondroitin + Glucosamine	90	13
Ranitidine	25	4
Vitamin B1 + Vit-B6 + Vit-B12	24	4
Esomeprazole + Naproxen	4	1
Tolperisone Hydrochloride	6	1
Naproxen	58	9

Calcium Orotate	9	1
Aceclofenac	70	10
Diclofenac Sodium	1	0
Celecoxib	1	0
Diacerein+Glucosamine Sulphate	2	0
Prednisolone	1	0
Cephradine	2	0
Baclofen	38	6

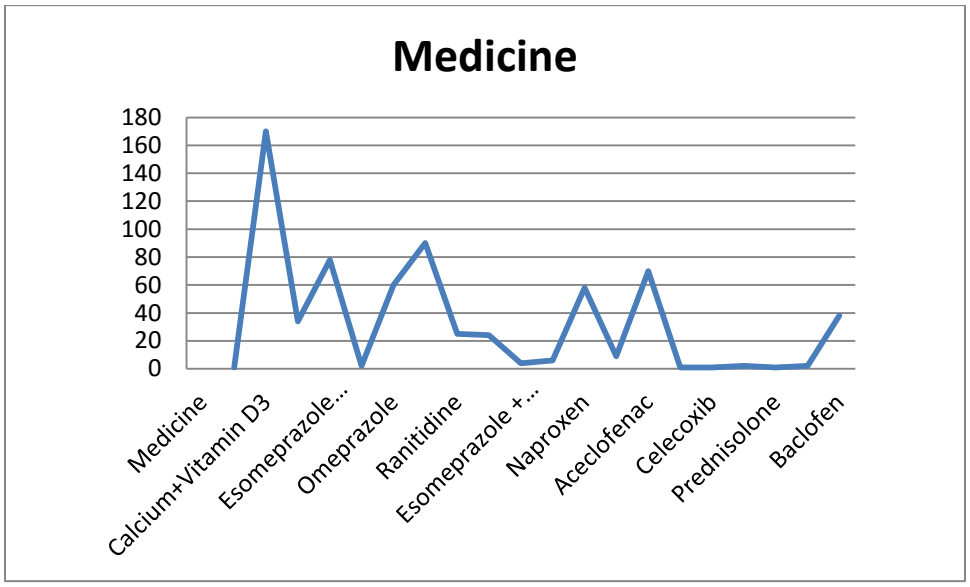


Figure 5.12: Medicine as treatment

Here we observed that, most of the patients were given calcium supplements and esomeprazole and omeprazole to avoid GIT disorder. The patients were also given ketorolac tromethamine, chondroitin with glucosamine, naproxen, aceclofenac etc but these medicines were used most.

5.10.4 Surgery:

Table 5.13: Surgery as treatment in the osteoarthritis patients

Surgery	Number of Patients	Prevalence (%)
Done	11	5
Not done	170	85
Recommended	19	10

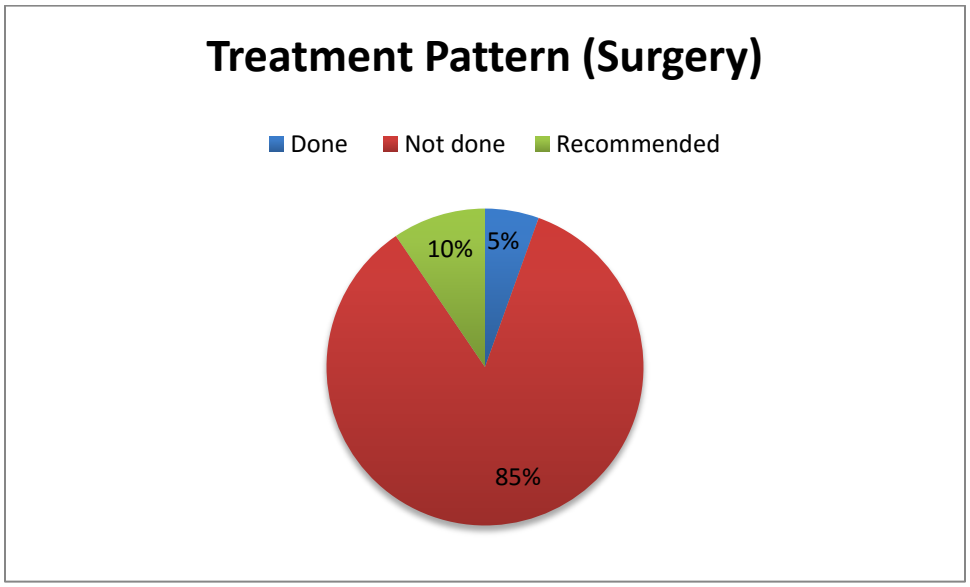


Figure 5.13: Surgery as treatment

Here we observed that, 85% patients were not done the surgery since most of the patient case is new. And 10% patients were recommended for surgery of joint.

5.10.5 Complementary and alternative therapy:

Table 5.14: Complementary and alternative therapy as treatment pattern in the osteoarthritis patients

Complementary and alternative therapy	Number of Patients	Prevalence (%)
Assistive material	1	1
Thermotherapy	9	9
Physiotherapy and Thermotherapy	5	5
Physiotherapy	89	85

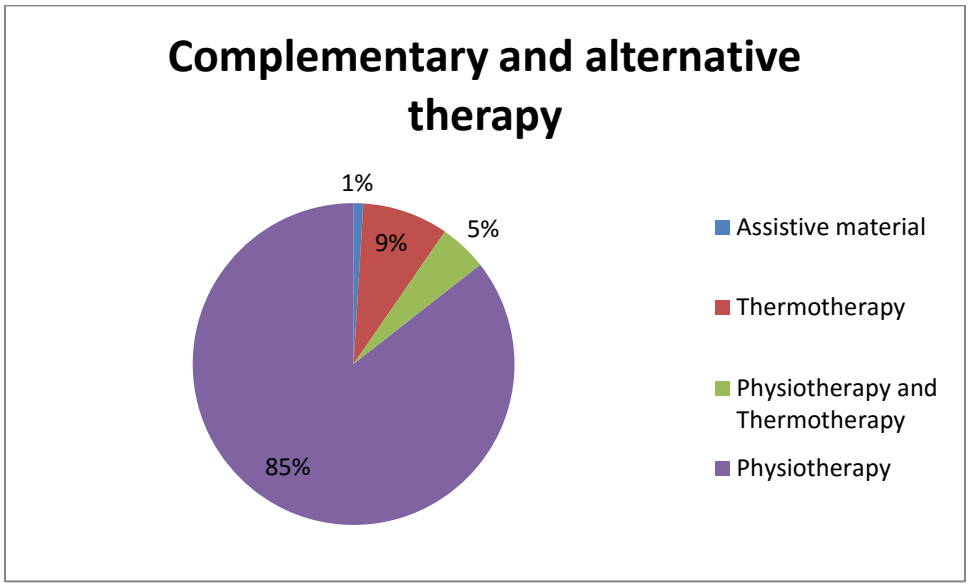


Figure 5.14: Complementary and alternative therapy

Here we observed that, there were also complementary and alternative therapy used as treatment along with medicine. Physiotherapy was the most used complementary therapy and the prevalence was 85%.

5.10.6 Outcome of the treatment:

Table 5.15: Outcome of the treatment in the osteoarthritis patients

Outcome of Treatment	Number of Patients	Prevalence (%)
Satisfied	98	49
Non satisfied	34	17
No improvement	68	34

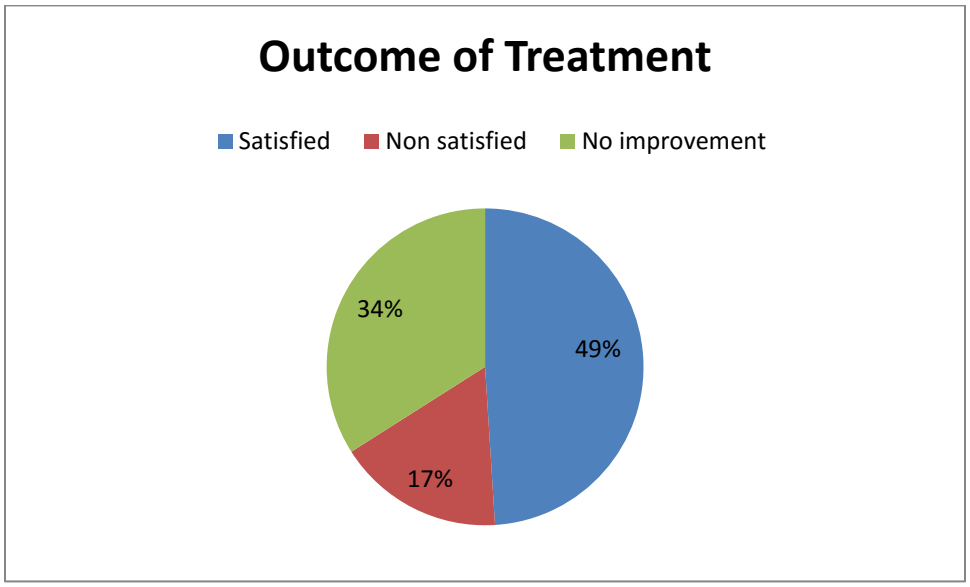


Figure 5.15: Outcome of the treatment

Here we observed that, 49% patients were satisfied with the treatment. But there were also non-satisfied patients and the prevalence was 17%. And 34% patients had no improvement since they were new to the treatment.

Chapter Six: Discussion

6.1 Discussion

In this study, I found out the male female percentage of those participants who have received treatment for osteoarthritis from CRP osteoarthritis department, Holy Family Medical osteoarthritis department, BSM osteoarthritis department, Dhaka Community Medical osteoarthritis department and Trauma Center osteoarthritis department. This data shows that most of the osteoarthritispatients were female who had come to take treatment at those medical department. Two hundred patients of OA were studied. Out of them, 87 (43%) were male and 113 (57%) were female. This data indicates that females were more affected than male. OA is the most common joint disorder of human body and is more often found in women than in men.

There different age group who were affected with OA. The participants were different ages. For better presentation the subjects were divided into four age groups. First age group is less than 20 years, and second age group is (20-44) years, third age group is (45-64) years and fourth group is more than 65 years. Among them more participants were into the age groups 45-64 years and less participants were into the aged group of >20 years. It indicates that overall 45-64 years are more vulnerable age group to be affected with osteoarthritis.

Occupation of OA patients was an important focusing point of this study. A number of studies have considered the role of occupational factors in the development of OA. It has been suggested that repetitive use of specific joints by workers exceeds normal tolerances and might be conducive to degeneration of joints.

The pattern of joint involvement in osteoarthritis is influenced by prior vocational or a vocational overload. In my study 77 (39%) patients were house wife. that means housewife are mostly affected by knee OA, this may be due to long time activity in knee bending position according to our culture. In Bangladesh women constitute 48.6% of total population.

Physiotherapy helps a patient of OA of knee by controlling pain, improve proprioception, strength, stability and endurance all of which improve functional independence. It was found

the participants with minimal to moderate osteoarthritis recruited from both community and clinic that were being treated with various types of exercise treatment.

Unsuccessful rate of the treatment procedure was less than successful rate. Sometimes aims of treatment are not achieved due to some cause and problems of the patient. In this study only 98 (49%) participants aims of treatment is achieved in out of 200 participants. And remaining 34 (17%) are not satisfied with the treatment.

Everybody knows that OA is a progressive disease and treatment is a long time process. For that participants need patience to complete treatment session.

The possible reason of this result may be they do not continue exercise, medicine at their home due to lack of knowledge, awareness. Short of time or some participants are too much lazy. They do not want to give physical effort. On the other hand in our country most of the people are poor. They have not enough money to continue a long time treatment session or after 2-3 session of treatment patient think that they learn all of the treatment procedure and know everything and it's no need to go to a physiotherapist.

Chapter Seven: Conclusion

Conclusion:

The main aim of the study was to explore the risk factor, prevalence and treatment pattern for osteoarthritis. In this study it was proved that osteoarthritis is common over 30 to 64 years of age and 57% female are more affected than male. Among 200 participants 39% was housewife. It indicates that house wives are more affected by OA.

This survey work also reflects the overall figure of age group, gender distribution, weight variation, socio-economical condition, occupation, pain mode, stiffness, difficulty amount and treatment pattern of patients in Dhaka city.

OA is a serious illness that affects one's quality of life and could have lethal complications. It is a very common disease and, with the aging population, it is becoming an even greater public health concern in Bangladesh. Currently, extensive work is being done to determine the risk factor of the disease and refine prevention strategies, as well as to design better medical and surgical treatments that will provide further symptomatic relief, and possibly, stop or reverse the degenerative processes of osteoarthritis.

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