

**A STUDY TO ASSESS THE EFFECT OF ISOMETRIC EXERCISES  
ON PAIN PERCEPTION, FUNCTIONAL MOBILITY AND ANXIETY  
OF OLD AGE PEOPLE WITH OSTEOARTHRITIS IN SELECTED  
OLD AGE HOMES AT COIMBATORE**

**M.Sc (NURSING) DEGREE EXAMINATION  
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R.V.S. COLLEGE OF NURSING  
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**“A Study to Assess the Effect of Isometric Exercises on Pain Perception,  
Functional Mobility and Anxiety of Old age People with Osteoarthritis  
in selected Old age Homes at Coimbatore”**

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## ABSTRACT

A Study to assess the Effect of Isometric Exercises on Pain Perception, Functional Mobility and Anxiety of Old Age People with Osteoarthritis in selected old age homes at Coimbatore.

The main aim of the study was to test the hypothesis whether isometric exercises makes any difference in the degree of pain and level of functional mobility and anxiety in old age people with Osteoarthritis.

A non equivalent quasi experimental pre test – post test control group design was used. Thirty males with Osteoarthritis from two selected old age homes were selected, 15 were assigned to experimental and 15 to control group. The experimental group was taught isometric exercises. They practice the exercises every day 15 minutes for 20 days in the presence of the investigator.

Pre and post intervention assessment of pain was done using a numerical pain intensity scale and level of functional mobility and anxiety by using a four point rating scale. The data was analyzed by using descriptive and inferential statistics.

Major findings of the study were that 73.3 percent of the old age people were partially dependent before the intervention and 73.3 percent were independent after the intervention. In the control group 66.7 percent of the samples who were partially dependent continued to have the same level of functional mobility after 20 days.

Before intervention there was no significant difference in the functional mobility of the two groups. After the intervention the functional mobility of the experimental group significantly improved (mean score= 16.9) compared to control group (mean score 14.8) ( $t= 2.9^*$ ,  $df = 28$ ,  $p= 0.010$ ).

There was no significant difference between the mean pain score of experimental( 5.8 ) and control group ( 6 ) before the intervention ( $t = 0.35$  at  $df= 28$ ,  $p= 0.0$ ). After the intervention there was significant difference between the mean pain score of experimental group ( $m = 3.4$ ) and control group ( $m= 6$ ) ( $t= 3.9$  at  $df = 28$ ,  $p = 0.01$ ).

There was no significant difference between the mean score of anxiety in experimental and control group before the intervention ( $t = 1.9$  at  $df - 28$ ,  $p = 0.01$ ).

After the intervention the level of anxiety reduced in the experimental group (mean score = 8.7) compared to control group (mean score = 12.5) ( $t= 2.9$  at  $df= 28$ ,  $p= 0.01$ ).

There was a significant association between the level of functional mobility and mode of admission to the old age home ( $\chi^2 = 5.1$ ,  $df - 1$ ,  $p = 0.05$ ) and also between the anxiety and education ( $\chi^2- 6.5$ ,  $df- 2$ ,  $p = 0.05$ ) anxiety and mode of admission to the old age home( $\chi^2- 7.1$ ,  $df- 1$ ,  $p = 0.05$ )

There was a significant correlation between the functional mobility, degree of pain and level of anxiety ( $t= 11.4$ ,  $df - 28$ ,  $p= 0.05$ ).

This study concluded that isometric exercise had a significant effect in improving the level of functional mobility, minimizing the pain and anxiety of old age people with Osteoarthritis.

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# CHAPTER – 1

## INTRODUCTION

### BACK GROUND OF THE STUDY

Old age consists of ages nearing or surpassing the average life span of human beings, and thus end of the human life cycle. Euphemisms and terms for old people include seniors (American usage), senior citizens ( British and American usage) or the elderly. As occurs with almost any definable group of humanity, some people will hold a prejudice against others – in this case, against old people. This is one form of ageism (**John Anne**).

The aging process depends on a combination of both genetic and environmental factors. Recognizing that every individual has his or her own unique genetic makeup and environment, which interact with each other helps us to understand why the aging process can occur at such different rates in different people. Overall, genetic factors seems to be more powerful than environmental factors in the determining the large differences among people in aging and lifespan. There are even some specific genetic disorders that speak up the aging process, such as Hutchinson – Gilford, Werner’s and Down syndrome.

The aging process will affect the old age people physically, physiologically, socially, spiritually, and psychologically.

Due to the physical decline, old age people become less active. Old age can cause, amongst other things: wrinkles and liver spots on the skin, change of hair color from gray to white, hair loss, lessened hearing, worse eye sight, slower reaction times and agility. Reduced ability to think clearly, difficulty recalling memories, lessening or cessation of sex, sometime because of physical symptoms such as erectile dysfunction in men, but often simply a decline in libido, causes greater susceptibility to bone disease such as Osteoarthritis

There is a change in height and weight of the old age people. Generally, our height increases until our late forties and then decreases about two inches by age 80. The reason for height loss include changes in posture, a forward bending of the spine, joint changes in the feet, decreased joint space in the trunk and extremities.

In men, body weight generally increases until their mid – fifties; then it decreases, with weight being lost faster in their late sixties and seventies. In women, body weight increases until the late sixties and then decreases at a rate slower than that of men.

Physiologically the aging causes functional changes in cells. For example, the rate at which cells multiply tends to slow down as we age. Certain cells that are important for our immune system to work properly also decreases with age. In addition, age causes changes in our response to environmental stresses or exposures, such as ultraviolet light, heat, not enough oxygen, poor nutrition.

Age also interferes with an important process called apoptosis, which programs cells to self-destruct or die at appropriate times, and also all the systematic functions too are getting slowed down due to the physiological changes.

Psychosocially due to the aging process old people are often depressed and feel loneliness. Because old people are often sick and tired and also retired old people usually don't have a lot of money, they must spend money for medicines. They can't eat a lot of dishes, because of health reason: liver, heart and weak teeth. Old age people often have depressions and sometimes don't want to live any longer due to the loss spouse. **(Miller,2007)**

Aging and disease are related in subtle and complex ways. Several conditions that were once thought to be part of normal aging have now been shown to be due to disease process that can be influenced by lifestyle. Commonly the old age people are prone to get heart and blood vessel disease, cataract, arthritis, Alzheimer's disease, Parkinson's disease, depression, Mania.

As person grow older the cartilage that serves as shock absorber between bones can no longer sustain the rubbery and become stiff. It also loses its elasticity and becomes damaged. When these cartilages and ligaments wear out. They cause the joint pain (Joint pain is the common most problem of the old age people) **(Pekker, 2004)**.

Exercising is an effective and enjoyable way for sufferers of Osteoarthritis to feel better and to regain a functional lifestyle. The expression “no pain, no gain” is as untrue as it is outdated; this is particularly true for an Osteoarthritis patient.

In a study by the National Institute of Health published in “Arthritis”, April 2008, researchers suggested that exercise not only reduces the pain and improves the physical mobility of arthritis patients but also a catalyst in improving mood and outlook. By being proactive with exercise, an Osteoarthritis patient may feel that he is not passively allowing the disease to overtake his life. Exercise also released endorphins, the body’s natural feel good hormones that attach to receptors in the brain and create a feeling of well being.

Reduction of weight is very important, the less you weigh the less pressure on the joints the less the pain and discomfort. Massage of the joint – you can do it, provide you don’t apply to much pressure that leads to swelling. Application of oils- Massage or pain reliever oils can help you in reduction of pain and increase in strength of the adjoining muscles and tendons. Yoga and light exercises help in reduction of pains, provided you to do these exercises very slowly and they show it effects after some time. Calcium supplement will help to keep a bone healthy, and density **(Tugwell. P 2003)**.

Patients education, self management programs (eg. Arthritis self – help course), Yoga , Health professional social support via telephone contact. Occupational therapy like joint protection and energy conservation, assistive devices for activities of daily living. These all things helps to reduce the pain in Osteoarthritis.

Pharmacologic therapy like intra articular steroid injections, non – opioid analgesics, topical analgesics, non steroidal anti-inflammatory drugs also helps to treat the knee Osteoarthritis (**Birmingham. A**).

In the industrialized countries, life expectancy has increased consistently over the last decades. In the United States the proportion of people aged 65 or older increased from 4% in 1900 to about 12% in 2000. In 1900 only about 3 million of the nations citizens had reached 65. By 2000, the number of senior citizens had increased to about 35 million.

Population experts estimated that more than 50 million Americans – about 17 % of the population – will be 65 or older in 2020. The number of old people is growing around the world chiefly because more children reach adulthood, and increases in the provision and standards of health care.

## **NEED FOR THE STUDY**

Old age people are like the tones of knowledge and experience in your basket but their suggestion not fit for this generation (**Henry Donald 2008**).

In the last decades joint family system was very common, with lot of family members around . In such a situation the old age people got much attention from all their children. Even after their retirement they were engaged with some other work like small shopping, going out with their grand children etc., So, they don't feel lonely thinking about themselves, and their problems and aging process. Their children also provided care to the parents.

Today due to the socio cultural changes the joint family pattern has changed to nuclear ones. And even if there is a joint family the members are restricted to 4 or 5. This has created great impact on the old age people as they are left alone due to the higher education and well settled jobs children in abroad and now a days even with the females working, they receive no attention at all. Some do send financial help for their parents but whereas, some do not even turn to have a look towards their parents.



Since the children are away and no body to care for them, they feel lonely, become depressed, and more concerned about their health problems much more.

The development of old age home was based on supporting the old age people. There are old age homes run by the government and non governmental organizations. Even though some old age homes are giving proper care with all facilities to the people, some homes are providing only shelter and food, and there are no medical facilities available.

At present survey says that more than 50 percent of old age people are suffering from joint pain and 25 percentage from Cardiovascular disease and remaining from other health problems.

Exercise is one of the best method to treat Osteoarthritis. From the literature review it is quite evident that isometric exercises are beneficial to improve the functional mobility of joints in old age people. When the mobility increases, intensity of joint pain decreases. There are different techniques in carrying out the isometric exercise and some of the technique have already been tried out, in other countries. The isometric exercises does not take much time, requires no special equipments, except a comfortable place to do the exercises. It is a simplest technique, which is considered to be appropriate for the low socio – economic status, and easily applicable for the old age people.

The investigator visited the old age homes which has no medical facilities. This study was undertaken to find out the effect of isometric exercises on functional mobility, joint pain and anxiety in old age people with Osteoarthritis.

## **STATEMENT OF THE PROBLEM**

A study to assess the effect of isometric exercises on pain perception, functional mobility and anxiety of old age people with Osteoarthritis in selected old age homes at Coimbatore.

## **AIM OF THE STUDY**

The aim of the study was to give isometric exercises to a group of old age people and to determine the level of functional mobility, pain, and anxiety compared to a group of old age people without receiving the isometric exercise.

## **OBJECTIVES OF THE STUDY:**

### **Specific objectives**

- To determine the level of joint pain perceived by the old age people in both experimental and control group before and after intervention.
- To assess the level of functional mobility of old age people in the experimental and control group before and after intervention.
- To assess the level of anxiety of the old age people in the experimental and control group before and after intervention.
- To associate the functional mobility, pain, and anxiety with demographic variables of old age people with Osteoarthritis.
- To determine the correlation between the functional mobility, pain and anxiety of old age people with Osteoarthritis.

## **HYPOTHESIS**

### **Research hypothesis :**

There will be a significant difference in functional mobility, pain and anxiety of old age people who have undergone isometric exercises compared to the old age people who have not undergone isometric exercise.

### **Specific hypothesis :**

H<sub>1</sub> – There will be a significant difference between the functional mobility of experimental and control group after intervention and no significant difference before intervention.

H<sub>2</sub> – There will be a significant difference in the functional mobility of experimental group before and after intervention and no significant difference of functional mobility in control group before and after intervention.

H<sub>3</sub> – There will be a significant difference between the pain score of experimental and control group after intervention and no significant difference of pain before intervention.

H<sub>4</sub> – There will be a significant difference in the pain score of experimental group before and after intervention and no significant difference of pain score in control group before and after intervention.

H<sub>5</sub> – There will be a significant difference between the anxiety of experimental and control group after intervention and no significant difference before intervention.

H<sub>6</sub> – There will be a significant difference in the anxiety of experimental group before and after intervention and no significant difference of anxiety in control group before and after intervention.

## **OPERATIONAL DEFINITION :**

### **Pain perception**

An unpleasant bodily sensation experienced by a person due to internal or external stimuli which is self reported and measured using numerical pain intensity scale.

### **Functional mobility**

The ability of a person to move freely and do the daily activities like walking, sitting, standing, lifting, washing, climbing the stairs etc. which are measurable and reportable.

## **Anxiety**

Is worry, problem, uneasiness or tension experienced by a person due to a situation, events, happenings. Here the worry or problem, experienced by old age people with Osteoarthritis is self reported and measured on rating scale.

## **Isometric exercise :**

Isometric exercise is a system of exercise to strengthen specific muscles of the body by pushing parts of the body (such as the two hands or legs) strongly against each other, or against a fixed object, so that the muscles are strongly stressed, but are stretched only a little. It is claimed to produce strength in the muscle thus exercised.

## **Osteoarthritis :**

Osteoarthritis is a degenerative disease, involving all the joints in old age carrying joint pain and swelling which restricts the joint movements.

## **ASSUMPTION :**

- Threshold of pain, functional mobility and anxiety vary from one person to another.
- More the exercises done, more will be the improvement in functional mobility.
- Osteoarthritis is common in old age people.
- Some can do the activities but some can not do.

## **DELIMITATIONS :**

The study is delimited to

- People of 55 to 75 years of age with joint pain.
- Only males.
- Two old age homes.
- Data on functional mobility based only on observations.

## **LIMITATION**

- As sample size is small result cannot be generalized
- Data on pain and anxiety based on verbal report may not be a true reflection of what they experience.
- Assessment of functional mobility limited to certain activities.

## **SCOPE OF THE STUDY**

The levels of functional mobility, degree of pain and level of anxiety are measured in Osteoarthritis patients before and after intervention. If there is significant reduction of pain and anxiety and improvement of the level of functional mobility of the experimental group of sample, it is a clear indication of effectiveness of isometric exercises. Teaching isometric exercise is very simple. If the subject are able to perform the exercise without any difficulty, then this intervention is acceptable. It clearly indicates the utility value of isometric exercise for Osteoarthritis patients.

## **CONCEPTUAL FRAME WORK**

Conceptual framework refers to interrelated concepts or abstractions that are assembled together in some rational scheme by virtue of their relevance to a common theme (**Polit and Hunger- 1997**).

Theoretical model for this study was derived from Callista Roy's Adaptation theory (1996). Roy Employs a feedback cycle of input, throughout and output, input is identified as stimuli, which can come from the environment or from within a person. Stimuli are classified as focal (immediately confronting the person), contextual (all other stimuli, that are present) or residual (non specific such as cultural belief's or attitudes about illness). Input also includes a person's adaptation level (the range of stimuli to which a person can adapt easily. Through input we can make use of a person's processes and effectors. "Process" refers to the control mechanisms that a

person uses as an adaptive system”. “Effectors” refers to the physiological function self concept, and role function involved in adaptation.

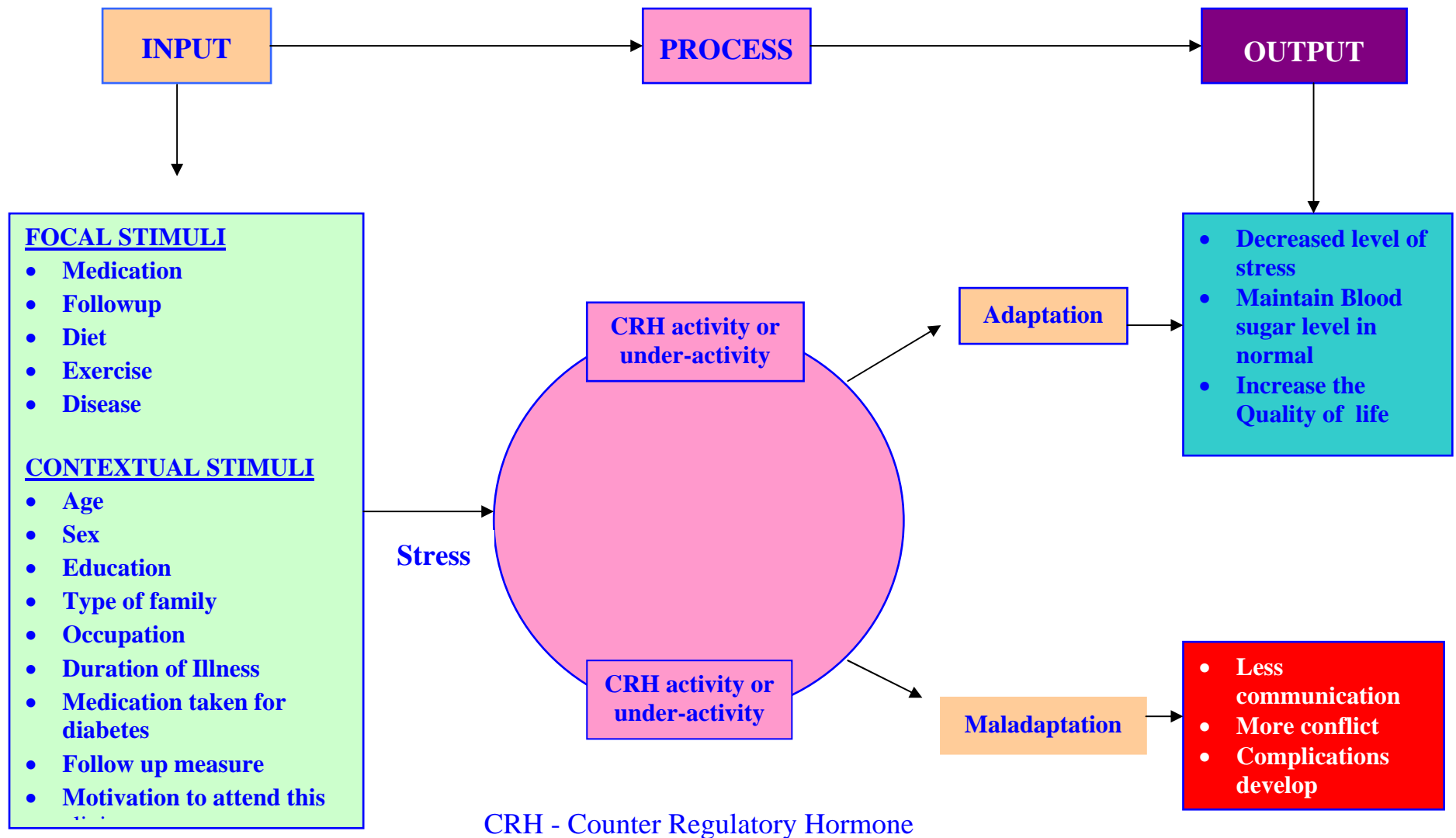
In the adaptive system, the term “system” is defined as self parts connected to function as a whole for some purpose and it so by virtue of the interdependence of its parts. This has two major internal control process called “ regulator” and “cognator”.

Regulator sub system consist of internal process including chemical, neural and endocrine – transmit the stimuli, causing output- physiological response, cognator sub system regulates self concepts, role function and inter dependence.

Output is the outcome of the system; when the system is a person, out put refers to the person’s behaviour. In Roy’s system, output is categorized as adaptive responses (Those that promote a person’s integrity) or ineffective responses (those that do not promote goal achievement) these responses provide feedback for the system.

The modified model in this study explains the input as the focal stimuli namely joint pain, decreased range of motion, lack of physical mobility and anxiety. The contextual stimuli are age, education. no of children, mode of admission. The coping mechanism of the cognator subsystem occurs as a result of isometric exercises. The experimental group is subjected to isometric exercise. The adaptive responses among the experimental group of old age people show reduction in the intensity of pain, anxiety, and improved functional mobility. The control group that has not undergone the isometric exercises might not show an effective adaptation.

Figure – 1 highlights the conceptual framework based on modified Roy’s adaptation model.



**FIGURE -1: CONCEPTUAL FRAMEWORK BASED ON MODIFIED ROY'S ADAPTATION MODEL 1996**

## CHAPTER -II

### REVIEW OF LITERATURE

A literature review is a “Critical analysis of a segment of a published body of knowledge through summary, classification and comparison of prior research studies, review of literature , and theoretical articles.”(Wisconsin 2004)

This chapter deals with the information collected in relation to the present study through published and unpublished materials, which provided the foundation to carryout this study.

In the present study the review of literature is organized and presented as follows.

1. Literature related to Osteoarthritis in old age.
2. Literature related to treatment of pain in Osteoarthritis .
3. Literature related to exercise in knee joint pain.
4. Literature related to exercise functional mobility and anxiety in Osteoarthritis.

#### 1. Literature related to Osteoarthritis in old age

A prospective study was conducted by **Bukowsk.E.L.(2003)**, University of Punjab to determine the average age group for Osteoarthritis. In this study participants were 200 patients attending an orthopaedic out patient department of the Punjab university health centre. Demographic analysis of this study revealed that, out of 200 patients 84 percentage of patients were in the age group of 40 - 70 years with the complaints of knee joint pain.

**Brenda Goodman. (1990)**, University of North Carolina, conducted a study to determine the gender deference for getting Osteoarthritis. In this study the participants included were 3,200 citizens of North America. Any one who was over the age of 50 years was eligible to join the study, whether they had arthritis or not. The conclusion revealed that, among 3,200 citizens, 74% of the participants had Osteoarthritis, of which 47% percentage were women and remaining were men.



**Caelor. R. B. (2003)** conducted a cross sectional controlled study to determine clinical and sonographic factors associated with painful episodes in patients with knee Osteoarthritis. In this study participants were prospectively placed in to two groups. In Group A, 81 patients had knee pain during physical activity of with score 30mm in Visual analogue scale for pain for at least 48 hours prior to inclusion and Group B 20 patients without knee pain for at least 1 month prior to inclusion. Clinical parameters, knee radiographic and ultrasonographic findings were collected, such as joint effusion, and Baker's cyst were collected. The findings of the study showed that Group A patients were older and heavier than group B(  $P < 0.05$ ). Ultrasonographic findings showed in group A significant increase of joint effusion ( $P < 0.005$ ) and a tendency towards an increase of Baker's cyst( $P = 0.06$ ).The researcher concluded that joint effusion ,Baker's cyst, and higher BMI are more frequent and seem to be risk factors of painful Osteoarthritis of the knee.

## **2. Literature related to treatment of pain in Osteoarthritis.**

**Wellington. S.R (2003)** Osteoarthritis is a common problem of old age people. According to the American survey prior problem of old age people is Osteoarthritis. Pharmacological, non pharmacological and complementary treatments such as acupuncture, acupressure, oil massage, physical therapy, yoga, thermotherapy, hydrotherapy may become the first line of treatment options to treat Osteoarthritis.

**Brosseau. L, Yonge. K. A, Robinson. V, Well. G. (2003)** conducted a retrospective study on effect of thermotherapy on patient with Osteoarthritis in old age. Twenty cases who underwent thermotherapy were selected. The overall group numerical pain intensity scale score decreased from 2- 10 at initial presentation to 0-5 at end of care. 17 of 20(85%) cases demonstrated clinical improvement. The result suggested that thermotherapy was safe and effective for reducing the pain intensity.

**Brain.M.Berman. (2004)** conducted a study on the effects of acupuncture in Osteoarthritis in old age. A total of 570 patients with Osteoarthritis were allocated randomly to two groups. 300 patients formed the study group and 270 patients for the control group. They reported the severity of pain using a numerical pain intensity scale from 0-10 and their capacity to perform general activities to work and to walk. The patients were followed up for 26 weeks and interviewed 13 times, at 2 weeks

intervals. Pain score decreased in 243(81%) patients in study group and 32 (12%) patients in control group. The capacity to perform activities, to work and walk improved significantly more in the study group than in the control group.

**Kirkley.A, Birmingham. T.B, Litchfield.R.B (2008)** University of Western Ontario conducted a randomized trial to compare surgical intervention followed by post operative conservative care and non operative conservative care to see how they may affect pain. In this study 188 participants were assigned to two groups. In the first group 94 patients for surgical intervention followed by conservative care and second group for non operative conservative care. Conservative care included both physical and medical therapy. Physical therapy was given for an hour per week for 12 weeks. Study outcome was measured by total Western Ontario and Mc Master Universities (WOMAC) score at years of follow up. The conclusion revealed that surgery with conservative care diminished knee joint pain more than the non operative conservative care.

**Lone.A.R, Wafai.Z.A, Buth.B.A, Wani.T.A, Koul.P.A.(2003)** conducted a study on analgesic efficacy of Transcutaneous Electrical Nerve Stimulation (TENS ) compared with Diclofinac sodium in Osteoarthritis of the knee. The randomized trial of 60 patients was planned. Patients were interviewed to record pain intensity on simple descriptive scale. 30 Patients formed the phase1 and 30 patients for phase11. In phase1 patients received Diclofinac sodium twice a day for 2weeks.For phase11 TENS was applied for 20 minutes sessions daily for 2 weeks followed by assessment of pain intensity. The conclusion revealed significant pain relief ( $p<0.001$ ) and improved functional mobility ( $p<0.001$ ) after TENS compared to the Diclofinac sodium.

**Basirnia.A, Sadeghipoor.G. (2001)** conducted a study to investigate the effect of low power laser therapy on Osteoarthritis of the knee. In this 20 patients aged 50- 60 year were included. All patients had received conservative treatment with poor results. Laser device used for this treatment was pulsed IR diode laser;810 nm wavelength once a day for 2 days interval. The total number of applications was 12 sessions. The outcome was observed and measured on Numerical rating scale. (Self assessment by the patient index of severity for Osteoarthritis of the knee). The

conclusion revealed that there was significant improvement in pain relief and quality of life in 70% of patients, compared to their previous status ( $P < 0.05$ ). There was no significant change in range of motion of the knee.

**Bjordal.J.M, Couper.C. (2008)** conducted a study to determine the effect of glucosamine sulphate and ibuprofen on pain in Osteoarthritis. In this 200 patients were divided in to two groups, one group taking 500 mg glucosamine sulphate 3 times daily, and the other group taking ibuprofen 400 mg 3 times daily. The study lasted for 4 weeks and patients were assessed weekly. At the end of the treatment, there was a success rate of 52% in the ibuprofen group and 48% in the other group. Significantly 35% of patients taking ibuprofen suffered side effects, compared with only 6% in the glucosamine sulphate group. The researchers concluded that “glucosamine sulphate” was effective than ibuprofen on pain in Osteoarthritis.

### **3. Literature related to exercise in knee joint pain**

**Eliza Chakaravarthy (2002)** conducted a long term study at Stanford University to investigate the effect of running in Osteoarthritis. In this study 90 persons were randomly assigned to two groups. Forty-five persons formed the study group and 45 persons for control group. The participants continued the study for a duration of 18 years. The persons were exercised once a day in early morning. The results indicated that after 18 years 20% of the runners had developed Osteoarthritis in the knee, compared with 42% of the non runners.

**Tippet SR (1992)** conducted a study to determine the effect of closed kinetic chain exercises in patient with knee joint pain. In this study the participants were 40 persons with knee joint pain who were in the age group of 55 to 65 years. In group one 20 persons were assigned for closed kinetic chain exercise two times a day for one month. In group two the persons did not exercise at all. The conclusion revealed that there was significant improvement in pain relief and functional mobility and quality of life in the study group than in the control group.

**Fisher M.N. Prentice.K.R. (2001)** conducted a study to determine the effect of progressive resisted exercise in patient with knee joint pain. A total of 50 patients

with knee joint pain were assigned randomly to two groups. Twenty five patients formed the study group and twenty five patients for the control group. They reported the severity of pain using the visual analog scale. The patients exercised once a day for 6 weeks. The pain score decreased in 25 (100%) patients in study group. The conclusion revealed that there was significant improvement in joint pain and functional mobility.

**Kang. P.S. (2004)** conducted a study to determine the effect of hydrotherapy in patients with Osteoarthritis. In this study the participants were 100 patients with Osteoarthritis who were above 50 years of age. Patients were divided into three groups. The first group of 33 patients exercised three times a week in a swimming pool, the second group 33 patients exercised in a gym, and the third group of patients did not exercise at all. The out come was that both the exercise groups were able to walk faster and functional mobility also improved. The researcher suggested that both the gym and hydrotherapy interventions produce passive functional outcomes for the patients with Osteoarthritis than those in the control group.

**Archives of physical medicine and rehabilitation (2002).** A randomized control trial to compare the effectiveness of dynamic and isometric knee exercises in people with Osteoarthritis. In this study 102 old age people were randomly assigned to two groups. In group one 51 people were assigned for dynamic exercise and in group two 51 people were assigned for isometric exercises. They reported the severity of pain using the visual analog scale. Exercises were performed three times a week for 16 weeks. The out come of the study showed that both the exercises were equally effective in reducing the pain.

**Thomas.K.S,Muir.K.R,Doherty.M,Jone.A.C. (1999)** conducted a factorial randomized control trial to determine whether a home based exercise programme can improve the outcome in patients with knee pain. In this study 786 participants were randomized to three groups. Group one for monthly telephone contact, group two for exercise therapy plus telephone contact and group three no intervention. The participants continued the study for a duration of 24 months. . The out come was self reported score for knee pain on the WOMAC , general physical function scored on SF-36 questionnaire. Highly significant reduction in knee pain was apparent for the

exercises group than the other. Mean difference 0.82(95%), confidence interval 1.3 to -0.3. But there was no significant in other two groups

#### **4. Literature related to functional mobility and anxiety in Osteoarthritis**

**K.M.Misillian (2007)** conducted a study to determine the gender difference of anxiety level in old age home with Osteoarthritis. In this study participants were prospectively placed in to two groups. In group A 20 male persons and group B 20 female persons .The level of anxiety was scored on Jung anxiety scale. .The conclusion revealed that in group A 12% had severe anxiety and 43% moderate anxiety and remaining were in mild anxiety, but in group B 45% had severe anxiety and 37% had moderate anxiety and remaining were in mild anxiety. The result suggested that female persons had more anxiety than the male persons.

**Moses.k.B. (2004)** conducted a study to determine the effect of sleep in emotional well being and daily normal activities of patients with Osteoarthritis. This study aimed to examine the relations of sleep patterns to normal physical activities and emotional well being. The variables used were physical activity, and emotional well being. The samples were 66 persons selected by simple random technique. They reported the sleep using a Pittsburgh sleep quality index. Reliability of the tool was found to be 0.78. The validity had been described by the researchers as good with a sensitivity of 91.5% and a specificity of 83.4%. The method of data collection was through questionnaire and interview schedule.

The result showed that 64% experienced sleep disturbance and remaining had normal sleeping pattern. The researcher concluded that those who had normal sleeping pattern, had good emotional well being, and physical activities compared to the other.

**Grain. M.L (2003)** conducted a study on audio – visual relaxation training for anxiety among person with Osteoarthritis. The long tem effect of an audio- visual relaxation training treatment involving exercise, yoga, meditation was compared with

nursing care for reducing anxiety. This research was a quasi experimental two group pretest - post test study. In this study 40 old age people were randomly assigned to two groups. In group one 20 people were assigned for audio – visual relaxation training and in group two 20 people were assigned for routine nursing care. They reported the severity of anxiety using a Jung anxiety scale. Duration of the study was 2 weeks. The outcome of the study showed that there was significant reduction of anxiety in audio- visual relaxation training group than in the other group.

**Alli Daan (2004)** conducted a study to determine the anxiety level in old age people with Osteoarthritis. In this study the participants were 120 persons who were above 50 years of age. Patients were divided in to two groups. The first group of 60 persons had Osteoarthritis but remaining 60 persons in the second group had no Osteoarthritis. The overall group anxiety was scored on Jung anxiety scale. The findings revealed that in group one 72% had severe anxiety and remaining were in moderate anxiety, but in group two 68% persons had moderate anxiety and remaining were in mild anxiety.

**Schumacher.H.R, Hery.M, Resher.R.A. (1994)** conducted a study to determine the effect of yoga in Osteoarthritis of the knee. A total of 47 patients were enrolled; 26 patients for yoga and 21 patients for control. Yoga was performed 4 times a week for 8 weeks. Variables assessed were pain, strength, motion, anxiety, using the Stanford questionnaire. The result suggested that yoga group improved significantly in functional mobility more than the control group.

The review of literature enlightened the investigator to develop an insight in to the isometric exercise and its effects. This review helped the investigator to gain a deeper knowledge of the research problem and guided in designing the study.

## CHAPTER – III

### METHODOLOGY

This chapter explains the methodology adopted by the researcher to assess the degree of functional mobility, joint pain and anxiety and deals with description of research design, research setting, sample and sampling technique, development and description of tool, pilot study, data collection method and statistical analysis.

#### RESEARCH APPROACH

The research approach is an overall plan chosen to carryout the study. The selection of research approach is the basic procedure for the conduct of research inquiry. An evaluative approach is used in this study as it is aimed at assessing the effectiveness of isometric exercise on functional mobility, pain and anxiety of old age people with Osteoarthritis.

#### RESEARCH DESIGN:

A non equivalent quasi experimental pre test - post test control group design was used,

Experimental group     $O_1$  xxxxxxxxxxxxxxxxxxxxxxxxxxxx $O_2$

Control group             $O_1$  —————  $O_2$

$O_1$  – Pre assessment of joint pain on numerical pain intensity scale, functional mobility and anxiety on two rating scales for both experimental and control group.

$O_2$  – Post assessment of joint pain, functional mobility and anxiety after 20 days of exercise for the experimental group and after 20 days without exercise for the control group.

X – Isometric exercises

For the experimental group isometric exercise was taught in both standing and lying position. The exercise was carried out for 15 minutes every day for 20 days in the presence of the investigator.

### **VARIABLES OF THE STUDY**

Dependent variables : Pain perception, functional mobility and anxiety

Independent variables : Isometric exercises.

### **SETTING OF THE STUDY :**

The study was conducted in two old age homes (A and B) in west Vadavalli. Both these old age homes come under one administration funded by the Egypt Senior citizens association. Old age home A has 172 inmates and old age home B has 144 inmates.

Both these two old age homes have 20 rooms and 5 dormitories. Each room accommodates 4-5 members and the dormitory accommodates 7-10 members. There is separate room for meditation, news reading, television, meeting hall, visitors, and office for administrator. There is a kitchen along with the dining room.

Admission to these old age homes takes place once a year in the month of May. Two months prior to admission name is registered. Old age people seek admission to these homes either voluntarily or brought by relatives. Two separate registers are maintained for voluntary and involuntary admission.

In both these old age homes has no medical facilities. If any health problem arises the inmates are referred to the near by hospital.

### **POPULATION:**

Target population comprised of all the males in the age group between 55 – 75 years with knee joint pain in the two selected old age homes at Coimbatore. 44 inmates from each of the old age home were eligible to participate in this study.



### **SAMPLE SIZE:**

The sample consisted of 30 males based on the criteria for sample selection.

15 males were assigned to experimental group and 15 were assigned to control group.

### **SAMPLING TECHNIQUE:**

A list of eligible subjects was prepared for old age home A and B. By simple random sampling technique – lottery method 15 samples were selected from old age home A and were assigned to the experimental group. From old age home B 15 samples were selected and assigned to the control group.

### **SAMPLING CRITERIA:**

The following were the criteria for selection of samples for the study.

#### **Inclusion Criteria**

- Males with knee joint pain aged 55 – 75 years.
- Bilateral or unilateral knee joint pain.
- Those willing to participate in the study.

#### **Exclusion Criteria**

- Bed ridden persons.
- Person who had undergone orthopaedic surgery. (eg: amputation, knee replacement)
- Persons with systemic disease

### **DESCRIPTION OF THE TOOL**

The tools used for the study were a questionnaire, numerical pain intensity scale and 2 rating scales. The technique used for data collection was interview..

## **1. Questionnaire**

The questionnaire was to gather demographic data such as age, education, number of children, duration of stay in the old age home, reason for separation from the family. (appendix - 6 )

## **2. Numerical pain intensity scale**

A 10 point horizontal numerical pain intensity scale was used to assess the degree of joint pain. It is a standardized tool to assess pain. It has been widely used in many of the studies. It is recommended by Agency for Health Care Policy and Research (AMCPR - 1992).It consists of a straight – line ( 1 – 10 ) representing the intensity of pain and has verbal descriptions at each end. A person designates a point on the scale corresponding to their pain at the time of assessment. (appendix - 6 )

## **3. Rating Scales**

### **Rating scale I**

This rating scale was developed to assess the ability of the subjects to perform activities before and after the intervention. There were 8 physical activities such as (walking, sitting, standing, climbing, lifting, bending etc). A four point scale (without difficulty, with difficulty, with assistance, not able to perform) was provided to record the response and columns were provided to mark the response before and after intervention. (appendix - 6)

### **Rating Scale II**

This rating scale was developed to assess the level of anxiety before and after intervention. There were 10 items (8 positive items and 2 negative items) focusing on self rated anxiety such as (feeling of troubling others, depending on others, worrying about pain, lack of communication, feeling of bedridden). A three point rating scale (often, sometime, not at all) was provided to record the response and columns were provided to mark the response before and after intervention.(appendix -6)

The tools were developed based on the objectives of the study, review of literature and discussion with experts.

## SCORING AND SCORING INTERPRETATION

### 1. Pain

Score		Scoring interpretation
0	-	No pain
1-3	-	Mild pain
4-6	-	Moderate pain
7-9	-	Severe pain
10	-	Worst pain

### 2. Functional mobility

Score	score%	Scoring interpretation
0-8	0-33.3%	Fully dependent
9-16	33.4-66.7%	Partially dependent
17-24	66.8-100%	Independent

### 3. Anxiety

Score	Score%	Scoring interpretation
0-10	0-33.3%	Mild anxiety
11-20	33.4-66.7%	Moderate anxiety
21-30	66.8-100%	Severe anxiety

## STRUCTURED TEACHING PLAN : (appendix -7)

### Isometric exercise

Isometric exercise is an exercise in which muscles of lower extremities are exercised and strengthened. This is done either in standing or lying position.

A teaching plan on isometric exercises was prepared.

The following steps were adopted to develop the teaching plan

- Development of objectives based on the study objectives.
- Selection of teaching learning contents.
- Selection of audio visual aids.
- Organization of the content

The contents included were

- Symptoms of joint pain
- Benefits of exercise
- Steps of isometric exercise
- Things to remember
- Instructions to follow

### **Exercise in standing position**

- Stand next to a fixed object (eg:wall. Table)
- Stand on right leg, and raise the left foot and rest the foot back of right calf muscles
- Hold the fixed object for balance
- Hold 10 –30 sec.
- Repeat 5-10 times .

### **Exercises in lying position**

- Lie in supine position
- Keep the care giver right hand in the sole of the foot and give compression
- Keep the left hand under the back of the knee joint.
- Ask the person to hold the knee down and straight against the resistance
- Hold 10-30 sec.
- Repeat 3- 5 times

The teaching plan was developed in English and it was translated in to Tamil.

### **CONTENT VALIDITY:**

The tool along with the teaching plan and objectives, were submitted to one medical expert, two nursing experts, one physiotherapist and one psychologist. Both the nursing experts hold a Master's Degree in nursing and with 5 – 6 years of teaching experience and working in one of the private colleges. The medical expert (M.D. Orthopedic) is a Chief consultant in one of the private hospitals in Coimbatore with more than 20 years of experience.

The Psychologist is an Assistant Professor in one of the private colleges in Coimbatore with more than 10 years of experience and the Physiotherapist is a chief consultant in one of the Private hospitals. These were concerns us of opinion with regards to all the items on the tools.

### **RELIABILITY:**

The reliability of the rating scales and pain scale was established by test, retest method. The retest was given after a gap of 20 days. Correlation Co- efficient was calculated by Spear man Brown correlation method. The obtained 'r' value was 1 for functional mobility, 1 for pain and 0.7 for anxiety ,which confirmed that there was high positive correlation and stability of the tool.

### **PILOT STUDY:**

A pilot study was conducted in two old age homes other than the selected old age homes in Kasthuri Nayaikkan Palayam because of the investigator thought that from those 5 inmates, other inmates are may started the exercises before the main study. A formal permission was obtained from the chairmen.

Five samples were selected by simple random technique – lottery method from each of the old age home and assigned to the experimental group and control group. After a self-introduction, the investigator explained the nature of the study to the samples. After developing good rapport the investigator collected the data on joint pain, functional mobility and anxiety by interviewing the samples individually.

Isometric exercise was taught and demonstrated to all the 5 samples together in the experimental group and they were asked to redemonstrate. The exercises was carried out for 15 minutes every day for 20 days in the presence of investigator. Base line data on pain, functional mobility, and anxiety were collected by interviewing the samples individually in the control group. On the of 20<sup>th</sup> day the investigator conducted the post test by using the same rating scales and numerical pain intensity scale for both the groups. The pilot study confirmed the adequacy of the tools and technique. Hence the tools were used for the main study without any alteration. The

average time taken for data collection was 15 minutes for each sample. The duration of pilot study was 20 days.

### **DATA COLLECTION METHOD :**

The main study was conducted in the two selected old age homes in west Vadavalli. Permission was obtained from the Chairman and Manager of the two selected old age homes. A hall was arranged for demonstrating the exercise. Based on the sampling criteria and technique 15 samples were selected for the experimental group from old age home A and 15 samples for the control group from old age home B. After establishing good rapport and obtaining their willingness the investigator explained the nature of the study to the samples and base line data on functional mobility, joint pain, and anxiety were collected by interviewing the samples individually from the old age home A. After that the investigator went to old age home B and collected the same data by interviewing the samples individually.

The next day onwards the investigator stayed in the old age home. An every day from 9.30am -12.30pm. For the group A isometric exercises was taught and demonstrated according to the teaching plan for a group of 5 samples at a time in 3 session. The old age people were asked to redemonstrate and carried out the exercises 15 minutes a day for 20 days in the presence of investigator. Two social worker assisted the investigator in arranging the place and getting the participants. On 20<sup>th</sup> day the investigator conducted the post test by using the same rating scales collected data on functional mobility, pain, and anxiety. After completing the collection for old age home A, the investigator visited the old age home B on the 20th day and conducted the post test and collected the same data as in the experimental group. The study was done from 02-07-09 to 22-07-09.

### **PLAN FOR DATA ANALYSIS**

The data obtained would be analyzed in terms of the objectives of the study using descriptive and inferential statistics.

**Descriptive Statistics :**

Frequency and percentage distribution were used to analyze demographic variables, to assess the degree of joint pain, and functional mobility, anxiety of the experimental and control group.

Mean and standard deviation were used to determine the difference in degree of joint pain, functional mobility and anxiety.

**Inferential Statistics :**

't' test was used to determine the significance of the difference in degree of joint pain, functional mobility and anxiety.

Correlation coefficient 'r' value was used to find the correlation between degree of pain, functional mobility and anxiety.

$\chi^2$  test was used to associate the demographic variables with functional mobility, degree of pain, and level of anxiety.

## CHAPTER – IV

### ANALYSIS AND INTERPRETATION OF DATA

**Copper.K.L (2008)** defines data analysis as the “systematic organization and synthesis of research data, and the testing of research hypothesis using those data. Interpretation is the process of making sense of the results of a study and examining their implications”.

This chapter deals with the analysis and interpretation of data collected from 30 old age people with Osteoarthritis. The data have been analyzed and presented under the following headings.

#### **1. Demographic characteristics of the sample.**

#### **2. Assessment of functional mobility in experimental and control group**

Various aspect of functional mobility has been analyzed in four levels (without difficulty, with difficulty, with assistance, not able to perform) for the experimental and control group before and after intervention in frequency and percentage and comparison of performance of functional mobility has been done by mean score and its significance by statistical test.

#### **3. Assessment of pain in experimental and control group**

Pain has been analyzed in three degrees (mild, moderate, severe) for the experimental and control group before and after intervention in frequency and percentage and comparison of degree of pain in experimental and control group has been done by mean score and its significance by statistical test.

#### **4. Assessment of anxiety in experimental and control group**

Anxiety has been analyzed in three levels (mild, moderate, severe) for the experimental and control group before and after intervention in frequency and percentage and comparison of level of anxiety by mean score and its significance by statistical test.



## 1. DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

TABLE - I

FREQUENCY AND PERCENTAGE DISTRIBUTION OF EXPERIMENTAL AND CONTROL GROUP ACCORDING TO DEMOGRAPHIC VARIABLES

N = 30

S.No	Demographic variables	Experimental group n=15		Control group n= 15	
		Fre	%	Fre	%
1	Age in years				
	a) 55- 65	03	20.0	02	13.3
	b) 66- 75	12	80.0	13	86.7
2	Educational status				
	a) No. schooling	01	06.7	01	06.7
	b) Primary	01	06.7	01	06.7
	c) Secondary	06	40.0	09	60.0
	d) Beyond secondary	07	46.7	04	26.7
3	No. of children				
	a. 1-2	07	46.7	04	26.7
	b. 3-4	07	46.7	10	66.7
	c. More	01	06.7	01	06.7
4	Mode of admission to old age home				
	a) Voluntary	11	73.3	07	46.7
	b) Involuntary	04	26.6	08	53.3
5	Duration of stay in old age home in years				
	a) 1-2	03	20.0	01	06.7
	b) 3-4	05	33.3	05	33.3
	c) More than 4	07	46.7	09	60.0

Table – I presents the demographic characteristics of the sample

**Age :** All the thirty samples were above 55 years of age. Majority of the experimental group 12 (80%) and the control group 13 (86.67%) were in the age group of 66-75 years, and only 5 samples from both the groups (33.4%) were in the age group of 55-65 years.

**Education :** Education of the samples ranged from no schooling to beyond secondary level of education. In experimental group 46% of the samples had secondary education and 40% had beyond secondary education. In control group 60% of the samples had secondary education and 26.7% of the samples had beyond secondary education. In each group 6.7% of the samples had primary education and 6.7% had no schooling.

**Number of Children :** In experimental group of samples 7 (46.7%) were having 1 – 2 children and 7 samples were having 3 – 4 children. In control group 10 samples (66.7%) were having 3 – 4 children and 4 samples (26.7%) were having 1 – 2 children and in each group 6% of the samples were having more than 4 children.

**Mode of Admission :** In experimental group majority of the samples 11 (73.3%) were admitted to the old age home voluntarily and the remaining 26.7% had involuntary admission. In control group 8 samples (53.3%) were admitted involuntarily and 7 samples (46.7% )had voluntary admission.

**Duration of stay :** 46% of the samples from experimental group and 60% of the samples from control group stayed for more than 4 years in the old age home, 5 samples (33.3%) from each group stayed for 3 – 4 years and 20% of the samples from experimental group and 6.7% from the control group stayed for 1 – 2 years.

## 2. ASSESSMENT OF FUNCTIONAL MOBILITY IN EXPERIMENTAL AND CONTROL GROUP

**TABLE – II**  
**DISTRIBUTION OF EXPERIMENTAL AND CONTROL GROUP IN THREE**  
**LEVELS OF FUNCTIONAL MOBILITY BEFORE AND AFTER**  
**INTERVENTION**

S. No	Levels of Functional Mobility	Experimental group n= 15				Control group n = 15			
		Before		After		Before		After	
		F	%	F	%	F	%	F	%
1	Fully dependent (score 0 - 8)	01	06.7	-	-	-	-	-	-
2	Partially dependent (score 9 – 16)	11	73.3	04	26.7	10	66.7	10	66.7
3	Independent (score 17- 25)	03	20.0	11	73.3	05	33.3	05	33.3

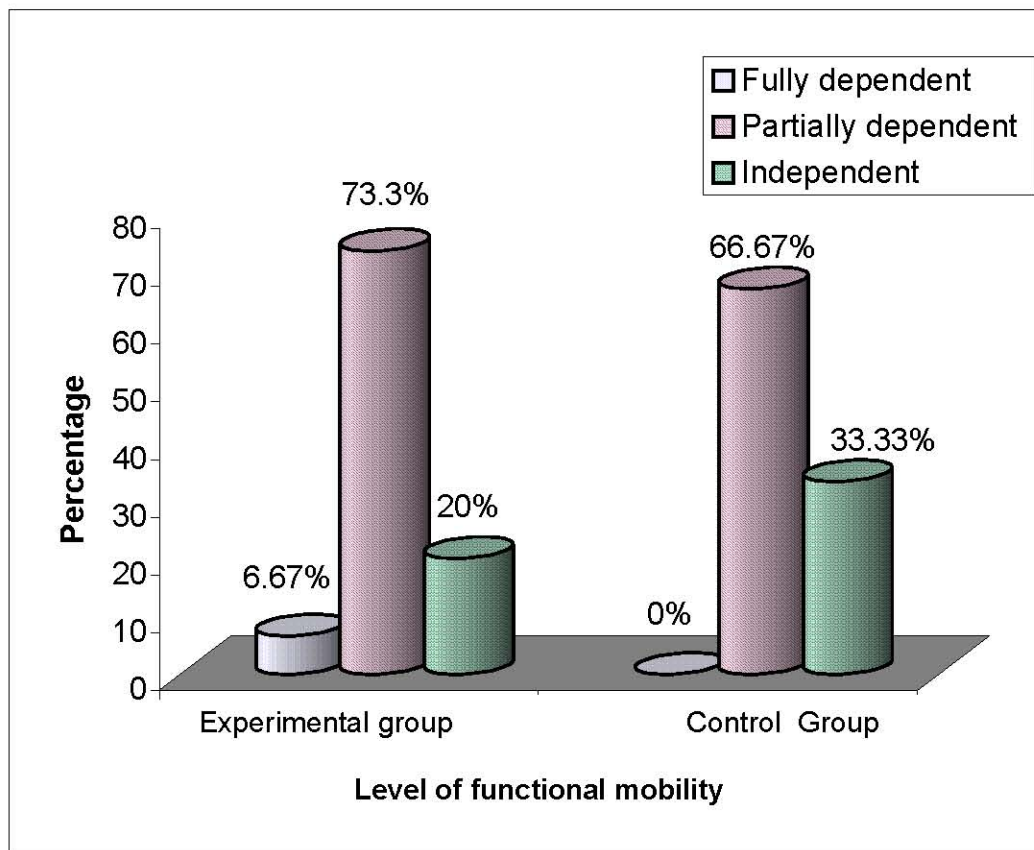
N=30

**Table II** – presents the distribution of experimental and control group in three levels of functional mobility before and after intervention.

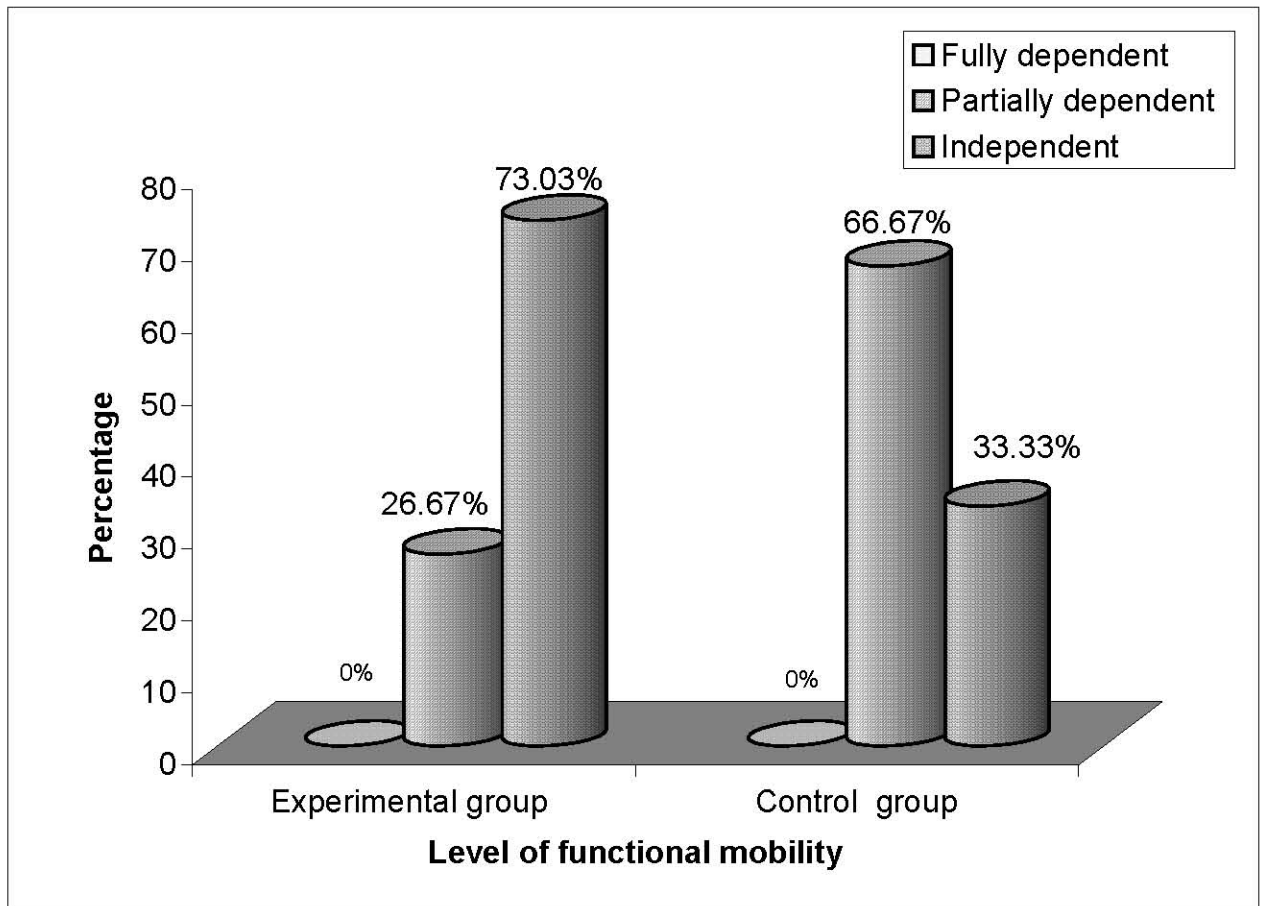
In the experimental group 3 samples (20%) and in the control group 5 samples (33.3%) were able to do the physical activities such as walking, washing, sitting, standing and climbing the stairs independently before the intervention. After the intervention the percentage of samples who performed the physical activities independently increased by 53% in the experimental group and remained the same in the control group.

In the experimental group 11 samples (73.3%) and in the control group 10 samples (66.7%) were partially dependent for the physical activities before the intervention. But in experimental group after the intervention the number of the samples who were partially dependent reduced from 11 to 4. Where in control group all the 10 samples continued to remain partially dependent in the subsequent observation on the 20<sup>th</sup> day.

**Figure 2** and **3** presents the percentage of experimental and control group in the level of functional mobility before and after intervention.



**Figure – 2:** Percentage of experimental and control group in three levels of functional mobility before intervention.



**Figure -3:** Percentage of experimental and control group in three levels of functional mobility after the intervention.

**TABLE – III**  
**COMPARISON OF MEAN SCORE OF FUNCTIONAL MOBILITY**  
**BETWEEN THE EXPERIMENTAL AND CONTROL GROUP BEFORE AND**  
**AFTER INTERVENTION AND LEVEL OF SIGNIFICANCE**

N =30

Intervention	Experimental group n = 15		Control group n = 15		Mean Difference	Unpaired ‘t’ value p = 0.01 df - 28
	Mean score	SD	Mean score	SD		
Before	14.6	2.6	14.8	3.9	0.2	1.2 NS
After	16.9	5.9	14.8	3.9	2.1	2.9*

\*Significant    NS – Not Significant    df – degree of freedom    Table value = 2.78

**Table-III** presents the mean score of functional mobility in experimental and control group before and after intervention.

The data suggests that the mean score of functional mobility in control group and in experimental group appear to be the same before intervention.. Statistically there is no significant difference between the mean score of functional mobility of experimental group and control group before intervention (t = 1.2 at df – 28, p = 0.01).

Mean score of functional mobility in experimental group is higher than the mean score of functional mobility in control group after intervention. Statistically there is a significant difference between the mean score of functional mobility both the group after intervention. (t = 2.9\*, df – 28, p = 0.01 )

So the hypothesis H<sub>1</sub> (pg - 7) “There will be significant difference between the functional mobility of experimental and control group after intervention and no significant difference of functional mobility in both the groups before intervention” is accepted.

**TABLE – IV**  
**MEAN SCORE OF FUNCTIONAL MOBILITY IN EXPERIMENTAL AND CONTROL GROUP BEFORE AND AFTER INTERVENTION AND LEVEL OF SIGNIFICANCE**

N = 30					
Group	Intervention	Mean score	Mean difference	SD	Paired 't valve P = 0.01 df – 14
Experimental Group	Before	14.6	2.3	1.4	6.4*
	After	16.9			
Control Group	Before	14.8	-	-	NS
	After	14.8			

\*- Significant    NS – Not Significant    df – degree of freedom    Table value = 2.98

**Table – IV** presents the mean score of functional mobility in experimental and control group before and after intervention.

In the experimental group the mean score of functional mobility before intervention is lesser than the mean score of functional mobility after intervention. The difference observed in the mean score of functional mobility of pre and post intervention is statistically significant. ( $t = 6.4^*$  at  $df - 14$ ,  $p = 0.01$ ). The difference seen in the functional mobility of the experimental group clearly indicates the effect of Iso metric exercises.

In the control group the mean score of functional mobility is same at base line and subsequent observation. Without exercise the ability to carry out various functions remains the same in the control group over a period of time.

So the hypothesis  $H_2$  (pg -7) “There will be a significant difference between the functional mobility of experimental group before and after intervention and no significant difference of functional mobility in control group before and after intervention” is accepted.

**TABLE- V**

**MEAN PERFORMANCE SCORE OF ACTIVITIES IN EXPERIMENTAL  
GROUP BEFORE AND AFTER INTERVENTION AND LEVEL OF  
SIGNIFICANCE**

n= 15

S.No	Activities	Before intervention		After intervention		SD	Paired 't' value P = 0.05 df -14
		Mean score	Mean %	Mean score	Mean %		
1	Walking (3 meter)	2.7	89.0	3.0	100	0.4	2.2 NS
2	Climbing up the stairs (10 steps)	1.7	57.7	1.8	62.3	0.3	1.4 NS
3	Climbing down the stairs (10 steps)	1.7	57.7	1.8	62.3	0.3	1.4 NS
4	Sitting on the floor from standing position	1.2	40.0	1.6	55.6	0.5	3.0 *
5	Standing from sitting on the floor	1.0	33.3	2.8	95.6	0.5	4.5 *
6	Lifting half bucket of water and walk (1meter)	2.5	84.3	2.8	95.6	0.6	1.8 NS
7	Washing clothes sitting on the floor	0.9	29.0	1.1	37.6	0.6	1.5 NS
8	Bending and picking things in down	2.7	89.0	3.0	100	0.6	1.8 NS

\* Significant NS- Not Significant df- degree of freedom. Table value: 2.78

**Table- V** presents the mean performance score of experimental group before and after intervention for each activities



The mean score percentage of sitting on the floor from standing position and standing from sitting on the floor were 40% and 33.3% respectively before intervention but it increased up to 55.6% and 95.6% after the intervention. This difference is statistically significant ( $t = 3^*$  and  $t = 4.5^*$   $p = 0.05$ ,  $df = 14$ ). It is quite evident that these two activities which are difficult to perform with joint pain, shows a marked improvement perhaps as a result of the exercise.

The mean score percentage of remaining activities climbing up the stairs, climbing down the stairs, washing clothes sitting on floor increased after the intervention from fully dependent to partially dependent and partially dependent to independent. But statistically there is no significant difference in the performance of these activities before and after intervention.

**TABLE VI**

**MEAN PERFORMANCE SCORE OF ACTIVITIES  
IN CONTROL GROUP BEFORE AND AFTER INTERVENTION AND  
LEVEL OF SIGNIFICANCE**

S.No	Activities	Before intervention		After intervention		SD	Paired 't' value P = 0.05 df -14
		Mean score	Mean %	Mean score	Mean %		
1	Walking (3 meter)	2.8	95.6	2.8	95.6	0	0 NS
2	Climbing up the stairs (10 steps)	1.7	57.7	1.7	57.7	0	0 NS
3	Climbing down the stairs (10 steps)	1.7	57.7	1.7	57.7	0	0 NS
4	Sitting on the floor from standing position	1.3	43.3	1.3	43.3	0	0 NS
5	Standing from sitting on the floor	1.1	36.7	1.1	36.7	0	0 NS
6	Lifting half bucket of water and walk (1meter)	2.5	84.3	2.5	84.3	0	0 NS
7	Washing clothes sitting on the floor	1.0	33.3	1.0	33.3	0	0 NS
8	Bending and picking things in down	2.4	82.3	2.4	82.3	0	0 NS

NS- Not Significant      df- degree of freedom.

Table value: 2.78

**Table- VI** presents the mean performance score of control group before and after intervention for each activities.

The mean score percentage of functional mobility in all the 8 activities remained the same for the control group at the base line and in subsequent observation. Without exercise the ability to carry out various functions remain the same in the control group over a period of time.

**TABLE –VII**  
**MEAN PERFORMANCE SCORE OF ACTIVITIES IN EXPERIMENTAL AND**  
**CONTROL GROUP BEFORE INTERVENTION AND LEVEL OF**  
**SIGNIFICANCE**

N= 30

S.No	Activities	Experimental group n=15			Control group n= 15			‘t’ Value P= 0.01 df- 28
		Mean score	Mean %	SD	Mean score	Mean %	SD	
1	Walking (3 Meters)	2.7	89.0	0.5	2.8	95.6	0.3	1.4 NS
2	Climbing up the Stairs (10 Steps)	1.7	57.7	0.5	1.7	57.7	0.5	0 NS
3	Climbing down the stairs (10 steps)	1.7	57.7	0.5	1.7	57.7	0.5	0 NS
4	Sitting on the floor from standing position	1.2	40.0	0.7	1.3	43.3	0.9	1.9 NS
5	Standing from sitting on the floor	1.0	33.3	0.6	1.1	36.7	0.7	0.9 NS
6	Lifting half bucket of water and walk (1 meter)	2.5	84.3	0.5	2.5	84.3	0.6	0 NS
7	Washing clothes sitting on floor	0.9	29.0	0.6	1.0	33.3	0.8	0.5 NS
8	Bending and picking things in down	2.7	89.0	0.5	2.4	82.3	0.5	1.0 NS

NS- Not Significant      df- degree of freedom.

Table value: 2.78

**Table- VII** presents the mean performance score of activities in experimental and control group before the intervention.

For the activity of washing clothes sitting on the floor the mean score for the experimental group was 29% and for the control group 33.3% before intervention. This shows that both the groups were fully dependent in performing this activity.

The mean score of climbing up the stairs, climbing down the stairs, sitting on the floor from standing position, standing from sitting on the floor ranged from 33 – 58% for both the groups, which reflects that both the groups were partially dependent in performing these activities.

For walking- 3 meters, lifting half bucket of water and walk – 1 meter, and bending and picking things from the floor both the groups got high mean score ranging from 82 - 96% before intervention. Both groups were independent in performing these three activities.

This table clearly shows that old age people with joint pain show a similar functional mobility. In some activities they are independent while in some other activities they are either partially or fully dependent.

Statistically there is no significant difference in performing all the activities between the experimental and control group before intervention.

**TABLE- VIII**  
**MEAN PERFORMANCE SCORE OF ACTIVITIES IN EXPERIMENTAL AND**  
**CONTROL GROUP AFTER INTERVENTION AND LEVEL OF**  
**SIGNIFICANCE**

N= 30

S.No	Activities	Experimental group n= 15			Control group n= 15			't' Value P= 0.01 df- 28
		Mean score	Mean %	SD	Mean score	Mean %	SD	
1	Walking (3 Meters)	3.0	100	0.0	2.8	95.6	0.3	0 NS
2	Climbing up the Stairs (10 Steps)	1.8	62.3	0.3	1.7	57.7	0.5	0.9 NS
3	Climbing down the stairs (10 steps)	1.8	62.3	0.3	1.7	57.7	0.5	0.9 NS
4	Sitting on the floor from standing position	1.6	55.6	0.5	1.3	43.3	0.9	3.2*
5	Standing from sitting on the floor	2.8	95.6	0.5	1.1	36.7	0.7	4.3*
6	Lifting half bucket of water and walk (1 meter)	2.8	95.6	0.5	2.5	84.3	0.6	1.9 NS
7	Washing clothes sitting on floor	1.1	37.6	0.6	1.0	33.3	0.8	0.46NS
8	Bending and picking things in down	3.0	100	0.0	2.4	82.3	0.5	0 NS

NS- Not Significant

df- degree of freedom.

Table value: 2.78

**Table- VIII** presents the mean performance score of experimental and control group for each activities after intervention

The mean score percentage of sitting on the floor from standing position and standing from sitting on the floor was 55.6% and 95.6% for the experimental group and 33.3% and 36.7% for the control group after the intervention..

Statistically there was a significant difference in these two activities of sitting on the floor from standing position ( $t = 3.2^*$  ,  $p = 0.01$ ,  $df=14$  ) and standing from sitting on the floor (  $t = 4.3^*$  ,  $df =_14$  ,  $p= 0.01$  ). The mean score percentage of walking, lifting half bucket of water and walk , and bending and picking things from down was above 82.2 % in the both the groups. So they are dependent in doing the all physical activities. However statistically there was no significant difference between the two groups in performing all these activities.

### 3. ASSESSMENT OF PAIN IN EXPERIMENTAL AND CONTROL GROUP

**TABLE –IX**  
**FREQUENCY AND PERCENTAGE DISTRIBUTION OF EXPERIMENTAL**  
**AND CONTROL GROUP ACCORDING TO DEGREE OF PAIN BEFORE**  
**AND AFTER INTERVENTION**

N = 30

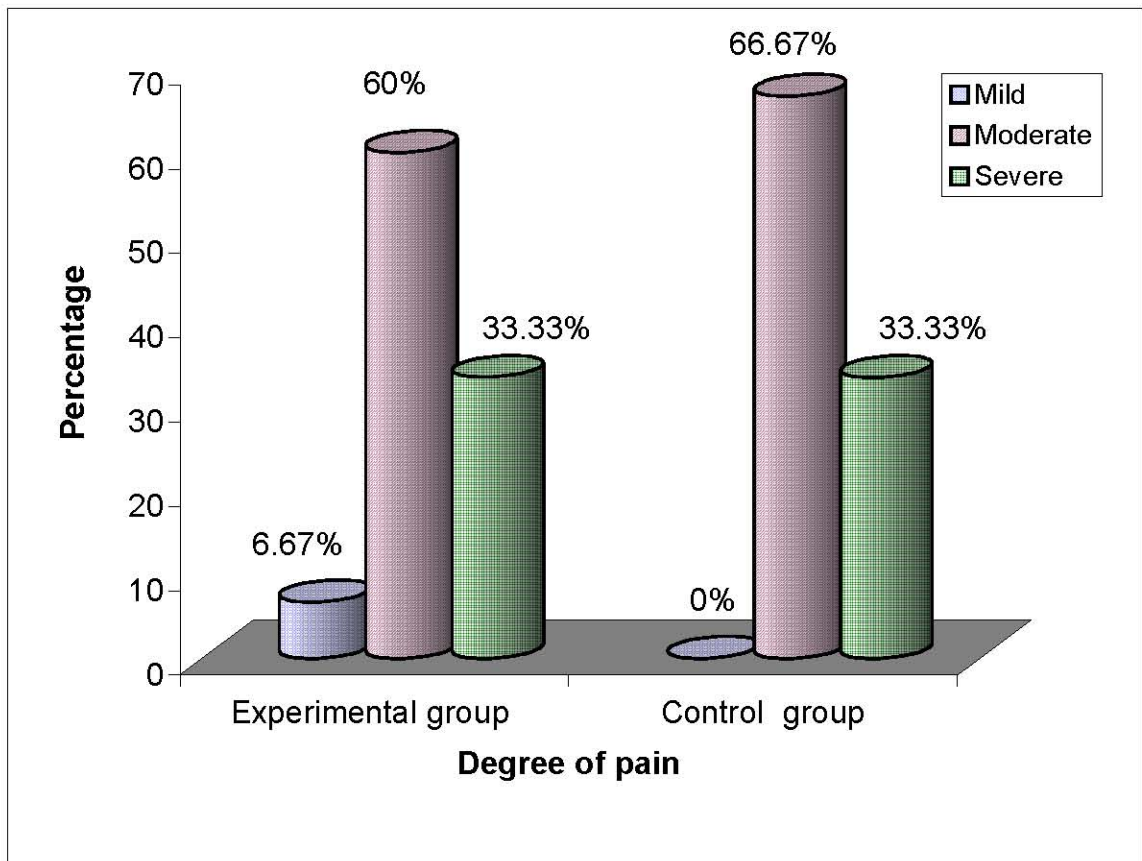
S.No	Degree of Pain	Experimental group n= 15				Control group n = 15			
		Before		After		Before		After	
		F	%	F	%	F	%	F	%
1	Mild pain (score 1 - 3)	01	06.7	10	66.7	-	-	01	06.7
2	Moderate pain (score 4-6)	09	60.0	03	20.0	10	66.7	09	60.0
3	Severe pain (score 7-10)	05	33.3	02	13.3	05	33.3	05	33.3

**Table –I X** presents the frequency and percentage distribution of experimental and control group according to degree of pain before and after intervention.

In the experimental group and control group 5 samples (33.3%) had severe pain before intervention. After intervention in experimental group only one sample (13.3%) had severe pain. Where as in control group all the 5 samples continued to have severe pain. Similarly in experimental group 9 samples (60%) had moderate pain and one sample (6.7%) with mild pain before intervention.

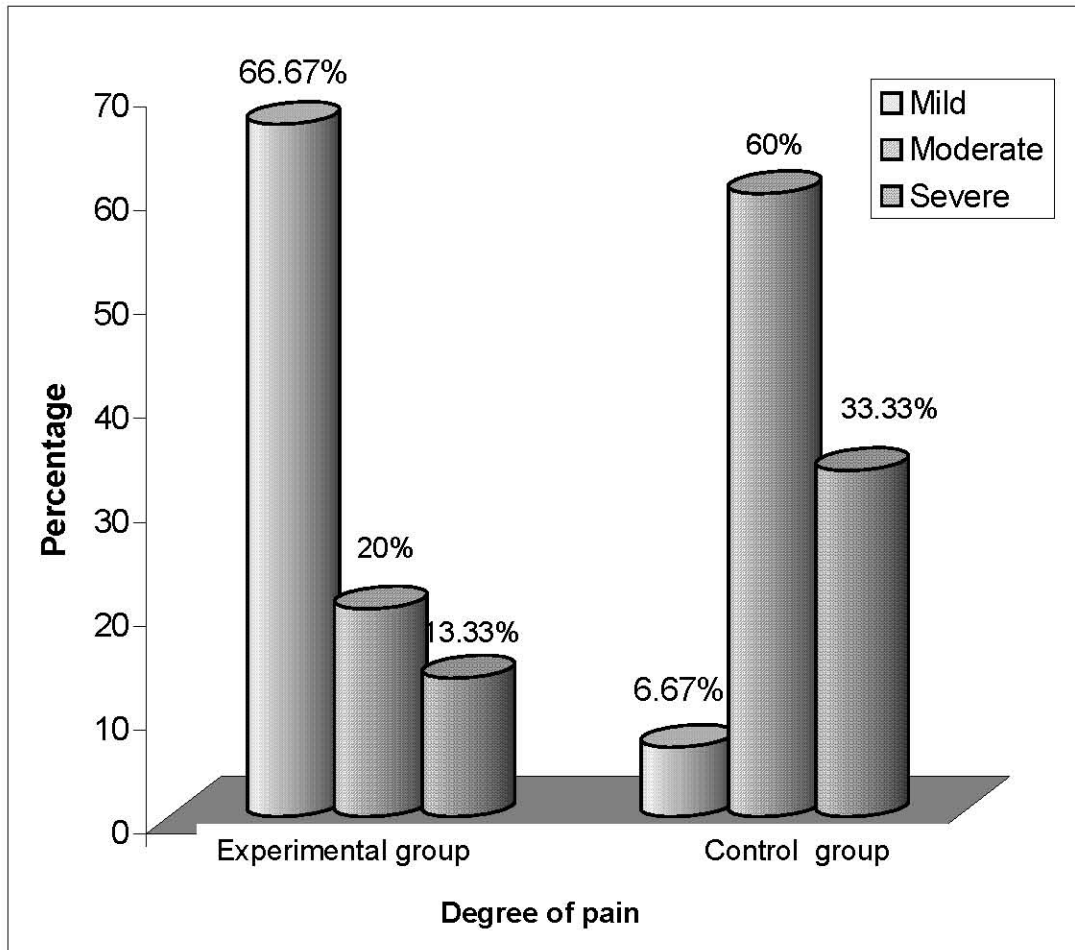
After intervention the number of person with moderate pain reduced from 9 to 3 (20%) and number of person with mild pain increased from 1 to 10 (66.7%) in the experimental group. In control group the number of person with moderate pain was 10 (66.7%) in the base line observation. In the subsequent observation after 20 days the number of person continued to remain the same expect 1 person who experienced mild pain.

**Figure 4 and 5** highlighting the percentage of experimental and control group according to degree of pain before and after intervention.



**Figure- 4:** Percentage of experimental and control group according to degree of pain before intervention.





**Figure- 5:** Percentage of experimental group and control group according to the degree of pain after intervention.

**TABLE- X**  
**COMPARISON OF MEAN PAIN SCORE OF EXPERIMENTAL AND CONTROL GROUP BEFORE AND AFTER INTERVENTION AND LEVEL OF SIGNIFICANCE**

Intervention	Experimental group n=15		Control group n=15		Mean Difference	Un Paired 't' Value P=0.01 df - 28
	Mean score	SD	Mean score	SD		
Before	5.8	1.7	6.0	1.4	0.2	0.4 NS
After	3.4	2.1	6.0	1.4	2.6	3.9 *

N= 30

\* Significant NS – Not Significant df – degree of freedom Table value –2.76

**Table – X** - presents the mean pain score of experimental and control group.

The data suggests that the mean pain score of control group and the experimental group is about the same before intervention. Statistically there is no significant difference between the mean pain score of experimental and control group before intervention ( $t = 0.4$  at  $df = 28$ ,  $p = 0.01$ ).

Mean pain score of experimental group is lesser than the mean pain score of the control group after intervention. Statistically there is a significant difference between the mean pain score of experimental and control group after intervention. ( $t = 3.9^*$ ,  $p = 0.01$ ,  $df = 28$ ).

So the hypothesis  $H_3$  (Pg - 7 ): “There will be significant difference between the mean pain score in the experimental and control group after intervention” is accepted. The pain reduction in the experimental group could be due to the effect of isometric exercise.

**TABLE – XI**  
**MEAN PAIN SCORE OF EXPERIMENTAL GROUP AND CONTROL**  
**GROUP BEFORE AND AFTER INTERVENTION AND LEVEL OF**  
**SIGNIFICANCE**

N = 30

Group	Intervention	Mean score	Mean difference	SD	Paired 't valve P = 0.01 df – 14
Experimental Group	Before	5.8	2.4	0.5	16.5*
	After	3.4			
Control Group	Before	6.0	-	-	NS
	After	6.0			

S- Significant NS – Not Significant df – degree of freedom Table value = 2.98

**Table – XI** presents the mean pain score of experimental group and control group before and after the intervention.

In the experimental group the mean pain score before intervention is higher (5.8) than the mean pain score after intervention (3.4). The difference observed in the mean pain score of pre and post intervention is statistically significant (t – 16.5\*, df – 14, p = 0.01)

Unlike the experimental group, the control group showed a mean score of 6.0 at the base line observation and showed the same degree of pain in the subsequent observation after a period of 20 days.

So the hypothesis H<sub>4</sub> (pg -7 ) “There will be a significant difference between the pain score of experimental group before and after intervention and no significant difference of pain score in control group before and after intervention” is accepted.

**4. ASSESSMENT OF ANXIETY IN EXPERIMENTAL AND CONTROL GROUP**

**TABLE – XII**  
**FREQUENCY AND PERCENTAGE DISTRIBUTION OF EXPERIMENTAL AND CONTROL GROUP IN THREE LEVELS OF ANXIETY BEFORE AND AFTER INTERVENTION**

N = 30

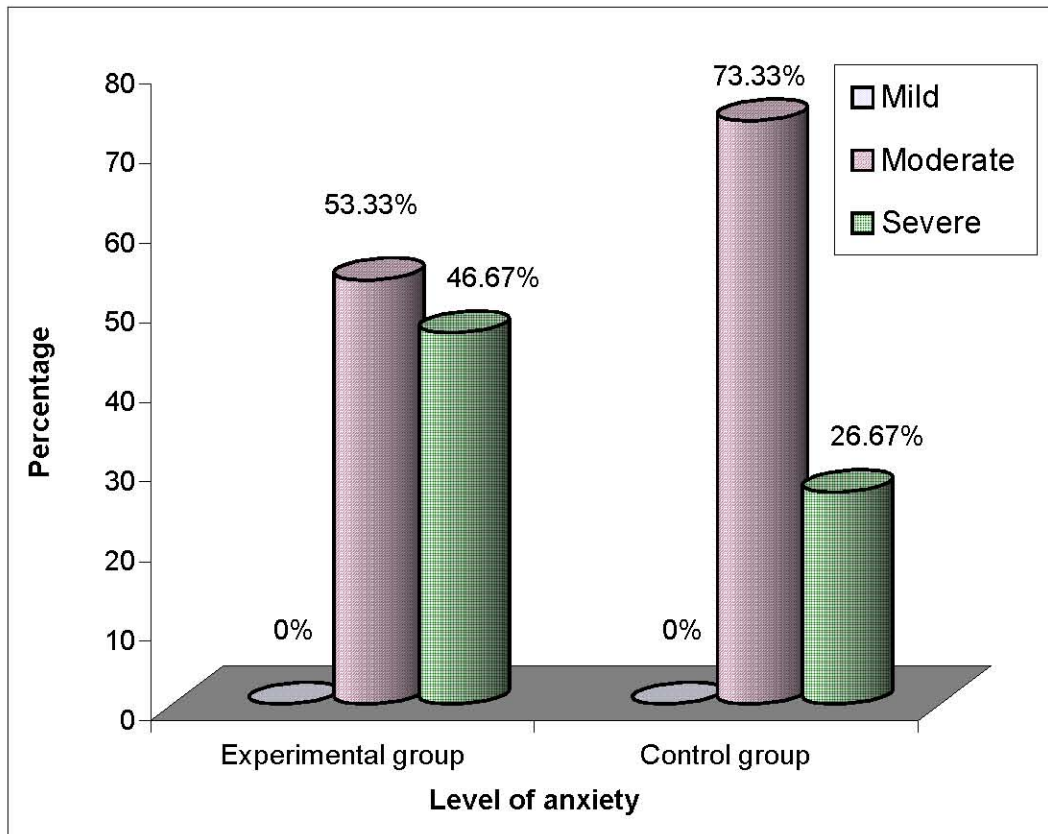
S.No	Degree of anxiety	Experimental group n= 15				Control group n = 15			
		Before		After		Before		After	
		F	%	F	%	F	%	F	%
1	Mild anxiety (score 0 – 7)	-	-	02	13.3	-	-	-	-
2	Moderate anxiety (score 8-14)	08	53.3	13	86.7	11	73.3	11	73.3
3	Severe anxiety (score 15 – 20)	07	46.7	-	-	04	26.6	04	26.7

**Table – XII** presents the frequency and percentage distribution of experimental and control group in three level of anxiety before and after intervention.

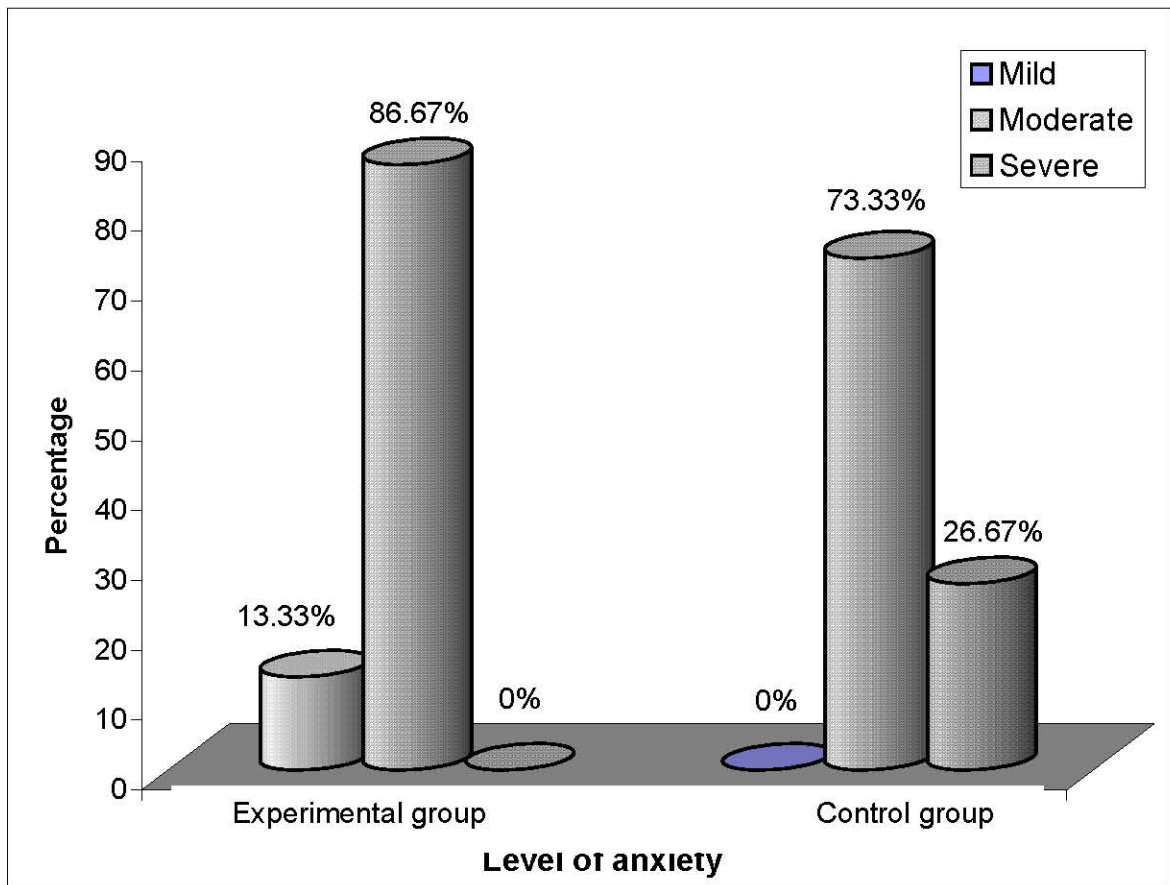
In the experimental group 7 samples (46.7%) had severe anxiety before intervention. After intervention in the experimental group no samples had severe anxiety, where as in the control group 4 samples (26.6%) continued to have severe anxiety .

After the intervention in the experimental group the number of persons with moderate anxiety increased from 8 to 13 (86.7%) and number of persons with mild anxiety after intervention 2 (13.3%). In the control group the number of persons with moderate anxiety was 11 (73.3%) in the base line observation. In the subsequent observation after 20 days the number of persons continued to remain the same.

**Figure 6 and 7** highlighting the percentage of experimental and control group according to the level of anxiety before and after intervention.



**Figure – 6:** Percentage of experimental and control group according to level of anxiety before intervention.



**Figure -7 :** Percentage of experimental and control group according to level of anxiety after intervention.

**TABLE XIII**  
**COMPARISON OF MEAN SCORE OF ANXIETY IN EXPERIMENTAL AND CONTROL GROUP BEFORE AND AFTER INTERVENTION AND LEVEL OF SIGNIFICANCE**

N = 30

S.No	Intervention	Experimental group n = 15		Control group n = 15		Mean difference	Unpaired 't' value p = 0.01 df – 28
		Mean score	SD	Mean score	SD		
1	Before	13.5	1.6	12.7	2.3	0.8	1.9 NS
2	After	8.7	0.6	12.5	2.4	3.8	2.9*

\*Significant NS – Not Significant df – degree of freedom Table value = 2.98

**Table – XIII** presents the mean score of anxiety in experimental and control group before and after intervention.

The data shows that the mean score of anxiety in experimental group is slightly higher than the control group before intervention. However, statistically there is no significant difference between the mean score of anxiety in experimental and control group before intervention ( $t = 1.9$ , at  $df - 28$ ,  $p=0.01$ )

The mean score of anxiety of experimental group is lesser than the mean score of anxiety in control group after intervention. Statistically there is a significant difference between the mean score of anxiety in experimental and control group after intervention ( $t = 2.9^*$ ,  $p = 0.01$ ,  $df - 28$ ).

So the hypothesis  $H_5$  (pg - 7 ) “There will be a significant difference between the anxiety of experimental and control group after intervention and no significant difference of anxiety in both the group before intervention” is accepted.

**TABLE – XIV**  
**MEAN SCORE OF ANXIETY IN EXPERIMENTAL GROUP AND CONTROL**  
**GROUP BEFORE AND AFTER INTERVENTION AND LEVEL OF**  
**SIGNIFICANCE**

N = 30

Group	Intervention	Mean score	Mean difference	SD	Paired 't valve P = 0.01 dt – 14
Experimental Group	Before	13.5	4.8	1.9	2.9*
	After	8.7			
Control Group	Before	12.7	0.2	0.64	0.8 NS
	After	12.5			

S\*- Significant NS – Not Significant df – degree of freedom Table value = 2.98

**Table – XIV** presents the mean score of anxiety in experimental and control group before and after intervention.

The mean score of anxiety in experimental group before intervention is higher (13.5) than the mean score of anxiety after intervention (8.7). The difference observed in the mean score of anxiety (4.8) of pre and post intervention is statistically significant. ( $t = 2.9^*$ ,  $df = 14$ ,  $p = 0.01$ )

The mean score of anxiety in control group before and after intervention has little difference. However statistically there is no significant difference before and after intervention.

So the hypothesis  $H_6$  ( pg -7 ) “ There will be a significant difference between the anxiety of experimental group before and after intervention and no significant difference of anxiety in control group before and after intervention” is accepted.



## 5. ASSOCIATION OF STUDY VARIABLES AND DEMOGRAPHIC VARIABLE

**TABLE - XV**  
**ASSOCIATION OF DEMOGRAPHIC VARIABLES WITH LEVEL OF**  
**FUNCTIONAL MOBILITY OF TOTAL SAMPLES BEFORE**  
**INTERVENTION**

S.No	Demographic variables	Level of functional mobility				$\chi^2$ Value	$\chi^2$ table value P <0.05
		Partially dependent		Independent			
		F	%	F	%		
1	Mode of admission a. Voluntary b. Involuntary	15 06	51.7 20.6	02 06	06.8 20.6	5.1 *	df - 1 3.8
2	Duration of stay in old age home in years a. <4 b. >4	12 09	41.3 31.0	04 04	13.7 13.7	0.2 NS	df - 1 3.8

N = 29

\* Significant

NS – Not significant

**Table - XV** – presents the association between demographic variables and level of functional mobility

The table shows that there is an association between mode of admission and level of functional mobility before intervention ( $\chi^2=5.1^*$ ). The samples admitted to the old age home involuntarily are more independent than those admitted by voluntarily and there is no association between duration of stay in old age home and level of functional mobility before intervention.

**TABLE - XVI**  
**ASSOCIATION OF DEMOGRAPHIC VARIABLES WITH DEGREE OF**  
**PAIN OF TOTAL SAMPLES BEFORE INTERVENTION**

N=30

S.No	Demographic variables	Degree of pain				$\chi^2$ Value	$\chi^2$ table value P <0.05
		Moderate		Severe			
		F	%	F	%		
1	Mode of admission					0.9NS	df - 1 3.8
	a. Voluntary	10	34.4	07	24.1		
	b. Involuntary	09	31.0	03	10.3		
2	Duration of stay in old age home in years		34.4	03	10.3	1.5NS	df - 1 3.8
		10	31.0	07	24.1		
	a. <4	09					
	b. >4						

\* -Significant                      NS – Not Significant

**Table - XVI** – presents the association between the demographic variables and degree of pain.

The table value shows that there is no association between mode of admission, duration of stay and degree of pain in old age home.

**TABLE - XVII**  
**ASSOCIATION OF DEMOGRAPHIC VARIABLES WITH LEVELS OF**  
**ANXIETY OF TOTAL SAMPLES BEFORE INTERVENTION**

N=29

S.No	Demographic variables	Level of anxiety				$\chi^2$ Value P < 0.05	$\chi^2$ table value P < 0.05
		Moderate		Severe			
		F	%	F	%		
1	Education (n=29) a. Primary b. Secondary c. Beyond secondary	02	06.0	-	-	6.5*	df - 2 5.9
		09	34.6	06	23.0		
		07	26.7	04	15.3		
2	Number of children a. < 2 b. >2	06	20.0	05	16.7	0.6NS	df - 1 3.8
		13	43.3	06	20.0		
3	Mode of admission a. Voluntary b. Involuntary	08	26.7	10	33.3	7.1*	df - 1 3.8
		11	36.7	01	03.3		
4	Duration of stay in old age home in years a. <4 b. >4	09	30.0	05	16.7	0.1NS	df - 1 3.8
		10	33.3	06	20.0		

\* - Significant      NS – Not significant      df- degree of freedom

**Table - XVII** – presents the association between the demographic variables and level of anxiety..

The table value shows that there is an association between the education, mode of admission, and levels of anxiety before intervention ( $\chi^2 = 6.5^*$ ,  $7.1^*$ ). Lesser education of old age people had higher anxiety and higher education had lesser anxiety, but no association between the number of children and duration of stay in old age home before intervention.

## 6.CORRELATION OF VARIABLES

**TABLE - XVIII**  
**CORRELATION BETWEEN OVERALL LEVEL OF FUNCTIONAL**  
**MOBILITY AND DEGREE OF PAIN OF TOTAL SAMPLES BEFORE**  
**INTERVENTION AND LEVEL OF SIGNIFICANCE**

N= 30

S.No	Variables	Mean score	'r' value	't' value df-28 p=0.05
1	Overall level of functional mobility	14.7	-0.77	6.4*
2	Overall degree of pain	5.9		

\*-Significant

df – degree of freedom

Table value = 2.04

**Table - XVIII**– presents the correlation between level of functional mobility and degree of pain.

Correlation was examined between the level of functional mobility and degree of pain by Karl Pearson's Correlation Coefficient. The obtained 'r' value of level of functional mobility and degree of pain was -0.77. When statistically computed there was significant strong negative correlation found between the level of functional mobility and degree of pain.

The calculated value ( $t = 6.4^*$ , at  $df=28$ ,  $p = 0.05$ ) is greater than the table value. So significant strong negative correlation between the level of functional mobility and degree of pain.

It concludes that when the degree of pain reduces, the level of functional mobility will increase.

**TABLE - XIX**  
**CORRELATION BETWEEN OVERALL LEVEL OF FUNCTIONAL**  
**MOBILITY AND LEVEL OF ANXIETY OF TOTAL SAMPLES BEFORE**  
**INTERVENTION AND LEVEL OF SIGNIFICANCE**

N= 30

S.No	Variables	Mean score	'r' value	't' value df- 28 p= 0.05
1	Overall level of functional mobility	14.7	-0.38	2.1*
2	Overall level of anxiety	13.1		

\* - Significant                      df – degree of freedom                      Table value = 2.04

**Table - XIX**– presents the correlation between level of functional mobility and level of anxiety.

Correlation was examined between the level of functional mobility and level of anxiety by Karl Pearson's Correlation Coefficient. The obtained 'r' value of level of functional mobility and level of anxiety is –0.38. When statistically computed there was significant mild negative correlation found between the level of functional mobility and level of anxiety.

The calculated value (t = 2.1,df –28, p =0.05) is greater than the table value. So significant mild negative correlation between the level of functional mobility and level of anxiety.

It concludes that as the level of functional mobility decreases, level of anxiety increases.

**TABLE - XX**  
**CORRELATION BETWEEN OVERALL DEGREE OF PAIN AND LEVEL**  
**OF ANXIETY OF TOTAL SAMPLES BEFORE INTERVENTION AND**  
**LEVEL OF SIGNIFICANCE**

N= 30

S.No	Variables	Mean score	'r' value	't' value df –28 p = 0.05
1	Overall degree of pain	5.9	0.91	11.7*
2	Overall level of anxiety	13.1		

\* - Significant

df – degree of freedom

Table value = 2.04

**Table - XX**– presents the correlation between degree of pain and levels of anxiety.

The obtained 'r' value of degree of pain and level of anxiety is 0-91. When statistically computed there was significant positive correlation found between the degree of pain and level of anxiety.

The calculated value (11.7 and df – 28, p= 0.05) is greater than the table value. So significant positive correlation exist between degree of pain and level of anxiety in the experimental and control group before intervention.

It concludes that as the degree of pain increases, level of anxiety also increase.

## CHAPTER- V

### DISCUSSION

This study focused on assessing the effect of isometric exercise on functional mobility, pain and level of anxiety in old age people with Osteoarthritis. This chapter presents the main findings and its discussion.

**Table II to VIII presents functional mobility of the sample.**

**Table – II** In the experimental group 11 old age people (73.3 %) were partially dependent, 20% were independent and 6% were fully dependent before intervention. After the intervention 11 samples (73.3%) were independent and the rest partially dependent. But in the control group 10 samples (66.7%) were partially dependent and 5 (33.3 %) were independent before intervention and remained in the same level of functional mobility without any intervention after 20 days.

The present study findings is supported by the **Fisher M.N, Prentice K, R** on effect of progressive resisted exercise in patient with joint pain. The finding showed that there was a significant improvement in functional mobility.

**Table- III** The functional mobility significantly improved in the experimental group (mean score 16.9) compared to control group (mean score 14.8) with a statistical significance of  $t = 2.9^*$ ,  $df = 28$ ,  $p = 0.01$ .

**Table IV** The experimental and control group showed more or less same level of functional mobility (mean score 14.6 and 14.8 respectively) before intervention, after intervention the mean score of experimental group was 16.9 and for the control group 14.8. The experimental group showed a significant improvement ( $t = 6.4^*$ ,  $df = 14$ ,  $p = 0.01$ ) after the intervention compared to their mobility before intervention. Whereas in the control group no difference was seen.

**Table VII and VIII** The old age people capable of carrying physical activities (walking, lifting half bucket of water and walk, bending and picking things in down) independently ranged from 80 – 100% and partially dependent (climbing up the stairs

, climbing down the stairs, sitting on the floor from standing position , standing from sitting on the floor, washing clothes sitting on the floor) ranged from 33 – 58% in both the groups before intervention. Among these two activities (sitting on the floor from standing position, standing from sitting on the floor ) there is a significant improvement in functional mobility ( $t = 3.2^*$ ,  $t = 4.3^*$ ,  $df = 28$ ,  $p=0.01$  ) after the intervention. Whereas in the control group no difference was seen.

The present study findings is supported by **Schumacher .H.R , Herry.M, Resher .R.A** on the effect of yoga in Osteoarthritis. The finding showed that there was improvement in level of functional mobility. The marked improvement in functional mobility has seen among the old age people was by the effect of isometric exercise.

**Table – IX to XI presents the pain in the old age people.**

**Table – IX :** Ten old age people (60%) had moderate pain, 5 ( 33.3%) had severe pain and 1 (6.7%) had mild pain in the experimental group before intervention. After intervention 11 (66.7%) had mild pain, 3 of them (20%) had moderate pain and 2 (13.3) had a severe pain. In the control group 10 (66.7%) had moderate pain and 5 samples (13.3%) had severe pain before intervention, but there was no difference seen after 20 days.

**Table - X, XI:** In the experimental group the mean pain score was (5.8) before intervention and after intervention (3.4). The difference observed in the mean pain score was (2.4) .So there is a significant reduction of mean pain score ( $t = 16.5^*$ ,  $df = 14$  ,  $p= 0. 01$  ). In the control group the mean pain score was (6) before intervention and continued the same after intervention.

The report of the present study is consistent with the study finding of **Tippet. S. R.** to determine the effect of closed kinetic chain exercise in patient with knee joint pain. The finding showed that there was a significant improvement in pain relief and functional mobility.



The present study finding is supported by **Archives of Physical Medicine and Rehabilitation** to compare the effectiveness of dynamic and isometric exercise. The outcome showed that both exercises were equally effective in reducing the pain.

**Table – XII to XIV presents the anxiety of old age people**

**Table – XII:** In the experimental group 8 samples (53.3%) had moderate anxiety and rest of them (46.7%) had severe anxiety before intervention, but after the intervention majority of the 13 (86.7%) people had moderate anxiety and 2 (13.3%) had mild anxiety. In the control group 11 (73.3%) had moderate and 4 (26.7%) had severe anxiety, continued the same after 20 days.

**Table – XIII, XIV:** In the experimental group mean score of anxiety before intervention was (13.5) and after the intervention the mean score was (8.7), a reduction of (4.8). In the control group the mean score of anxiety (12.5) continued to be the same.

A study was done by **Alli Daan** to determine the anxiety level in old age people with Osteoarthritis. The findings revealed that 72% had severe anxiety and remaining were in moderate anxiety. This support the findings of the present study.

**Table –XV to XVII presents the association of demographic variables with study variables .**

**Table – XV** There is no association between the duration of stay in the old age home and level of functional mobility, there is association between the mode of admission to the old age home and level of functional mobility (  $\chi^2 = 5.1^*$ , df –1.  $p=0.05$  ).Those who came to the old age home involuntarily were more independent than those who came voluntarily.

**Table – XVI** There is no association between the degree of pain with mode of admission to the old age home and duration of stay in the old age home.

**Table – XVII** There is no association between the anxiety with number of children and duration of stay in old age home. There is an association between the

anxiety with education (  $\chi^2 = 6.5^*$ , df -2, p= 0.05 ) and mode of admission to the old age home (  $\chi^2 = 7.1^*$ , df -1, p= 0.05 ).

**Table XVIII to XX presents the correlation of variables .**

Significant strong negative correlation was found between the level of functional mobility and degree of pain (  $r = -0.77$  ), (  $t = 6.4^*$ , df - 28, p =0.05 ).When the pain is less the functional mobility increases (table XVIII). Significant mild negative correlation was found between the level of functional mobility and anxiety (  $r = -0.33$  ), (  $t = 2.7^*$ , df -28. p = 0.05 ).When the level of anxiety increases the functional mobility decreases (table XIX ). Significant positive correlation was found between the degree of pain and anxiety (  $r = 0.91$  ), (  $t = 11.7^*$ , df- 28 , p = 0.05 ). When the anxiety increases, the degree of pain also increases.

## **CHAPTER - VI**

### **SUMMARY OF FINDINGS, CONCLUSION, RECOMMENDATION AND IMPLICATION**

This chapter presents the summary of the study, summary of findings, conclusion, implication and recommendations.

#### **SUMMARY OF THE STUDY:**

The main aim of the study was to determine whether isometric exercise made any significant difference on functional mobility, pain and anxiety of old age people living in two old age homes.

The conceptual framework of the study was based on the Callista Roy's Adaptation theory. The research design used in this study was quasi experimental pretest post test control group design. The independent variable of the study was isometric exercise. Functional mobility, pain perception and anxiety were the dependent variables.

The sample consisted of 15 old age people with Osteoarthritis in the experimental group from one old age home and 15 old age people from another old age home in control group, selected by simple random method. In the pre test data on pain was collected using a 10 point numerical pain scale, and functional mobility and anxiety using rating scales by interview method .For the experimental group isometric exercises was taught using a teaching plan in a group of 5 samples at a time , followed by exercising every day for 15 minutes for 20 days .Post test data on pain, functional mobility, anxiety was gathered from both the groups on the 20th day. The data was analyzed using descriptive and inferential statistics.

## **SUMMARY OF FINDINGS:**

### **Demographic data**

12 – 13 samples in the both the groups were between 66 – 75 years of age and the rest between 55 – 65 years of age. 13 samples (86.7) in both the groups had either secondary or beyond secondary education. 14 samples ( 93.3 ) in the both the groups had either 1-2 or 3 – 4 children. 11 samples from the experimental and 7 samples from control group had voluntary admission to the old age home and rest of the samples had involuntary admission. 5 samples ( 33 .3% ) in both the groups had 3 – 4 years of duration of stay in the old age home and the rest with more than 4 years of admission in the old age home.

### **Functional mobility in the experimental and control group**

Before intervention , in the experimental group 4 samples ( 73. 3 % ) were partially dependent and 3 samples ( 20% ) independent . In control group 10 ( 66.7%) were partially dependent and 5 ( 33.3%) independent .After the intervention 11 (73.3 ) samples in the experimental group were independent and only 4 ( 26.7%) partially dependent. In the control group there was no change in the functional mobility after 20 days.

In the experimental group the mean score of functional mobility increased from 14.6 to 16.9 after intervention. In the control group the mean score of functional mobility remained the same ( 14.8 ) before and after the intervention.

After the intervention the experimental group gained independency from partial dependency for the two activities, sitting on the floor from standing position and standing up from sitting on the floor and for all other activities there was little improvement in the experimental group. In the control group there was no change in the performance of these activities.

### **Pain in experimental and control group**

In the experimental group 9 samples (60% ) had moderate pain. 5 (33.3%) with severe pain, and one (6.7%) with mild pain before intervention. After intervention 10 samples (66.7% ) had only mild pain and rest with moderate pain. The control group continued to have moderate(66.7%) and severe pain ( 33.3% ).

The mean pain score of experimental group reduced from 5.8 to 3.4 after the intervention and the mean pain score of control group was the same (6) before and after the intervention.

### **Anxiety in the experimental and control group**

In the experimental group 8 sample (53.3%) had moderate anxiety and 7 (46.7% ) with severe anxiety before the intervention. After intervention 13 samples (86.7 % ) had moderate anxiety and 2 ( 13.3% ) had mild anxiety. In the control group 11 (73.3%) had moderate anxiety before and after the intervention.

The mean score of experimental group reduced from 13.5 to 8.7 after the intervention and the mean score of the control group remind the same before and after the intervention.

### **SIGNIFICANT FINDINGS**

- There was significant improvement in the functional mobility of the experimental group compared to the control group after the intervention (  $t = 2.9^*$ ,  $df = 28$  ,  $p=0.01$  ) .
- In the experimental group there was significant improvement in the functional mobility after intervention compared to before intervention (  $t = 6.4^*$ ,  $df = 14$ ,  $p=0.01$  )
- There was a significant reduction of pain in the experimental group compared to the control group after the intervention(  $t = 3.9^*$ ,  $df = 28$ ,  $P = 0.01$ )
- In the experimental group there was a reduction of pain after intervention compared to the before intervention (  $t = 16.5^*$ ,  $df = 14$  ,  $p= 0.05$  )

- There was a significant reduction of anxiety in the experimental group compared to the control group ( mean score 12. 5 ) after the intervention. (  $t = 2.9^*$ ,  $df = 28$ ,  $p = 0.01$ ).
- In the experimental group there was a significant reduction of anxiety after the intervention compared to before intervention (  $t = 2.9^*$  ,  $df = 14$ ,  $p = 0.01$ ).

## **CONCLUSION**

The findings of the study concluded that there was a significant reduction in the degree of pain and level of anxiety in the experimental group after the intervention. There was an improvement in all the 8 activities of the experimental group and a significant improvement in functional mobility. It could finally be concluded that the improvement in functional mobility and reduction in pain and anxiety in the experimental group could be attributed to the effect of isometric exercise. The control group without intervention did not show any difference in the degree of pain , level of functional mobility and level of anxiety after 20 days.

## **IMPLICATION**

There was significant improvement in the level of functional mobility and reduction of pain and anxiety by the effect of isometric exercises. But among the 8 activities significant improvement was seen in only 2 activities .So to get a quality of life the patients must improve their ability in all the activities by carrying the exercise on a continued basis.

## **Nursing Practice**

Nurses play an important role in providing care to the old age people. The findings of the study indicates the benefit of exercise to old age people with Osteoarthritis. The health team members should be encouraged to teach the exercise to the old age people. To emphasize the present study findings to the management of the old age home and encourage the management to appoint the separate trained person to teach the exercise to the old age people. Isometric exercise is cost – effective. So it can be implemented in nursing practice in all the settings.

### **Nursing Education:**

The findings of the study emphasizes the effect of isometric exercise on functional mobility, pain and anxiety. The importance of exercise during the old age period can be taught to the nursing students and graduate nurses and this can be incorporated in the care of old age people. This will help the peoples to cope with functional mobility pain and anxiety.

### **RECOMMENDATIONS FOR FURTHER RESEARCH**

- The study can be replicated on a larger sample for generalization of the findings.
- The study can be conducted in different settings.
- A study can be conducted to find out the effectiveness of self instructional learning through media.
- A comparative study can be conducted with males and females.

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**APPENDIX – 1**

**LETTER SEEKING PERMISSION TO CONDUCT THE STUDY**

To

The Chairman  
Seniors Citizen's Complex  
Kasthuri Naiken Palayam  
Vadavalli (P.O)  
Coimbatore – 641 041

Respected Sir/ Madam

**Sub: permission requested for conducting Nursing research - Reg.**

We request you to kindly grant permission for our II year M.Sc (N) student \_\_\_\_\_ to do her research in your esteemed hospital during the month of July as a partial fulfillment of the University requirements.

The topic is **“A study to assess the effect of isometric exercise on pain perception, functional mobility and anxiety level of old age people with Osteoarthritis in selected old age homes at Coimbatore”**.

Kindly oblige and do the needful.

Thanking you

Your faithfully

Place:

Principal

Date :

**APPENDIX – 2**

**LETTER SEEKING PERMISSION FOR CONTENT VALIDITY OF TOOL**

From

---

II year M.Sc Nursing  
R.V.S. College of Nursing  
Sulur, Coimbatore

To

Through : The principal

Respected Sir/ Madam

**Sub: Request for validation of research tool**

I am a Master of Nursing student of R.V.S. College of Nursing, Trichy Road, Sulur, Coimbatore in the speciality of Medicals – Surgical Nursing. As per the requirement for partial fulfillment of the Nursing Degree under the Tamil Nadu Dr. M.G.R. University, I have selected the following topic for dissertation.

**“A study to assess the effect of isometric exercise on pain perception, functional mobility and anxiety level of old age people with Osteoarthritis in selected old age homes at Coimbatore”.**

I humbly request you kindly validate the tool and give your valuable suggestion.

Thanking you

Place :

Date :

Your sincerely,

(V. Vimala)

### APPENDIX – 3

#### CERTIFICATE OF CONTENT VALIDITY

This is to certify that tool developed by Mrs. V. Vimala M.Sc (Nursing) II year student, RVS College of Nursing, RVS Educational Trust, Sulur, Coimbatore to collect data on the problem.

**“A study to assess the effect of isometric exercise on pain perception, functional mobility and anxiety level of old age people with Osteoarthritis in selected old age homes at Coimbatore”.**

Is validated by the undersigned and she can proceed with this tool to conduct the main study.

Name and Address:

Signature

Seal :

Date :

## **LIST OF EXPERTS**

- 1. Mr. Raja M.Sc (N)**  
Professor in Medical Surgical Nursing  
KMCH College of Nursing  
Avinashi road, Coimbatore
- 2. Mrs. Beena Chacko**  
Associate Professor in Medical Surgical Nursing  
P.S. G. College of Nursing  
Peelamedu  
Coimbatore
- 3. Dr. P.T. Saleendran**  
Assistant Professor in Management  
D. J. Academyfor Managerial Excellence  
Coimbatore - 30
- 4. V. Sriram, B.Sc., BPT., M.I.A.P.**  
HOD & SR Physiotherapist  
GKNM Hospital  
Coimbatore – 37
- 5. Dr. Chitharanjan, M.B.B.S, MD.,**  
Orthopedic Surgeon  
R.V.S. Hospital  
Sulur, Coimbatore

**APPENDIX - 4**

**CRITERIA RATING SCALE FOR VALIDATING THE INTERVIEW SCHEDULE, CHECKLIST FOR SELECTED ACTIVITIES, NUMERAL PAIN SCALE AND ANXIETY SCALE**

Kindly go through this tool, please give your views regarding clarity relevance, adequacy and remarks

S.No	ITEMS	CLARITY	RELEVANCE	ADEQUACY	REMARKS
<b>1</b>	<b>PART – I</b> Demographic Profile				
	1				
	2				
	3				
	4				
	5				
	6				
<b>2</b>	<b>PART – II</b> Observation Checklist				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
<b>3</b>	<b>PART- III</b> Numerical pain scale				
<b>4</b>	<b>PART- IV</b> Anxiety scale				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				

Suggestion

Signature

Name, Designation

## APPENDIX- 5

### REQUISITION LETTER FOR CO-GUIDE

From -----  
M.Sc. Nursing II year  
R.V.S. College of Nursing  
R.V.S. Educational Trust,  
Sulur, Coimbatore.

To Dr. Chitharanjan, M.B.B.S, MD.,  
Orthopedic Surgeon,  
R.V.S. Hospital,  
Sulur, Coimbatore.

Through; The Principal,

Respected Madam,

**SUB : Request for Co – Guide**

I wish to state that I am \_\_\_\_\_ II Year M.Sc Nursing student of R.V.S. College of Nursing have selected the below mentioned topic for dissertation as a partial fulfillment for the Master of Nursing Degree to the Tamil Nadu Dr. MGR medical University.

**“A Study to Assess the Effect of Isometric Exercises on Pain Perception, Functional Mobility and Anxiety of Old age People with Osteoarthritis in selected Old age Homes at Coimbatore”**

Regarding this I am in need of your valuable help and cooperation by providing services to be a Co-Guide for my study.

I humbly request you to consider the same and do the needful.

Thanking you,

Yours sincerely,

( )



## APPENDIX - 6

### TOOL

#### Interview schedule

As we grow old, so many changes occur in our body. As a result one will not be able to carry on with all the activities as before. A person may feel that difficulty in carry out certain activities. In addition as a person gets older they may have health problems particularly pain and aches in the body, which will limit a person activity.

#### Purpose

The purpose of this interview is to find out from you, what pain and ache you have at present, when you carry with the daily activities.

#### Instruction

- Kindly give the information which is asked.
- Your response will be kept strictly confidential.

#### PART – I DEMOGRAPHIC PROFILE

- |    |  |   |                            |                          |
|----|--|---|----------------------------|--------------------------|
| 1. | Age  | - | 55-65                      | <input type="checkbox"/> |
|    |  |   | 66-75                      | <input type="checkbox"/> |
| 2. | Education                                    | - | No Schooling               | <input type="checkbox"/> |
|    |  |   | Primary                    | <input type="checkbox"/> |
|    |  |   | Secondary                  | <input type="checkbox"/> |
|    |  |   | Beyond secondary           | <input type="checkbox"/> |
| 3. | Number of children                           | - | 1-2                        | <input type="checkbox"/> |
|    |  |   | 3-4                        | <input type="checkbox"/> |
|    |  |   | More                       | <input type="checkbox"/> |
| 4. | Mode of admission                            | - | Voluntary                  | <input type="checkbox"/> |
|    |  |   | Involuntary                | <input type="checkbox"/> |
| 5. | If voluntary admission reason for separation |   |                            |                          |
|    |  |   | Loneliness                 | <input type="checkbox"/> |
|    |  |   | Lack of love and affection | <input type="checkbox"/> |
|    |  |   | Loss of partner            | <input type="checkbox"/> |
|    |  |   | No children                | <input type="checkbox"/> |
| 6. | Duration of stay                             | - | 1 –2 yrs                   | <input type="checkbox"/> |
|    |  |   | 3 - 4 yrs                  | <input type="checkbox"/> |
|    |  |   | More than 5 yrs            | <input type="checkbox"/> |

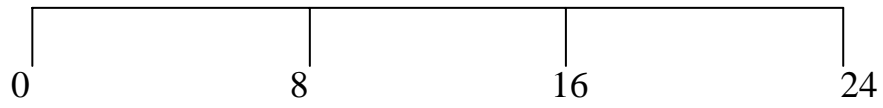
## PART - II

### OBSERVATION CHECK LIST ON SELECTED ACTIVITIES

(Ask the person to do activities and observe the activity, the facial expressions, gesture and also ask the patient)

S.No	ITEM	ACTIVITY PERFORMANCE							
		PRE TEST				POST TEST			
		Independently		With assistance	Notable to Perform	Independently		With assistance	Not able to perform
		With out difficulty	With difficulty			With out difficulty	With difficulty		
1	Walking (3meters)								
2	Climbing up the stairs (10 steps)								
3	Climbing down the stairs (10 steps)								
4	Sitting of the floor from standing position								
5	Standing from sitting on the floor								
6	Lifting half bucket of water and walk (1 meter)								
7	Washing clothes sitting on floor								
8	Bending and picking things in down								

- 3 - Independently without difficulty
- 2 - Independently with difficulty
- 1 - With assistance
- 0 - Not able to perform



0-8 - Fully dependent

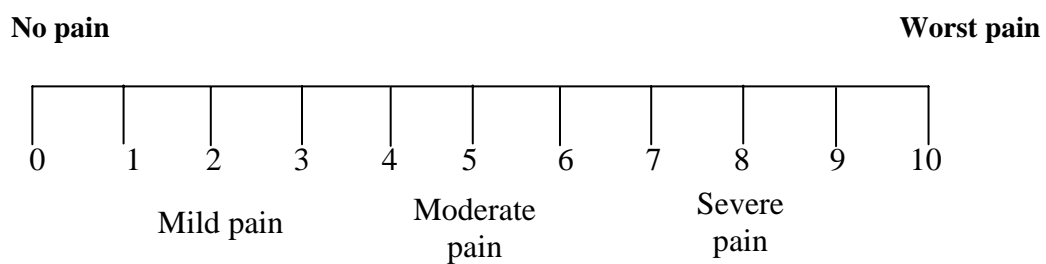
9- 16 - Partially dependent

17-24 - Independent

### PART – III

#### NUMERICAL PAIN INTENSITY SCALE

(Look at this scale and points to a number according to the pain you experience smaller the number, lesser pain and higher the number, greater the pain)



<b>Pre-test and Post test</b>	<b>No pain</b>	<b>Mild</b>	<b>Moderate</b>	<b>Severe</b>	<b>Worst</b>
Pre test 1 day					
Post test 21 days					

- 0 – No pain
- 1-3 - Mild pain
- 4-6 - Moderate pain
- 7-9 - Severe pain
- 10 – Worst pain

**PART – IV**  
**ASSESSMENT OF ANXIETY**

**(I have seen, some can able to do the activities. Some can't able to do the activities, so I want to know the your level of anxiety)**

S.No	Item	Often	Some time	Not at all
1	Do you think bad in getting help from others ?			
2	Do you feel you are troubling others?			
3	Do you feel that your activities to carry out will further be restricted?			
4	Are you able to sleep well?			
5	Do you worry that you are not able to freely move and communicate with others?			
6	Are you worry that your pain will increase day by day?			
7	Are you worry that you may become bed ridden ?			
8	Does the pain interference with your eating ?			
9	Do you have a hope that you can carry the activities alone ?			
10	Are you interested in any recreational activity?			

2 - Often

1 - Some time

0 - Not al all



0-10 Mild anxiety

11- 20 Moderate anxiety

21 -30 Severe anxiety

**APPENDIX - 7**  
**TEACHING PLAN**

Name of the teacher	:	V. Vimala
Topic	:	Isometric exercise
Duration	:	30 min
Number of Osteoarthritis person	:	5
Date	:	
Time	:	
Method of teaching	:	Lecture cum demonstration, redemonstration
Central objectives	:	At the end of the teaching old age person will gain knowledge about arthritis and will be able to carryout Isometric exercises.
Specific objectives	:	At the end of teaching the old age person will able to. <ul style="list-style-type: none"><li>❖ Explain what is Osteoarthritis</li><li>❖ Explain symptoms of Osteoarthritis</li><li>❖ Explain the management of Osteoarthritis</li><li>❖ Demonstrate Isometric exercises.</li></ul>

S.No	Time	Objectives	Content	Teaching learning activities	Avoids
1	2 mts	The old age people will able to	<p><b>Introduction</b></p> <p>As we grow old, so many changes occur in our body, as a result one will not be able to carry on with all the activities as before. In addition as a person get older there may be health problems particularly pain and aches in the body, which will limit a person's activities. The pain is particularly in the joints.</p>	What difficulty you are having on doing the functional activities ? List and summarise the difficulty	
2	2 mts	Explain what is Osteoarthritis	<p><b>What is Osteoarthritis?</b></p> <p>It refers to the involvement of all joints due to the lack of fluid circulation of old age people, which limit the activities of the people.</p>	Explain	Picture of joints
3	2 mts	Explain the symptoms	<p><b>Symptoms of joint pain</b></p> <ul style="list-style-type: none"> <li>• Fever</li> <li>• Malaise</li> <li>• Fatigue</li> </ul>	List the symptoms of join pain  Explain	

4	3 mts	Explain the management	<ul style="list-style-type: none"> <li>• Joint pain</li> <li>• Crepitation</li> <li>• Joint stiffness</li> </ul> <p><b>Management of Osteoarthritis</b></p> <ul style="list-style-type: none"> <li>• Minimize the difficulty</li> <li>• Adequate rest</li> <li>• Proper exercise (isometric)</li> <li>• Medication</li> <li>• Surgery</li> </ul>		
5	2 mts	Explain the purpose of exercise	<p><b>Purpose of exercise</b></p> <p>Regular exercise for all aged group of people will help to improve the free movement of all the joints. There are 2 types of exercise are available to relief from the joint pain.</p>	Explanation about purpose of exercise	
6	15 mts	Demonstrate isometric exercise	<p><b>Isometric exercises</b></p> <p><b>Exercise in standing position</b></p> <ul style="list-style-type: none"> <li>• Stand next to the fixed object</li> <li>• Stand on right leg, and raise the left foot and rest the foot</li> </ul>	What is isometric exercise and	Picture of isometric exercise





		<b>Conclusion</b>		
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Now we have discussed about the joint pain and the exercise to reduce the symptoms of your joint pain. You have to do the exercise regularly for 20 days for 15 minutes duration.

Explain and discuss