

## Effect of Physiotherapy on Knee Pain Resulting From Long Period of Sitting in Females of University Of Hail

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**Abstract:Background:** knee pain the most common complaint and a cause of disability. Sitting for a long time comes with several health risks, especially if the sitting is done for more than four hours without interruption . Strengthening exercises, (Rest , Ice, Compression , Elevation) and walking can have an effect in patients with knee pain . A descriptive study design was aimed to, assess the pain of knee joint as a result of long periods of sitting and give proper treatment and instructions to correct position for these individuals **Objectives:** This study was conducted o evaluate the Effects of physiotherapy on knee pain resulting from long period of sitting for females in University Of Hail. Descriptive design is selected for conduction of this study. **Methods:** the study was carried out in collage of Applied Medical Sciences in Hail university . **Results:** Statistical analysis of The pain before and after was significantly decreased ( $P<0.05$ ) . details the results of sample according Rang Of Motion of knee joint before and after treatment were significantly increased( $P<0.05$ ) in both flexion and extension resulting from long period of sitting ,it can be **Concluded** that most Hail females do not have enough information about their Risk factors that will occur for not succumbing to the treatment of early pain ,correct sitting position ,exercises and advices to help them go through this period successfully.

**Key words:** knee pain , sitting position , physiotherapy management.

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### I. Introduction

The knee is a complicated joint that is often subject to pain and there are many causes of knee pain such as Overuse, Sprains, Tendinitis ,Tendon Tears, Osteoarthritis .Approximately 50 million people in USA suffer from knee pain. If there is a pop in combination with your pain, there may be cause for concern. There are two main causes for knee pain and popping you just tore one of the ligaments in your knee or you have osteoarthritis. The first one often results in one big pop when the ligament is torn. The second has recurring popping .<sup>[2]</sup>

Millions of people live with chronic knee pain. The knee is a complex joint and there are many situations that can cause knee pain. However knee pain can be from a problem with the muscles, ligaments and/or tendons and not necessarily damage to the joint cartilage or bones. A torn ligament such as the ACL needs a different treatment approach than osteoarthritis of the knee. Since different diagnoses call for different treatment plans, you cannot effectively manage your condition until you know the exact cause.<sup>[12]</sup>

Knee ligament injuries -- The knee has four ligaments : medial collateral ligament, lateral collateral ligament , posterior cruciate ligament and anterior cruciate ligament. Anyone of these can be torn due to trauma or a fall. Often a tear is indicated by a popping sound that accompanies an injury. an anterior cruciate ligament injury or medial collateral ligament injury may cause bleeding into your knee, which makes the pain worse. Bursitis -- inflammation from repeated pressure on the knee, such as kneeling for long periods of time, overuse, or injury.<sup>[3]</sup>

Osteoarthritis, or degenerative arthritis, is very common and is the result of wear and tear or overuse of a joint. The pain is not as sudden and sharp as the ligament injury and the popping is associated with movement. The arthritic knee is often swollen and stiff in the morning.<sup>[4]</sup> (Nuttall,2011)

The symptoms of osteoarthritis knee pain vary greatly from person to person,Tenderness, Stiffness, Loss of flexibility , Grating sensation and the development of bone spurs.<sup>[5]</sup>

Factors that increase the risk of osteoarthritis include the following regarding to:<sup>[6]</sup>

1. **Older age.** The risk of osteoarthritis increases with age.
2. **Sex.** Women are more likely to develop osteoarthritis, though it isn't clear why.
3. **Bone deformities.** Some people are born with malformed joints or defective cartilage, which can increase the risk of osteoarthritis.
4. **Joint injuries.** Injuries, such as those that occur when playing sports or from an accident, may increase the risk of osteoarthritis.

5. **Obesity.** Carrying more body weight puts added stress on your weight-bearing joints, such as your knees.
6. **Certain occupations.** If your job includes tasks that place repetitive stress on a particular joint, that joint may eventually develop osteoarthritis.
7. **Other diseases.** Having diabetes, underactive thyroid, gout or Paget's disease of bone can increase your risk of developing osteoarthritis.

Knee pain does not only occur from physical activity, as sitting for too long can cause soreness and pain in the knees as well. Pain often becomes more intense the longer you sit, and is usually felt in the front of the knee where sitting with the knees in a bent position causes pressure by pulling on the tendons. Since pain can occur in one or both knees, there are some steps you can take to prevent knee discomfort caused by sitting <sup>[1]</sup>.

#### **The Good Sitting Positions for Knee are:**

1. **Aligned:** A neutral seated position is important because it reduces stress and strain on the muscles, tendons and skeletal system<sup>[7]</sup> (Marten, 2007)
2. **Behind Knees:** Right behind your knees is a very sensitive area of tendons where many blood vessels and nerves pass. there should be a distance of about three fingers between the back of your knees and the front of the chair <sup>[8]</sup>.
3. **Separated :** Keep your knees slightly separated while seated. When they are pressed together, they can cause tightness in leg muscles or hip pain<sup>[9]</sup>.
4. **Knee-Level :** The midpoint of your knees should be slightly lower than the midpoint of your hips. This slope should not be result in a sliding sensation, which leads the seated body to tense feet<sup>[10]</sup>.

Sitting for a long time comes with several health risks, especially if the sitting is done for more than four hours at a time without interruption lead to Muscle Fatigue, Lowered Blood Circulation, Decreased Fitness and Risk of Fatality , Increased Risk of Chronic Back and Neck Injuries, Increased Risk of Diabetes And Osteoarthritis<sup>[11]</sup>

#### **Management:**

The first step in managing knee pain is to get the condition properly diagnosed you cannot effectively manage your condition until you know the exact cause by: <sup>[13]</sup>.

1. **Aware of the Symptom by** Create a list of the symptoms you are experiencing ,Try to describe the type of pain and observant of other symptoms such as numbness or tingling.
2. **Get a Physical Exam**
3. **Have the Appropriate Tests :** X-rays can pick up on fractures, tumors or degenerative changes such as arthritis. Having an MRI will determine if the pain is due to a muscles, soft tissue injury or ligament damage.

To Avoid knee pain by keeping the muscles around your knee strong and flexible. Treatment will depend on the cause and severity of condition. If you have torn a ligament you may recover just loss Wight , resting, Hot and cold therapy are both helpful in relieving joint pain. Warmth will alleviate stiffness and cold treatments will help with muscle spasms. You can use a heating pad or hot water bottle, or you can take a warm bath. Heat may be applied several times each day for 20 minutes at a time. Ice packs may be used several times a day as long as you do not have numbness or circulation problems, compressing and elevating your leg a few days followed by some physical therapy<sup>[14]</sup>.

#### **Exercises:**



**fig(1):** Quadriceps set.

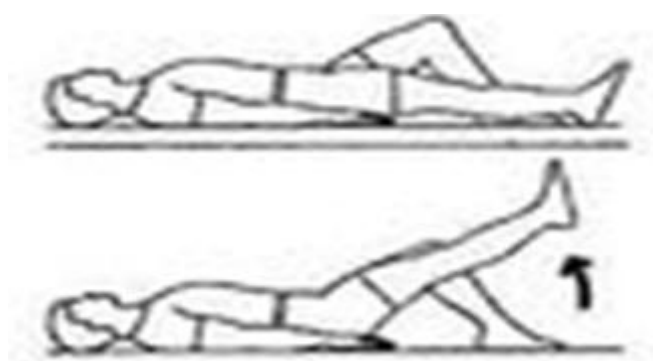
Flex your quadriceps muscle (on the front of your thigh), and push your knee downward. You won't actually be moving your knee, you're just pushing it down internally while tightening your quad. Push your knee downward, hold and stay flexed for about 10 seconds, then rest for about 5-10 seconds and repeat about 10 more times<sup>[15]</sup>.



**fig(2):** Short arc knee straightening.

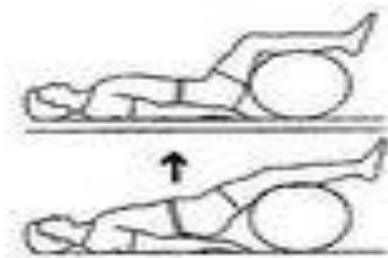
For this next exercise, lie on your back. Prop up the underside of your thigh using a pillow so that your knee is at the 45° angle shown. While keeping your knee in place, lift your lower leg so that it is extended straight, then lower it. Slowly count 1, 2 while lifting, and 3, 4 while lowering. If necessary, place your hand on your knee to keep it steady. Only the lower part of your leg should be moving.

Try to do about 15 repetitions of this exercise, but of course stop if it becomes painful or if you cannot maintain proper form. Rest about a minute<sup>[16]</sup>.



**fig(3):** Straight leg raising.

Stay on your back for this next exercise. It is similar to the one above, but instead of bending and flexing at the knee, you will lift and lower your entire leg, keeping it straight. Bend the non-working knee, and extend the working leg straight out. Lift and lower that leg up to the level of the bent leg as shown<sup>[17]</sup>.



**fig(4):** Bridging .

For this last exercise you will need an exercise ball or a chair. Lie on the back as shown, and place the knees bent over the ball or chair. Lift your buttocks smoothly off the floor, and then lower them. Count and do reps and sets as described above. We can press down into the mat with the hands if that is helpful, but make sure that it is actually the abs and legs that are doing most of the work. This exercise has a side benefit of strengthening your abdominal muscles which is highly important for any and all physical activity that are involved in<sup>[18]</sup>.

Range of motion exercises improve the flexibility in your joints and help you avoid the stiffness and the simple stretches of the knee improve your range of motion. For a workout that focuses on flexibility and balance, take a yoga or tai chi class<sup>[19]</sup>.

If it is a bad tear, may need to Topical Analgesics and Medications They include acetaminophen to relieve pain, non-steroidal anti-inflammatory medications ,creams and gels are helpful for temporary pain relief<sup>[20]</sup>.

Surgery is often the last resort when other methods of treatment are not helpful. Joint replacement involves plastic or metal prostheses. Arthroscopic debridement is the removal of cartilage and bone fragments, and cleaning of the joints. Bone realignment can shift the area that bears weight<sup>[21]</sup>.

**Significance Of The Study :** Most women have knee pain resulting from long periods of immobility due to long periods of sitting position in work. So this study conducted to assess and treat knee pain in Women who have kneepain in Hail university.

**Objective Of These Study:**

1. To assess knee pain associated with long periods of sitting position in females of U.O.H
2. Study the effect of PT on knee pain resulting from long period of sitting position in females of U.O.H.
3. Give advices and proper treatment .

**Hypothesis:**

There is no effect of PT on either knee pain and knee ROM resulting from long periods of sitting position .

**II. Subjects , Methode:**

This study was carried out in collage of Applied Medical Sciences in Hail university. The target population of this study were females who are working in UOH.

**SUBJECT :**

A convinces sample of (40) females was recruited for this study from UOH according to the following criteria:

1. Age ranging from 30-45 years.
2. All females stay for average 6 hours sitting on chairs for 5 day/week.
3. All females do not have any other pervious injuries or diseases.

**III. Methods And Materials :**

The study was carried out in collage of Applied Medical Sciences in Hail university. The target population of this study consists patient with knee pain subjects . The diagnosis of knee pain was based on clinical history and results of examination.

**For assessment:**

**1.Numeric Rating Scale:** To asses knee pain

Rating	Pain Level
0	(0)No Pain
1 – 3	(1) Mild Pain
4 – 6	(2)Moderate Pain
7 – 10	(3)Severe Pain

**Fig(5):**numeric rating scale to assess knee pain.

The patient was asked to make three pain ratings, corresponding to current, best and worst pain experienced over the past 24 hours. The average of the 3 ratings was used to represent the patient’s level of pain over the previous 24 hours. Perhaps one of the most commonly used pain scales in healthcare, the numerical rating scale offers the individual in pain to rate their pain score. It is designed to be used by those over the age of 9. In the numerical scale, the user has the option to verbally rate their scale from 0 to 10 or to place a mark on a line indicating their level of pain. 0 indicates the absence of pain, while 10 represents the most intense pain possible. The Numerical Rating Pain Scale allows the healthcare provider to rate pain as mild, moderate or severe, which can indicate a potential disability level.<sup>[13]</sup>

**2. Goniometey :**To assess ROM

Range of Motion (ROM) is measured by therapist using a device called a Goniometer.



**fig(6):**goniometry to assess ROM.

When you measure, it is important that you place the Goniometer properly: As you can see here, when the goniometer is applied to knee flex.-test position : subject prone , with extended knee with femur goniometer align : axis-center of patellastationary lateral epicondoyle -align vertically moving-align with tibia.<sup>[12]</sup>



**fig(7):** Goniometry of knee flex.

knee ext.-test position :subject prone, stabilize femur goniometer align : axis-lateral epicondyle of femur stationary-align with greater trochanter moving-align .<sup>[14]</sup>



**fig(8):**Goniometry of knee ext.

This means that when you flex the knee, the hinge remains in that position which can look rather low. Make sure you 'aim' the upper arm along the femur towards the greater trochanter or hip done, which is more towards the back of the thigh than the front since there's a considerable quantity of muscle in front which can be misleading. The lower arm should end on the outer ankle bone which is the bottom of the fibula. You can see the dots the examiner has placed on these two points. Another point, normal knees usually get from 130 to 150 depending upon the leg. The skinnier it is, the more ROM it can achieve! (Hence mine is currently 'stuck' at 135!) It's rarely to do with the implants as they nearly all will flex to 155 outside the body! It's tissues that block it. Not scar tissue, just normal tissue (or fat!).<sup>[11]</sup>

## **B)-For treatment :**

### **1)-DESIGNED EXERCISE PROGRAM:**

#### **A)- "R.I.C.E.":<sup>[16]</sup>**

The "R" stands for REST. Some injuries just cannot be "played on" or "worked out" with activities. When a knee is swollen and painful, the best advice is to take it easy and listen to the symptoms. For some injuries.

The "I" stands for ICE. Inflammation in a swollen knee leads to a puffy, tender joint. The fluid that builds up in the knee is uncomfortable, so an ice bag on the knee can slow down the process of inflammation and hasten recovery. Ice should never be placed directly on the skin as cold injuries like frost bite can occur. Using a towel or pillow case on the knee with a sealed ice bag on top for 20-30 minutes can help a lot. Alternating 20 minutes on, then 20 minutes off also works well. The swelling will slow down, and the knee will hopefully start to feel better!

The "C" stands for COMPRESSION. An elastic wrap or bandage that is applied around the knee can limit the buildup of inflammatory fluid. The sensation of "snuggness" also tends to give the person more trust in the knee when walking. No wraps or bandages should be placed tightly on a knee, though. If the knee is "strangled" with the wrap, then blood cannot get to the knee or feet which can have serious consequences. It should never be painful to have a wrap or bandage on the knee.

Finally, the "E" stands for ELEVATION. By elevating the leg to the level of the heart or above (on pillows or a chair while sitting/lying down), the accumulated fluid can exit the leg and head back to the body easily. This makes sense, and it is a time tested treatment for swelling.

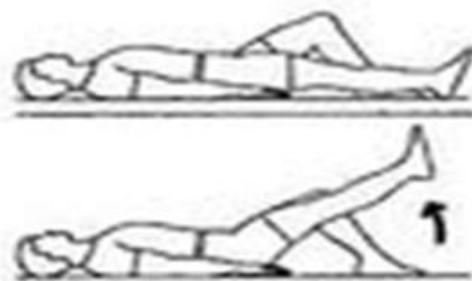
**B)- Therapeutic Exercise:**

**1)-Short arc knee straightening:** Lie on the back with a large towel roll under the knee. Tighten the thigh muscles and lift heel off the ground. Keep the knee on the towel roll as hold the leg as straight as possible for 5 seconds.<sup>[16]</sup>



**fig(9): Short arc knee straightening**

**2)-Straight leg raising:** perform this exercise lying, sitting,or standing. Lie on the back with affected leg straight and other leg bent. Tighten the thigh muscles then lift the leg no higher than the other knee without allowing the knee to bend. Keep the thigh muscles tight while the lower the leg.<sup>[16]</sup>



**fig(10): Straight leg raising**

**3)-Bridging:** Lie on the back with your knees bent and your feet flat on the floor. Gently tighten the stomach and buttock muscles. Lift the hips 3-5 inches from the floor without arching the back. Hold bridge for 5-10 seconds, and then slowly lower the hips to the floor.<sup>[18]</sup>



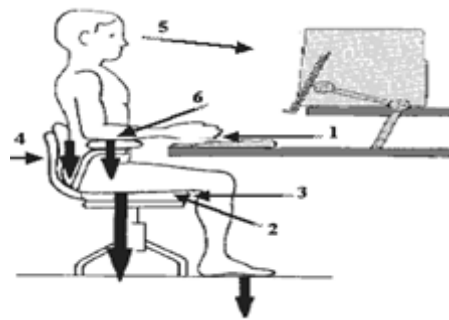
**fig(11): Bridging**

**C)- Aerobic Exercise:** Performing aerobic exercise like walking, or swimming, as tolerated, will help with your recovery. Begin with 5 minutes, progress up to 20 minutes, as able. The full revolution of the pedal should be comfortable to get around. Resistance should be very light so that the wheel doesn't spin freely.

**2)- Advices Charts:**

- 1)-avoid sitting for long period more than 4 hour.
- 2)-Don't carry objects that are too heavy. Use a step stool.
- 3)-Do not stand on chairs or other unsteady objects.
- 4)-Wear knee guards during sports or recreational .
- 5)-Stretch before and after physical exercise to warm up your muscles.
- 6)-Use the correct techniques or positions during activities.
- 7)-Use equipment appropriate to your size, strength , and ability.
- 8)-Avoid repeated movements that can cause injury. In daily routines or hobbies, look at activities in which you make repeated knee movements.
- 9)- good sitting posture in office.

10)- Feet should be firmly supported on the ground, using a footrest if necessary.



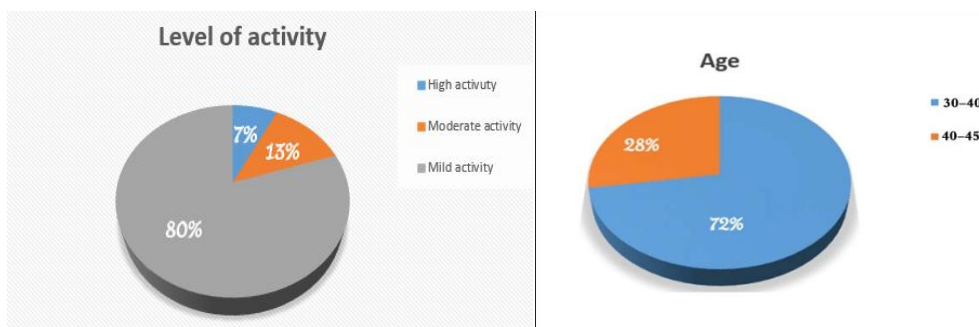
**fig(12):** Good sitting posture in office.

**Statistical Analysis:**

SPSS, V 16 was used for statistical analysis. The descriptive data of the patients subject were represented in the form of mean and standard deviations. Pained T test was used to compare the results before and after treatment.

**IV. Rusltes:**

The anthropometric characteristics and of the subjects were given . There were no significant difference with respect to age ( $p > 0.05$ ). the mean age of the patients represented  $40.1250 \pm 6.96580$ . The mean level of activity is  $82.62 \pm 11.14$ .



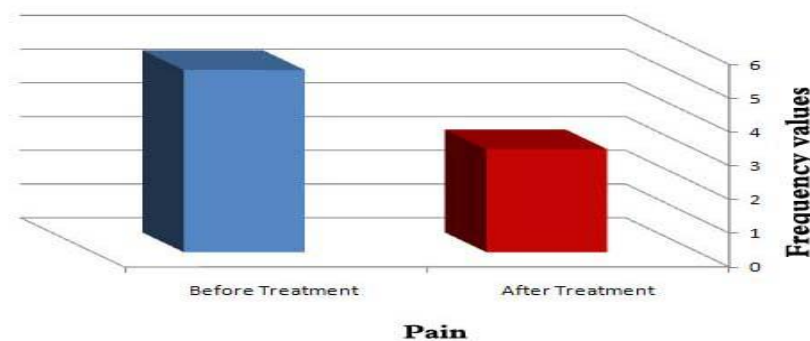
**Figurer (13):** level of activity it was found 7% of sample had high activity. Also this figure showed that about 72% of women started age at 30-45 years.

**Pain :**

**Table(1):** details the results of sample according pain before and after treatment using numeric rating scale. There was significantly difference in knee pain resulting from long period if immobility ( $p < 0.05$ ).

**Table(1):**

	Before Treatment			after Treatment		
	Mean	sta. deviation	p	mean	sta. deviation	p
Pain	5.4000	1.35495	0.001	3.0500	1.63851	0.001



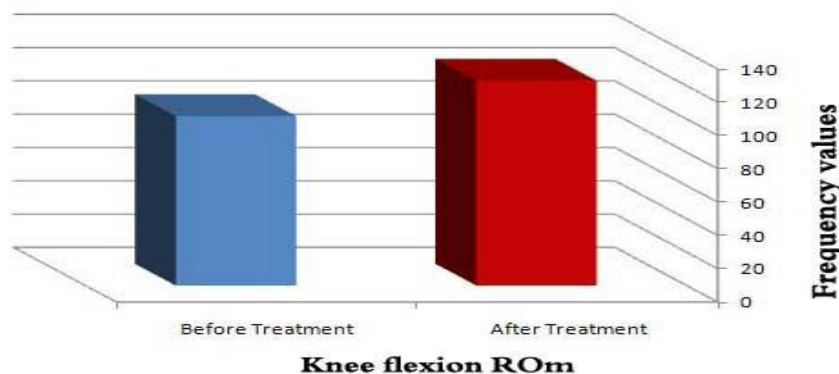
**Figure (14):** details the results of the Pain patient we see that the Pain before and after treatment.

**Rom Of Knee Flexion:**

**Table(2):** details the results of sample according to ROM of knee flexion before and after treatment. There was significant increase in women knee flexion ROM ( $p < 0.05$ ).

**Table(2):**

	Before Treatment			After Treatment		
	Mean	Std Deviation	P	Mean	Std Deviation	P
Knee extension ROM	88.4750	12.91191	0.003	111.1750	15.27506	0.001

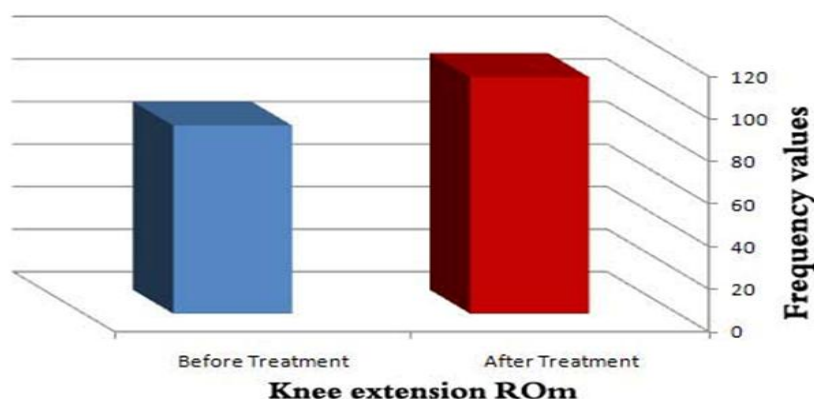


**Figure (15):** details the results of the Rom of Knee flexion before and after treatment.

**Rom Of Knee Extension:**

**Table(3):** details the results of sample according to ROM of knee Extension before and after treatment. There was significant increase in women knee Extension ROM ( $p < 0.05$ ).

**Table(3):**



**Figure (16):** details the results of the Rom of Knee Extension before and after treatment.

**V. Discussion :**

Million people suffer from knee pain. If there is a pop in combination with pain, there may be cause for concern. There are two main causes for knee pain and popping you just tore one of the ligaments in your knee or you have osteoarthritis. The first one often results in one big pop when the ligament is torn. The second has recurring popping.<sup>[2]</sup>

Negligence or lack of attention to pain it will be transformed over time into complex problems difficult to solve and causing problems have an impact on Activity Daily Level such as housework, shopping, climbing stairs, cooking, jumping and driving the car and also has an impact on the work, which may cause loss of work. Females are generally expected to exercise good to prevent themselves from these problems.<sup>[18]</sup>

However, Most of the women have knee pain while sitting for more than 4 hours may be in one or both knees and the pain often becomes more intense the longer you sit, and is usually felt in the front of the knee where sitting with the knees in a bent position causes pressure by pulling on the tendons. These findings are similar to those reported in past studies.<sup>[11]</sup>



The similarities in findings of this study with that of **Cornish,2009, Fialkoff,2004, Derek ,2007, Newell,1994,Nuttall,2011and Diso,1986** studies may perhaps be due to the fact that the studies were conducted for many women who are expected to have some exposure to this diseases either through increase age, obesity ,life style and other factor.

Our study however found that a lot of the women did not use foot rest and not seat in the neutral position . A neutral seated position is important because it reduces stress and strain on the muscles, tendons and skeletal system. In a neutral position, knees should be kept at or slightly below the hip height.

Feet should be firmly supported on the ground, using a footrest if necessary. Hips should be parallel to the floor, seated on a cushioned seat. Thighs should be horizontal to the floor, while lower legs are perpendicular to the ground and thighs .<sup>[7]</sup>

Keeping knees slightly separated while seated. When they are pressed together, they can cause tightness in leg muscles or hip pain. Can use a towel or small pillow can be used to keep the knees slightly apart. If knees tend to fall outward instead, another small towel or pillow can be placed between the chair side and your leg to stop your knees from falling to the side .These results are in accordance with the result of **(Cornish,2009)**.

There is evidence that several non-pharmacological therapies such as strengthening exercises, RICE , walking and weight loss can have an effect in patients with knee pain though the effect is usually only modest. A descriptive study design was aimed to assess the pain of knee joint and give proper treatment and instructions to correct sitting position for these women .These results are in accordance with the result of **(Deark,2007)**

The study revealed that almost one-half of the respondents believed that during sit for long period of time may adversely affect on the knee joint and caused pain. Recent approaches to knee pain research suggest the cultural beliefs can play an important role in the knee diseases. Anticipatory guidance is very important with health education before they worsen.

**(Dioso,1986)**They reported that performing exercise therapy by elders with knee pain and increased ROM of knee (flexion and extension) can significantly ( $P = 0.05$ ) improve ROM in major impaired joints, in comparison to those without any exercise intervention.

The results of sample according pain before and after treatment using numeric rating scale. There was significantly difference in knee pain resulting from long period if immobility ( $p < 0.05$ ) . That result agree with **(Newell,1994)**.

The results of sample according to ROM of knee Extension before and after treatment. There was significant increase in women knee Extension ROM ( $p < 0.05$ ).That result agree with **(Nuttall,2011)** .

## **VI. Conclusion :**

individual with long-standing knee pain have been found to have increased risk of developing functional disabilities due to knee joint pain.

## **Suggestions & Limitations :**

- Based on the results of the registered in this study became necessary to conduct more studies about knee pain and the use of different therapeutic methods, and also this study are formula in points for generations of researchers in the field of physical therapy.

-These results can be taken as a axis for anti pain of other joints.

-Emphasize the importance of linking the results been reached by the present study of knee pain with studies that have been by scientists necessary further research to verify the role of exercise in the treat of other joints pain.

### **Limitations:**

Although the positive fact ,there are some problems including:

- 1- Short of the period specified for treat.
- 2- Failure of cases to follow the exercises.
- 3- Time constraints .

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