

**EFFECTIVENESS OF ISOMETRIC EXERCISES ON LEVEL  
OF PAIN AMONG OSTEOARTHRITIS PATIENTS IN  
SELECTED VILLAGES AT VIRUDHUNAGAR**



**DISSERTATION SUBMITTED TO  
THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY  
CHENNAI  
IN PARTIAL FULFILLMENT FOR THE DEGREE OF  
MASTER OF SCIENCE IN NURSING**

**AUGUST 2016**

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**BY  
Ms. GRENA.J**



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**Affiliated to the Tamil Nadu Dr. M.G.R. Medical University,**

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**AUGUST 2016**

## ACKNOWLEDEMENT

I wish to express my deepest gratitude and warmest appreciation to the following people, who in any way have contributed and inspired me to the overall success of the undertaking. There were much guidance and supports, assisting hands in this journey, made it yield. I am fortunate to have found an abundance of all requisites at every step. With immense gratitude, it is a pleasure to thank those who made this thesis possible.

I thank the **ALMIGHTY LORD JESUS CHRIST** for his abundant blessing, giving me power, strength and health throughout the project work.

At the outset I express my heartfelt gratitude to **Mr.R.Vivekanandan** Chairman and **Mrs.PremShantha**, the Managing Trustee of Sri.K.Ramachandran Naidu College of Nursing for giving me a chance to uplift my professional life.

My earnest and genuine gratitude goes to Research Guide **Prof.(Mrs)N.Saraswathi, M.Sc(N)., Ph.D., Principal**, The Head of the Department of Pediatric Nursing, Sri.K.Ramachandran Naidu college of Nursing, for her valuable guidance, patience, source of inspiration, constant encouragement and enlightening ideas which enabled me to accomplish this task.

I wish to express my sincere thanks to my research Co-Guide **Mrs.P.Parvathi, M.Sc(N)., Reader**, Department of Medical and surgical Nursing , whose encouragement guidance for the successful completion of this study and support in every phase of my study.

I am extremely grateful to **Mrs.T.Tamilselvi, M.Sc(N)., Reader, Class Coordinator** for a constant source of inspiration and encouragement.

A memorable note of gratitude to **Dr.Muralitharen, Ms.,Ortho.surg**, for given support and nice guidelines to the study.

A memorable note of gratitude to **Dr.Karunagaran, M.B.B.S Medical officer**, for granting me permission and co-operation for conducting the study at Zaminkollankondan, Virudhunagar District.

I extend my heartfelt thanks to all the **Osteoarthritis patients** who were participated in my study for their cooperation during the data collection.

I acknowledge my genuine gratitude to **Mr.Senthil, M.Sc., sbio statistics**, Professor of Biostatistics for his suggestions and guidance in data analysis and interpretation of data.

I am indeed thankful to the **Librarians** of Sri. K. Ramachandran Naidu College of Nursing, and The Tamilnadu Dr. M.G. R. Medical University for their co-operation and their support extended in procuring the literatures related to the study.

I extend my sincere thanks to **Mr.L.Arun, M.A., M.L.**, Assistant Professor, for his patience and expertise in editing the content in English.

I extend my sincere thanks to **Mrs.Parameswari, M.A., B.Ed.**, Professor, and **Mr.Sujan**, Professor for his patience and expertise in editing the content in Tamil.

I was remain thankful to my parents **Mr.P.Jeyaraj** and **Mrs.J.Marymala** without whom it would have been impossible for me to enter this profession and pursue this study.I am deeply indebted to my Family members **Mr.Prabhakaren, Mr.Justin, Mr.Sam, Ms.Glory, Mrs.Kiruba, Ms.Harini, Ms.Jovitta, Mr.Josvin**, for their ever ready nature of unconditional support, encouragement and prayer which enables me to complete my study with renewed energy and vigor.

I extend my grateful thanks to those who have helped me directly and indirectly during my project work.

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## **ABSTRACT**

The Research Project “A study to assess the effectiveness of Isometric exercises on level of pain among osteoarthritis patients in selected villages at Virudhunagar”. It is conducted as partial fulfillment of the requirement for the Degree of Master of science in nursing at Sri.K.Ramachandran Naidu College of Nursing, Thirunelveli under the Tamil Nadu Dr. M.G.R Medical University, Chennai during the year August 2016.

### **The Objectives of the study were:**

- To assess the pre and post-test level of pain among patients with osteoarthritis in experimental group and control group.
- To compare the pre-test and post-test level of pain among osteoarthritis patients in experimental group and control group.
- To compare the effectiveness of isometric exercise on level of pain among osteoarthritis patients in experimental group and control group.
- To associate the pre-test level of pain among patients with osteoarthritis in experimental group and control group with their selected demographic variables. (Age, Sex, Body mass index, Marital Status, Education, Occupation, Dietary pattern, Duration of illness and Duration of treatment)

### **The following hypotheses were formed for the study:**

#### **All hypotheses are tested at 0.05 levels :**

**H1:** Mean post-test level of pain among osteoarthritis patients in experimental group will be significantly lower than the mean pre-test level of pain in experimental group.

**H2:** Mean post-test level of pain among osteoarthritis patients in control group will be significantly lower than the mean pre-test level of pain in control group.

**H3:** Mean post-test level of pain among osteoarthritis patients in experimental group will be significantly lower than the mean post-test level of pain in control group.

**H4:** There will be a significant association between the pre-test level of pain among Patients with osteoarthritis in experimental and control group with their selected demographics variables. (Age, Sex, Body mass index, Marital Status, Education, Occupation, Dietary pattern, Duration of illness and Duration of treatment)

The study was based on the CIPP (Context, Input, Process, Product Model). The quantitative approach was used for this study. The study was conducted in Zaminkollankondan and Avarampatti village in Virudhunagar. The design adopted for this study was Quasi experimental Pre-test and Post-test control group design to assess the effectiveness of Isometric exercises on level of pain among osteoarthritis patients. Non probability purposive sampling technique was used to select 30 samples for experimental group from zaminkollankondan village and the same method was used to select 30 samples for control group from avarampatti.

The data collection tool used for the study was modified Lequence observational checklist for osteoarthritis to identify the severity of osteoarthritis. The content validity of the tool was obtained from four nursing experts and one medical experts in the field of medical and surgical nursing. The reliability of the tool( $r=0.9$ ) was established by test and retest method by using Karl Pearson's correlation coefficient. The tool was accepted as reliable by the clinical experts. Pilot study was conducted to find out the feasibility and the data analysis was done.

Data collection was done by using the modified Lequence observational checklist to identifying the severity of osteoarthritis and pre and post-test level of pain was measured by Numerical pain intensity rating scale for experimental and control group. The data obtained were analyzed both in terms of descriptive and inferential statistics.

**The significant Findings of the study were :**

- Majority of patients 10 (33.3%) were between the age group of 30 - 40years in experimental group. Where as in control group majority of patients 11(37%) were in the age group of 41-50 years.
- With respect to sex classification, majority of patients 15 (50%) were female and 15 (50%) were male in the experimental group, whereas in control group majority of patients 16(53.3%) were female.
- With regard to Body Mass Index (BMI), majority of the patients 16(53%) were belongs to Overweight, whereas in control group, majority of patients 11 (37%) were belongs to normal weight and Overweight category.
- With regard to marital status, majority of patients 17(57%) were belongs to married in experimental group, where as in control group majority of patients 22(73%) were in unmarried group.
- Based on the educational status, majority of patients 12(40%) were belongs to no formal education in experimental group where as in control group majority of patients 13(44%) were completed primary education.
- With respect to occupation majority of patients 16(53%) were belongs to sedentary worker in experimental group and control group also majority of patients 13(44%) were in sedentary worker.

- With regard to dietary habits classification, majority of patients 21 (70%) were belongs vegetarian in the experimental group, whereas in control group majority of patients 26(87%) were non vegetarian .
- With regard to duration of illness, majority of patients 12(40%) were in more than 1 year to 2 years of illness, whereas in control group also the majority of patients were in 14(46%) were in more than 1 year to 2 years of illness.
- With regard to duration of treatment, majority of patients 16(53%) were in more than 1 year to 2 years of treatment, whereas in control group also the majority of patients were in 16(54%) were in the category of 6months -1year of treatment.
- With regard to the pre and post-test level of pain among experimental group, it was found that the pre-test mean was 6.17, standard deviation 2.07 and mean difference was 2.97 and post-test level of mean value was 3.2 standard deviation 2.35 and it was found that the mean difference was 2.97 and the t value was 7.77 indicating that the table value is highly than calculated value. It was found that there is significant reduction in post-test level of pain in the experimental group than the pre-test level of pain at  $p < 0.05$  level.
- With regard to the pre and post-test level of pain among control group, it was found that the pre-test 4.06 with standard deviation of 2.40 and the post-test mean value was 5.93 standard deviation 2.63. The mean difference was -1.87 and calculated 't' value was 2.87 which showed that there was no significant reduction in post-test level of pain than the pre-test test level of pain among osteoarthritis patients in control group at  $p < 0.05$  levels. Hence hypothesis was rejected.
- With regard to the post-test level of pain among experimental group it was found that the mean value is 3.2 and the standard deviation is 2.35, where as in



control group mean value is 5.93 and standard deviation is 2.63 and the 't' value was 7.01, it shows that there is significant reduction in post-test level of pain in experimental group than post-test level of pain in control group at  $p < 0.05$  level.

**Based on the findings of the study, it is recommended that :**

- Similar study can be conducted with large samples for better generalisation.
- An explorative study can be done at various settings like in hospitals or in orthoclinics to identify factors influencing osteoarthritis among elderly people.
- A similar study can be conducted to find out the effectiveness of other therapies like yoga and muscle relaxation technique.
- A comparative study can be done between aerobic exercise and isometric exercise for osteoarthritis.
- A study can be conducted to evaluate the knowledge and attitude of nurses regarding isometric exercises for osteoarthritis.

As a nurse working in hospital as well as in community has a vital role to provide effective nursing care for the patients. The nurses are need to develop their knowledge and skills in management of osteoarthritis by assessing the pain and providing care to the osteoarthritis patients, and to use wide variety of interventions in order to reduce pain in such patients.

**CONCLUSION**

From the result of the study, it was concluded that, rendering Isometric exercises to the osteoarthritis patient was effectiveness in reduction of knee pain. Therefore the investigator felt that the importance of isometric exercise for osteoarthritis patient used to reduce the level of pain.

# CHAPTER-I

## INTRODUCTION

*“In youth we run into difficulties, in old age difficulties run into us. The only thing that comes to us without effort is old age.”*

**-Josh Billings.**

### **BACKGROUND OF THE STUDY:**

The word arthritis means inflammation (swelling) of a joint. Osteoarthritis, also known as "wear and tear" arthritis and is the most common type of arthritis. Osteoarthritis affects the articular cartilage in a joint. Articular cartilage is the smooth coating that covers the surface of the bones inside a joint. Articular cartilage also cushions and helps lubricate the joint surfaces. In osteoarthritis the articular cartilage is damaged. Over time the articular cartilage can thin or form cracks. Pieces of articular cartilage may come loose and float inside the joint, further it irritates the joint. After a long period of time the articular cartilage can become completely "worn away" and the bones can rub together. **(Rheumatology for nurses, 2008).**

Osteoarthritis (OA) is a slowly progressive non inflammatory disorder of the synovial joints that affect the joint cartilage, synovial and joint capsule and affects around 60% of individuals aged over 50 years. In generally Osteoarthritis affects 9% of men and 18% women over 65 years old. Osteoarthritis is high in India, ranging from 22%-39%. **(Paulo June -2013)**

Osteoarthritis is the most common musculoskeletal condition affecting the quality of life of older adults. Strength of the quadriceps musculature is one of the intrinsic factors was affected knee joint function. It is evident that lower extremity strength has a muscle role in knee joint shock attenuation during weight bearing

activities, Reduction of pain and disability is the main aim of any treatment approach in the management of knee osteoarthritis. **(Shahnawaz-2014)**

Exercise is one of the most non pharmacologic management strategies for osteoarthritis of the knee. Health care providers and Patients share varied and often pseudoscientific beliefs regarding the effects of exercise on knee osteoarthritis formulated on outdated notion of the etiology, pathophysiology, and progression of the condition. Based on the literature, regular exercise should moderate physical activity have both preventive and therapeutic benefits for individuals with knee osteoarthritis. Exercise regimens with strong evidence of benefit include those that focus on aerobic/cardiovascular conditioning and lower extremity strength training. **(Chaitow-2011)**

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 nation 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 – was 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. **(William-2011)**

Although exercise is recommended for anyone, osteoarthritis exercises are intended to maintain and build muscle strength without aggravating the already tender areas of the body in those suffering from the disease. Physiotherapy involves a safe, gradual program designed to increase mobility while at the same time reducing pain. Osteoarthritis physical therapy can be extremely beneficial and with increased endurance and the build-up of muscle tissue, activities that were once

impossible can become a reality for many people. Regular physical activity is crucial when dealing with arthritis as it was help to increase both muscle and bone strength while increasing flexibility and decreasing fatigue, another common symptom of osteoarthritis. Both isotonic and isometrics are considered to be strengthening exercises and the muscles are exercised against resistance, their size and power was increase.

## **NEED FOR THE STUDY**

Osteoarthritis is a chronic degenerative disorder of multifactorial etiology characterized by loss of articular cartilage, hypertrophy of bone at the margins, subchondral sclerosis and range of biochemical and morphological alterations of the synovial membrane and joint capsule. Pathological changes in the late stage of osteoarthritis include softening, ulceration and focal disintegration of the articular cartilage. **(DottieRoberts, 2006)**.

Osteoarthritis is one of the major causes of impaired function that reduce quality of life. More than 50% of people over 65 years of age have evidence of osteoarthritis. The pain and disability associated with osteoarthritis affects approximately 10% of men and 18% of women over 60 years of age have evidence of osteoarthritis. The incidence and prevalence of osteoarthritis was continue to rise as the population ages unless measures are taken to improve disease prevention. **(Zhang and Ashraf -2011)**

Osteoarthritis treatment have more successful at decreasing pain rather than disability. Many of the factors that lead to disability can be improved with isometric exercise. Exercise, both aerobic and strength training, have been examined as treatments for knee osteoarthritis, with considerable variability in the results.

A majority of the studies had positive effect on pain and or disability. **(Baker,Kristin.,at al.,2005)**

Patella femoral pain is one of the most common knee disorders seen in orthopedic patients. Despite its high incidence, treatment of this disorder remains controversial. Traditionally, non operative management of patella femoral pain has focused on restoring normal patellar tracking by improving dynamic stability, blood circulation and muscle strength and reduce the pain intensity for osteoarthritis. It involve static contraction of a muscles without any visible movement in the angle of the joints. **(Christopher M. Powers- 1998)**

Recently, several alternative treatments for osteoarthritis have received considerable attention. These include transcutaneous electrical nerve stimulation (TENS) magnet therapy, therapeutic touch, acupuncture, yoga, herbal oil application,isometric exercise. Osteoarthritis is a progressive disorder without a permanent cure. In some patients, the rate of progression can be slowed by weight loss, appropriate exercise, surgical treatment, and the use of alternative therapies. Examples are relaxation, guided imagery, biofeedback, cutaneous stimulation, Distraction etc. Use of herbal products in management of pain and oedema or other ailments comes under complementary and alternative system of medicine in the collaborative care of arthritis. **(Ronald Melzack, 2004).**

In the present study 362 elderly of more than 65 years were interviewed and assessed clinically. The examinations were conducted in 1882 houses comparing of 7937 persons. The study revealed that the majority (66.6%) of elderly belonged to age group 65-74 years, about 6.6% were aged greater than 85 years. **(Indian academy of arthritis 2013)**

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 and reduce pain an old age people. When the mobility increases, intensity of joint pain decreases. 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.

**S.Srinivasan, T.M.Jeyasree, et al., (2015)** did a survey in India and reported that the prevalence of osteoarthritis in older adults more than 65 years of age was 32.6% in the rural population rate and 60.3% in the urban population rate.40% of cases are suffered with knee osteoarthritis.

**WHO (2004)** published the Tamilnadu government report in that 18% of all working group are affected with arthritis 5% of all cases of arthritis are having gout.Osteoarthritis is more common in women than men but the prevalence increases dramatically with the age.

By reviewing the prevalence of osteoarthritis and effect of isometric exercise in reducing pain, decrease the disabilities and improving the activities of daily living of osteoarthritis, influencing the investigator to select the isometric exerciseto reduce the pain and improve the comfort level of osteoarthritis patients.

### **STATEMENT OF PROBLEM:**

A study to assess the effectiveness of Isometric exercises on level of pain among osteoarthritis patients in selected villages at Virudhunagar.

**OBJECTIVES:**

- To assess the pre and post-test level of pain among patients with osteoarthritis in experimental group and control group.
- To compare the pre-test and post-test level of pain among osteoarthritis patients in experimental group and control group
- To compare the effectiveness of isometric exercise on level of pain among osteoarthritis patients in experimental group and control group.
- To associate the pre-test level of pain among patients with osteoarthritis in experimental group and control group with their selected demographic variables. (Age, Sex, Body mass index, Marital Status, Education, Occupation, Dietary pattern, Duration of illness and Duration of treatment)

**HYPOTHESES:**

All hypotheses were tested at p 0.05 level of significance.

- H1:** Mean post-test level of pain among osteoarthritis patients in experimental group will be significantly lower than the mean pre-test level of pain in experimental group.
- H2:** Mean post-test level of pain among osteoarthritis patients in control group will be significantly lower than the mean pre-test level of pain in control group.
- H3:** Mean post-test level of pain among osteoarthritis patients in experimental group will be significantly lower than the mean post-test level of pain in control group.
- H4:** There will be a significant association between the pre-test level of pain among Patients with osteoarthritis in experimental and control group with their selected demographics variables. (Age, Sex, Body mass index, Marital Status,

Education, Occupation, Dietary pattern, Duration of illness and Duration of treatment)

## **OPERATIONAL DEFINITION:**

### **Assess:**

In this study it refers to a process of systematically and continuously, collecting and validating the data regarding level of pain and effectiveness of isometric exercise on level of pain among osteoarthritis patients between the age groups of 30-70 years.

### **Effectiveness:**

It refers to measure the difference between the pre test and posttest level of pain. In this study effectiveness refers to the result of isometric exercises on the level of pain among osteoarthritis patients and it measured by Numerical Pain Intensity Rating Scale.

### **Isometric exercise:**

Isometric exercises are refers to form of involving the static contraction of a quadriceps muscles without any visible movement in the angle of the joint. In these exercise the length of the muscles and the angle of the joint do not change, though contraction strength may be varied. In this study the Isometric exercise are refers to the following form of exercise which are involving the static contraction of quadriceps muscles without any visible movement in the angle of joint such as,

#### **1 .Straight Leg Raising(SLR):**

**A) In supine position:** The patients are advised to lift the legs individually 4-6 Inches away from the floor and bring back to the floor after 5 seconds. This exercise



will be advised to continuous five repetitions for each legs followed with two times a day.

**B) In high sitting position:** The patients are advised to lift the straighten legs individually in high sitting position to be equal to hip level for a seconds and bring back to the same position to be continued 5 times for each leg and follow for two times a day.

## **II. Step up and step down exercise:**

Advice the patient to step up and step down for 10 times and followed for 2 times a day.

## **III. Wall slide exercise:**

Advised the patient to stand against the wall with back and slowly slide down the wall with the 75- 90° bending of the knee and hold this position for 5 seconds. Then ask to stand up and rest for 5 seconds. Repeat it continuously for 10 times and followed for 2 times a day.

## **IV. Hip adduction exercise:**

Advised the patient to lie flat or sit with leg straight. Place a inch roll under knee, allowing the knee to be bend. Tighten the muscle in front of knee as much as can, and lift the heel off the floor. Hold this position for 10 seconds.

Total duration of isometric exercise will be 30 minutes per time for two times a day subsequently for the period of 7 days.

## **Pain :**

In this study it refers to discomfort, unpleasant sensation and irritation of knee joint perceived by the patients who has osteoarthritis and measured by Modified Numerical Pain Intensity Rating Scale.

**Osteoarthritis (OA):**

It is refers to degenerative non-inflammatory disease that results in pain and restricted movement of affected joints. In this osteoarthritis refers to knee joint disorder which characterized by joint pain, joint stiffness, swelling and feeling of warmth over painful area will be assessed by modified Lequene Index Observational Checklist for osteoarthritis.

**Patients:**

In this study it refers to the patients with osteoarthritis in the age groups of 30-70 years with mild, moderate and severe pain including both males and females those who are fulfilling the inclusive and exclusive criteria.

**ASSUMPTION:**

- Pain tolerance level may differ from individual to individual.
- Osteoarthritis is common in old age people.
- Isometric exercise may reduce the pain of osteoarthritis.

**DELIMITATION:**

- The study is delimited to 4 weeks period of time.
- The study is delimited to two selected villages.
- The study is delimited to knee osteoarthritis patients.

**PROJECTED OUTCOME:**

- The study finding will help the old age to reduce the knee pain.
- The study finding will help to reduce the severity of osteoarthritis.
- The finding of the study will help the nurse to administer isometric exercise among osteoarthritis patients.

## CONCEPTUAL FRAMEWORK

The conceptual framework for research study presents the measure on which the purpose of the proposed study is based. The framework provides the perspective from which the investigator views the problem.

It is an organized phenomenon which deals with concepts that are assembled by virtue of their relevance to a common theme. Conceptual frame work can serve to guide research which will further support theory development. The conceptual models attempt to represent reality with its minimal use of words. Here the conceptual framework was based on CIPP model,

**Daniel L. Stufflebeam** who included context evaluation, input evaluation, process evaluation and product evaluation. Context evaluations help prioritize goals, input evaluations assess different approaches, process evaluations assess the implementation of plans, and product evaluations assess the outcomes (both intended and not intended). This model is used to evaluate both formative and summative assignments. The CIPP model advocates that "the purpose is not to prove, but to improve."

**Daniel L. Stufflebeam** model illustrate on four evaluation,

- ◆ Context Evaluation
- ◆ Input Evaluation
- ◆ Process Evaluation
- ◆ Product Evaluation

### **Context Evaluation**

Context evaluation assesses the needs, problems, assets and opportunities to help decision makers define goal and priorities to help the broad group of users to

judge goals, prioritize and outcome. The present study is carried out to determine the effectiveness of isometric exercise on reduction of pain among osteoarthritis patients.

### **Input Evaluation**

Input evaluation assesses alternative approaches completing action plans, specific resources, and strategies to meet target needs and achieving goals. Decision makers use input evaluation in choosing among competing plans, allocating resources and scheduling work. In this study input evaluation refers to Pre assessment of the level pain by using Numerical pain intensity rating scale and Lequence scale used determine the severity of osteoarthritis and performing isometric exercise

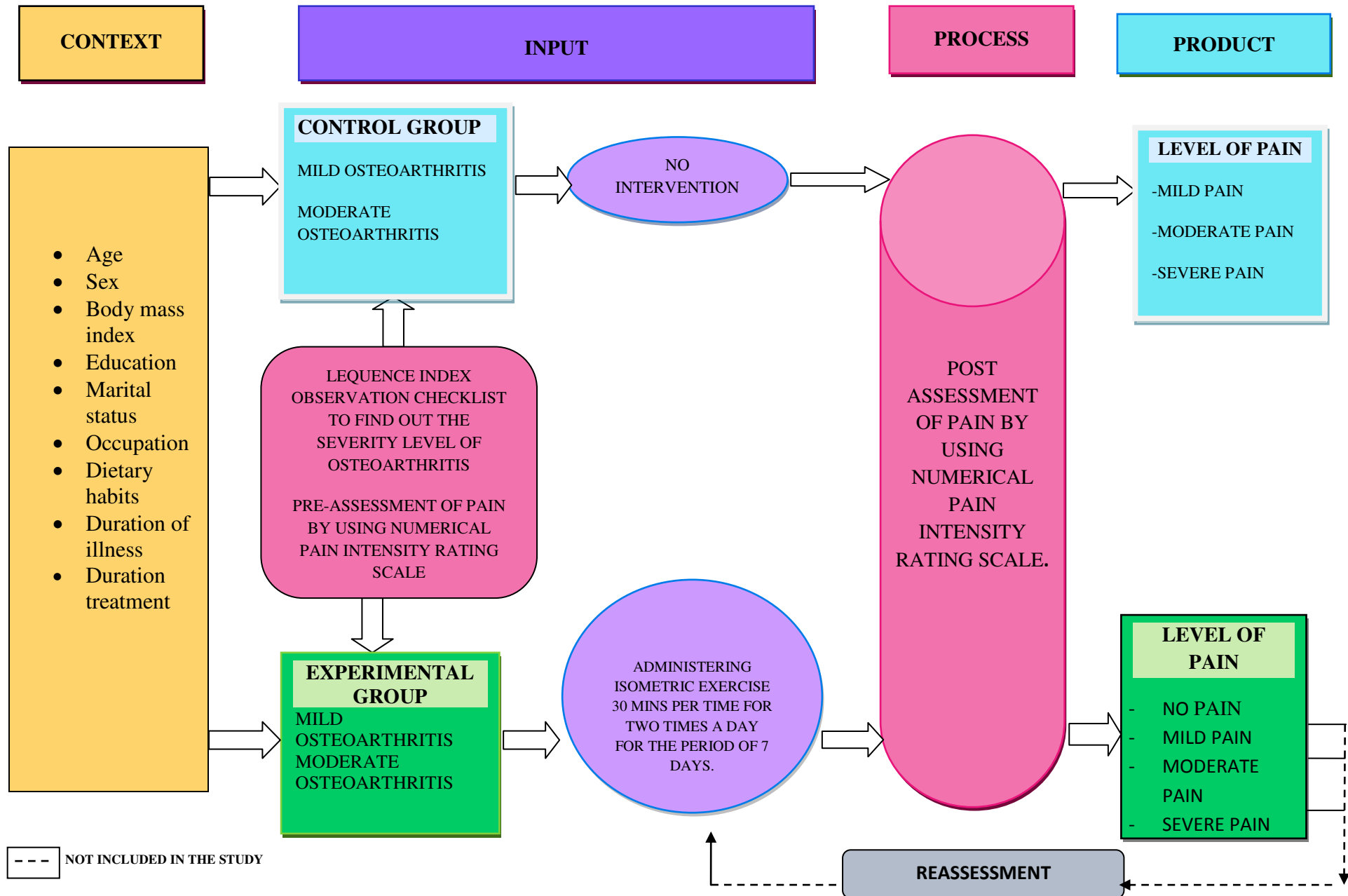
### **Process Evaluation**

To assess implementation and help guide efforts and interpret outcomes. In the present study process evaluation refers to the assessment of pain among osteoarthritis clients.

### **Product Evaluation**

Product evaluation helps to identify and assess the outcome intended short term and long term both help the investigator focused on achieving the important outcomes and ultimately to help the broader group of users gauge the effort of success in meeting the target needs.

In the present study product evaluation refers to the comparison of pretest and post-test level of pain among patients with osteoarthritis.Reduction in the level of pain and is assessed and tabulated by statistical computation. Product evaluation further leads to recycling decisions. In this study the inadequate reduction of pain needs attention to promote reduction of pain which is not included and denoted by line.



**Figure-1:** The conceptual framework based on modified CIPP model (context evaluation, input evaluation, process evaluation and product evaluation).

## **CHAPTER II**

### **REVIEW OF LITERATURE**

Review of literature is defined as a critical summary of review on a topic of interest, often prepared to put a research problem in contest. (**Polit& Beck, 2006**).

The review of literature in the research report is a summary of current knowledge about a particular practice problem and includes what is known and not known about the problem. The literature is reviewed to summarize knowledge for practices or to provide a basis for conducting a study (**Burns, 1997**).

This study examined the effectiveness of Isometric exercises on level of pain among osteoarthritis patients in selected villages at virudhunagar. From the collected review of various associated literature and research studies, topics can be organized under the following sections:

**Section: A** Studies related to prevalence and risk factors of osteoarthritis.

**Section: B** Studies related to effects of osteoarthritis in Activity of Daily Living

**Section: C** Studies related to effectiveness of isometric exercise on osteoarthritis.

**Section: D** Studies related to effectiveness of other therapies on osteoarthritis.

#### **SECTION A : STUDIES RELATED TO PREVALENCE AND RISK FACTORS OF OSTEOARTHRITIS.**

**S.Srinivasan, T.M. Jeyasree, et al., (2015)** did a community based cross sectional survey in primary health centre of Bhwanagir, cuddalore health unit district, to findout the prevalence of osteoarthritis of the knee joint among elderly population in rural area with selected socio-demographic variables. Totally 468 persons were participated in the study, among them 191 were males, 277 were females. The

researcher used the elderly population above 60 years in rural area using ACR (American College of Rheumatology) clinical criteria to diagnose osteoarthritis was 39% found to be independent risk factors for osteoarthritis knee. From the result of the study as the population of india is increasing, the number of elderly is going to increase resulting in higher magnitude of burden of osteoarthritis.

**David.T.Felson., (2011)** conducted a population based study, to estimate the prevalence and severity of osteoarthritis among 1637 persons of age group of 65-74 years in the rural areas of Puvaneswar. By systemic random sampling technique they have selected a list of houses. The data was collected by house to house survey on a pre designed and pretested format. Osteoarthritis was considered as if a elderly was suffering from pain, swelling and limitation of movement of larger joint or if one has already been diagnosed as having osteoarthritis. The study revealed that the majority (61.6%) of elderly were aged 65-74 yrs, about 7.6% were aged >85yrs.The overall prevalence of osteoarthritis in elderly of Puvaneswar was 52.6% in rural areas it was 32.6% in urban, it was 60.3%.(p<0.001).Osteoarthritis was more in females as compared to males (68% vs 44.7%).

**Jordan.J.W.,(2010)** conducted a population based study to estimate the prevalence of osteoarthritis in North California, among African American of Caucasians aged 74years.Totally 3018 participants have been selected conveniently, Kellagren and Lawrence radiographic grading was used to find out the osteoarthritis clients. They found that 28% had knee osteoarthritis 16% had symptomatic osteoarthritis 8% had severe osteoarthritis, increased prevalence present in older individuals, especially among women.

**Mounch 'A' et al., (2008)** conducted a comparative study to estimate the relationship between osteoarthritis with body weight in 182 Moroccan samples.

Interviews were conducted and information were obtained from 95% cases with osteoarthritis and controls taken from general population. The risk of osteoarthritis increases with higher body mass index adds ratio of 3.12 at  $p < 0.01$  overweight is a risk factor for osteoarthritis.

**Bearma et al.,(2008)** conducted a study to find out the risk factors of osteoarthritis that affects middle aged and elderly people among African. Totally 386 clients with the age group of 40-60 years were involved in this study. Interviews were carried out, it suggests that the physical workload, high intensity sports activities, and being overweight are risk factors for osteoarthritis. There is also a moderate to strong evidence that, high levels of hyaluronic acid are prognostic factors for osteoarthritis.

**Geater AF et al.,(2007)** conducted a population based survey to estimate the prevalence of osteoarthritis in relation to the positions used by the clients, 288 women and 288 men with the age of over 40 years from Southern Thailand have been studied in association with three common positions in floor activities squatting, side knee bending and kneeling. The activities were recorded and multinomial logistic regression analysis was used. The results showed that squatting and side lying positions had increased the relative risk of moderate to severe knee pain among osteoarthritis patients.

**Wafser.M (2007)** did a review by using meta analysis to identify the risk of osteoarthritis associating with occurrence of fracture among Belgium residents, totally 1233 patients were involved in this study among that 75% of patients had fracture associated with osteoarthritis (n=989), and they feel difficulty for the joint flexion in the early stages, moreover four relevant epidemic studies also showed a correlation between osteoarthritis of the knee joint and knee flexion under



physiological stresses leads to degeneration of osteophytes and early onset of tibia femoral osteoarthritis in the elderly.

**Liew CM et al., (2007)** conducted a retrospective study to investigate the association between squatting and prevalence of knee osteoarthritis. A random sample of 72 Beijing residents more than 60 years were enquired about duration of squatting at youth 40% of the men and 68% of the women reported squatting one hour per day at youth were having the greatest incidence. Prevalence of tibia femoral osteoarthritis was found to be increased in both men and women who squatted more than 30mts per day at youth compared to subjects who squatted less than 30mts per day at youth.

**Du.H.et al., (2004)** conducted a community based survey on the prevalence of knee osteoarthritis and associated factors of osteoarthritis at Shanglai Chinz.190 subjects received radiography. Radiographic knee osteoarthritis was found in 72.1% of symptomatic and 37% of asymptomatic knee osteoarthritis. Symptomatic knee osteoarthritis was significantly associated with disability, symptomatic knee osteoarthritis increases with age, from 1.3 % in the 40 -49 yrs to 13.2 % in the 70 yrs of age group.

**WHO., (2004)** reported the prevalence of osteoarthritis related knee replacement surgery in India. By cross sectional survey was found that there were 4,54,652 total knee replacements performed primarily for arthritis in India. Urban population survey study in Narayanpet, Pune under bone & joint disease programme in 2003 showed that almost 6.4% of community suffered from osteoarthritis. A population survey study conducted in village Blingwan under showed that 29% of community suffering from osteoarthritis and Tamilnadu government revealed

that 18% of all working group are affected with arthritis 5% of all cases of arthritis are having gout.

**Curropin., (2003)** states that osteoarthritis is the most commonly occurring musculoskeletal disease of the elderly affecting more than 25% of the population older than 60 years of age. The simple greater risk factor for the development of osteoarthritis is age. An exercise is a safe and effective therapy for patients with osteoarthritis. It reduces pain, increases flexibility, strength and prevents de conditioning, includes stretching to improve flexibility, strengthening to prevent contractures.

**Vaijyanthi Joshi &Aravind Chopra., (2002)** conducted a study to estimate urban prevalence of osteoarthritis and compare it to an earlier rural regional study in Pune and India, population included 8,145 adults from a urban locality in Pune. Cross sectional house survey was used to collect the data. Results suggested that 1152 urban cases of arthritis were identified. Among that 65% of women self reported that, the samples are having pain in joints mostly with knees followed by shoulders and ankle. The study concluded that urban profile was lesser when compared to cases in rural settings.

**Bark.K., (2002)** conducted a descriptive study to determine the health concerns of men with osteoarthritis of knee. A group of 104 men with a clinical diagnosis of osteoarthritis from Missouri Hospital were selected by convenient sampling technique. Arthritis impact measurement scale was used. The men had more concerned about pain, walking, bending, stairs climbing. They predicted that in the next 10 years arthritis would be a major health problems, so the interventions should focus on strategies to deal with pain and decrease mobility.

**Vilran.L., (2001)** said that 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.

## **SECTION B: STUDIES RELATED TO EFFECTS OF OSTEOARTHRITIS IN ACTIVITY OF DAILY LIVING.**

**Carol Eustice., (2008)** stated that, resistance exercise can improve muscle strength and physical function in people with knee osteoarthritis. Resistance exercise is any exercise where muscles contract against an external resistance by an object that forces the muscles to contract. Researchers in Sydney, Australia, reviewed 18 previous studies that assessed the effectiveness of resistance exercise on knee osteoarthritis. There were 2,832 people enrolled in the studies which utilized resistance machines, free weights, isometric exercise, and elastic bands. Resistance exercise improved muscle strength and self-reported pain and physical function in participants from a majority of the 18 studies. The goal of resistance exercise is to strengthen muscle groups around affected joints, stabilize and protect affected joints, and improve mechanics of the joints to reduce stress on the joints.

**Dr.Leena Sharma and Dr.James., (2006)** Stanford University of Medicine, California said that the impact of osteoarthritis on disability is substantial. For example, the risk of disability (walking or climbing stairs) due to osteoarthritis of the knee is greater than due to any other medical condition in elderly persons.

**Center for Disease Control and Prevention., (2001)** data explained that osteoarthritis of the knee is 1 of 5 leading causes of disability among non-institutionalized adults. About 80% of patients with Osteoarthritis have some degree of movement limitations and 25% cannot perform major activities of daily living (ADL'S), 11% of adults with knee osteoarthritis need help with personal care and 14% require help with routine needs.

**S.Lamb.J., et al., (2000)** did a cross sectional analysis on 769 older women with physical disability. Mobility was measured using timed performance tests. The result showed the prevalence of knee pain was 53%, one third of women with pain reported it to be severe. In women who had severe pain, activity like walking increased the risk of disability more than in activity. In old women with recent knee pain, a high pain severity score, obesity and activity are important factors that increase the risk of mobility limitation.

**Sheila. C. et al., (1998)** conducted a randomized trial to assess the effect of a home based exercise programme, designed to improve quadriceps strength, on knee pain and disability. 191 men and women with knee pain aged 40–80 were recruited from the community and are randomized to exercise .The exercise group performed strengthening exercises daily for six months. Result shows that WOMAC pain score reduced to 22.5% in the exercise group and 6.2% in the control group. Physical function scores reduced to 17.4% in the exercise group and were unchanged in controls ( $p < 0.05$ ). The researcher concluded that a simple programme of home quadriceps exercises can significantly improve self reported knee pain and function.

**Henrik.R,Rosan.T.,et al., (1998)** did a randomized control trail to assess the effectiveness of general physical programme on patients with severe knee osteoarthritis twenty five patients (3 men,22 women)received general physical

training in groups twice a week for 3 months. The result showed that isokinetic quadriceps strength improved 20% in the affected leg, isometric strength improved 21%. Pain had decreased to 2.0 point, and walking speed had increased. Frequency of crepitus decreased on least affected leg. They found out that the general physical training appears to be beneficial to patients with osteoarthritis of the knee.

### **SECTION C : STUDIES RELATED TO EFFECTIVENESS OF ISOMETRIC EXERCISE IN OSTEOARTHRITIS PAIN.**

**T.Graven,H.B.Vaegter (2014)** conducted a study to assess isometric exercise reduce temporal summation of pressure pain humans(TSP). The effect of different type of central mechanisms such as temporal summation of pain. The study hypothesized that both aerobic and isometric exercise would increase pain tolerance test (PTT) and reduce temporal summation of pain one hundred thirty six subjects (18-65 years;68 women) participated in two randomized crossover experiments with trails on two different days. The result of isometric exercise increased PTT and reduced visual analog score (VAS) (p-0.05).

**Shanawaz Anwar et al., (2011)** sought a randomized controlled trial to evaluate the effectiveness of electromyography biofeedback as add on therapy with isometric exercise on quadriceps strengthening in patients with osteoarthritis of knee. Among thirty three samples, 10 persons were men and 23 person were women with osteoarthritis of knee participated in the study. The experimental group received electromyography biofeedback along with guided isometric exercise programme for 5 days a week for 5 weeks, whereas the control group received an exercise programme only. The result showed that the electromyographic biofeed back for 5-weeks with isometric exercise program appeared to increase quadriceps muscle strength, compared to the exercise program alone for people with knee osteoarthritis.

**Mohamed Shakoor (2010)** conducted a comparative study in Bangladesh among 64 patients of osteoarthritis of the knee joints to observe the effects of isometric quadriceps muscle strengthening exercise plus non-steroidal anti-inflammatory drugs (NSAIDs) on osteoarthritis of knee joints. Another 75 patients were treated with NSAIDs as control group. Samples were assessed by visual analogue scale, WOMAC scale. In comparison, more improvement was found in the exercise group. This study suggested that isometric quadriceps muscle strengthening exercise has its beneficial role to reduce symptoms in osteoarthritis knee.

**Lange, A.K., Vanwanseele., (2008)** conducted a study to assess the effectiveness of isolated resistance training on arthritis symptoms, physical performance, and psychological function in people with knee osteoarthritis. A comprehensive systemic database search for randomized controlled trial was performed. Maximal in 56-100% of studies where researcher were measured. The mean cohort age range was 55-74 years. In that the average 8, out of 12 patients quality criteria were accounted for in the review literatures. Self reported measure of pain, physical function and performance along with muscles strength was found that the mean value is 17.4%.

**Kocaman et al., (2008)** conducted an experimental study to compare the effects of isometric exercises and electrical stimulation in the treatment of knee osteoarthritis among 30 older adults. The results showed that the electrical stimulation was found to be as efficient as the exercise treatment for knee osteoarthritis, in quadriceps muscle weakness and atrophy prevention. The findings suggested that electrical stimulation treatment could be used alone or in combination with exercise treatment in clinical setting and isometric exercises as a home programme

**National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), (2007)** sponsored a randomized classification study to show that isometric strengthening is beneficial in managing osteoarthritis of the knee. This study examined the effectiveness of a portable isometric exercise device for home use that guides the user through an exercise protocol by means of various forms of feedback. Samples randomly assigned with eligibility criteria to the exercise device group, and control group. This type of exercise can decrease joint-related pain and stiffness while increasing strength and functional measures. Researcher concluded that, individuals exercising with the device achieved better outcomes in pain, stiffness, strength, and functional measures than the control group.

**Narinder Kaur & Varma., (2005)** selected two hundred patients ranging in age from 40 to 70 years with established osteoarthritis knee to examine the association of quadriceps strength with pain and disability of knee osteoarthritis. In addition the relationships between various components of health related fitness, pain, efficiency and disability were also examined in the present study. Quadriceps strength seems to be in depend contributor to the severity of osteoarthritis knee; the findings illustrated the need of improving the muscles function in these patients.

#### **SECTION D : STUDIES RELATED TO EFFECTIVENESS OF OTHER THERAPIES IN OSTEOARTHRITIS**

**Eckhart Gruing., (2012)** conducted a prospective study to assess the effectiveness of short and long term efficacy of exercise training program for arthritis patients. Totally 21 patients were selected randomly for this study. Patients with invasively confirmed osteoarthritis received exercise training in-hospital for 3 weeks and continued at home for 12 weeks. Twenty-one consecutive patients were included and assessed at baseline, and after 3 weeks, after 15 weeks. Patients significantly

improved the mean distance walked in 6 minutes compared to baseline by  $67 \pm 52$  meters after 3 weeks ( $p < 0.001$ ) and by  $71 \pm 35$  meters after 15 weeks ( $p = 0.003$ ), scores of quality of life ( $p < 0.05$ ), heart rate at rest, peak oxygen consumption, oxygen saturation and maximal workload pain and oedema reduced after 3 weeks of exercise training. The 1- and 2-year overall-survival rates were 100%, the 3-year survival 73% [ $r=0.42$ ] it confirms that exercise training programme is increasing the quality of life and also reducing the pain and disability.

**Stephen Panicles., (2011)** conducted a prospective, single blind randomized controlled trial study to find out the effectiveness of intensive dietary restriction and exercise among obese osteoarthritis patients in Nagaland. Convenient sampling technique was used to select the patients. There are 454 enrolled over weight and obese ( $BMI = 27-42 \text{ kg/m}^2$ ) older adults aged over 55 yrs with pain and oedema clients. Participants were randomized to one of three 18-months interventions: Participants were grouped into three, among them one group received dietary restriction plus exercise training, other group receives intensive dietary restriction-only. Third group receives exercise-only control. After analysis it showed that the group which got both the dietary restriction and exercises were got good relief than the group received exercise only and had significant effectiveness.

**Michella Lawson., (2011)** conducted a study regarding the effectiveness of Epsom salt for the reduction of pain and stiffness in osteoarthritis patients in Beijing. There were 74 patients participated in this study. Purposive sampling technique was used. Epsom salt was applied over the swelling joints for twice a day for three weeks. Post-test assessment was done with the use of rating scale [ $t=5.24$ ]. It was concluded that Epsom salt was a best treatment for the relief of pain and joint stiffness among arthritis patients.



**Ottawa, et al., (2010)** conducted an experimental study to assess the effectiveness of transcutaneous electrical nerve stimulation (TENS) on reduction of pain among arthritis patients in Iran. He selected 70 patients for the study, from them 35 patients received TENS and other 35 were under control. Pain scores were measured by a visual analogue scale. The result of the study was mean of post-test pain scores in the experimental group [ $t=6.34$ ] were significantly lower than the mean post-test pain scores in the control group [ $t=2.04$ ] ( $p < 0.05$ ). There were significant differences between the pain perception among experimental and control groups. Thus transcutaneous electrical nerve stimulation is also an important pain and oedema reducing therapy.

**Hinson, et al., (2009)** conducted a study regarding the effectiveness of knee taping among osteoarthritis patients. Samples have adopted one group pre-test and post-test experimental design. Samples had selected 14 study participants and were used to evaluate the effectiveness of knee taping on osteoarthritis patients. And it was determined that a 25% reduction in pain occurred in patients with knee osteoarthritis after taping the patella (kneecap) [ $t=6.45$ ] medially or towards the middle for 4 days. The second study, published in the July 2010 issue of the British Medical Journal, is considered the premiere study on knee taping. It involved 87 study participants with knee osteoarthritis, who were randomly assigned to therapeutic tape, control tape, or no tape groups. The study lasted for 3 weeks and there was a 3-week follow-up period. Researcher concluded that therapeutic tape reapplied weekly and worn for 3 weeks significantly reduced pain by 38 to 40% and improved disability in patients with knee osteoarthritis. The benefit of knee taping was maintained for 3 weeks after taping had been stopped.

**Crig.R.Denegar., (2008)** conducted a study regarding the effectiveness of heat versus cold application on reduction of pain among osteoarthritis as randomized controlled study. There were 68 clients participated in this study. Each 34 patients received each treatment in 1 week blocks. Non-probability convenient sampling method was used. A osteoarthritis outcome score questionnaire and visual analog pain scale was used to assess the effectiveness .Near equal preferences were observed for cold (24%) and contrast (24%). Pain reduction and improvements in subscale measures were demonstrated for each treatment but responses were ( $P < 0.05$ ) greater which preferred treatment of cold application.

**Reiner., (2008)** conducted a study to evaluate the effect of camphor oil as an analgesic for osteoarthritis pain among osteoarthritis patients which can be applied as a local massage. Convenient sampling technique was adopted for this study. Thirty osteoarthritis patients were included in this study,8 grams of camphor (Ping on ointment) was applied for 50 cases for one month, it shows the significant association in reduction of pain.[ $t=5.86$ ],mean=1.24 in experimental group, and 2.56 in control group. The study was concluded as safe, simple, cheap, non-invasive and effective intervention for arthritis pain.

**Berman et.al.,(2006)** conducted a randomized controlled trail to evaluate the effectiveness of acupuncture among osteoarthritis. Totally 570 patients with osteoarthritis of the knee were selected from two outpatient clinic in maryl and the simple random sampling method was used .The experimental group received 23 true acupuncture sessions over 26weeks. While the control group received sham acupuncture (type of acupuncture) sessions over 26 weeks. Data were collected and analyzed for pain and functional capacity (primary outcome) using Western Ontario McMaster Universities, osteoarthritis index pain and functional scores were assessed

at the last of 26 weeks. The patients also underwent global assessment for severity, were capability for 6mts walking distance and physical health scores (secondary outcome) with the help of short form health survey. Results revealed that participants in the true acupuncture group experimental greater improvement in WOMAC pain scores and functional scores health survey [t=6.14] than the sham acupuncture group at 8 wks and 26wks [t=3.03]. Study concluded that acupuncture provides more improvement in function and pain scores and was more reliable as an adjuvant therapy for osteoarthritis clients groups respectively.

**Evans., (2005)** conducted an experimental study to evaluate the use of mashed potato application over the joints for pain among arthritis clients residing in Taysides, convenient sampling method was adopted to select the samples who were admitted in hospital for the treatment of arthritis. Totally 243 patients were selected for this study. A results identified significant association with reduction of joint pain and edema by mashed potato application. 89% at the significant of 0.001 level [t=6.34].The study results shows that the rate of pain reduction using mashed potato application among Taysides was high.

**Cochen, Wolfe ,et al., (2003)** conducted a randomized control trial to evaluate the effectiveness of topical cream containing Glucosamine sulphate, chonroitin sulphate camphor to reduce the pain related osteoarthritis of knee among tribal community population in Taiwan. In the study 63 patients were randomized to receive either a topical cream or placebo over an 8 weeks period . Efficiency was assessed using a visual analog scale for pain as well was the Western Ontario and McMaster University osteoarthritis index and self reported questionnaire. Visual analog scale scores indicated a greater mean reduction in pain for the glucosamine and chonroitin preparation group.(mean changes 3.4,S.D 2.6) compared to placebo

group (mean 1.6,S.D 2.7) after 8 wks of topical application it was found to be an effective in relieving the pain of knee and got an improvement with in 4wks.

**Stegman, et.al., (2003)** conducted a clinical random trial study to evaluate the effectiveness of cryotherapy on improvement of functional ability among osteoarthritis patients, in total of 96 sample participated in the study from the Gorith city of China by random method. Functional disability was measured using a version of the WHO. After the completion of cryotherapy the mean posttest score was 2.14. Then the study was concluded that the cryotherapy has the significant reduction in pain among osteoarthritis clients.

**Stelian.Git&Hobot ., (2002)** conducted a partially a double blinded study to evaluate the effect of low power light therapy on pain, edema and disability in elderly patients with degenerative osteoarthritis of the knee, the study comparing red infrared and placebo light emitters. Fifty patients with degenerative osteoarthritis of both knees were randomly assigned to three treatment groups first group (15 patients) received red light,18 patients received infrared light therapy, and 17 patients were considered as placebo group. Self applied treatment to both side of the knee for 15mts twice a day for 10days.Posttest assessment was done by using visual analogue scale and Erin edema scale for edema assessment were used after the tenth day of therapy patients got statistically significant result at  $P= 0.0$ . [mean=2,SD=1.543].

**Hegazi& Gilman., (2001)** conducted a randomized study to determine that a combination of apitherapy and conventional modulation on reduction of pain and oedema among osteoarthritis patients. A group of 50 patients with osteoarthritis in general open clinic was selected randomly from Jammu, data collected with the use of pain and edema scale, statistical analysis were done, Greater decline of pain, stiffness and edema benefits were noted also a significant drop in the relapse rate 12% to 32%and pain relief score computerized through the instrument included questionnaire on the basis of apitherapy.

## CHAPTER –III

### RESEARCH METHODOLOGY

This chapter describes the methodology to evaluate the effectiveness of isometric exercises on level of pain among osteoarthritis patients in selected villages.

This chapter provides a brief description of the method adopted for the study. It includes research approach, research design, setting of the study, population, sample, sample size, sampling technique and criteria for selection of samples, development and description of tool, pilot study, plan for data analysis and protection of human rights.

#### RESEARCH APPROACH:

Quantitative research approach was used.

#### RESEARCH DESIGN:

The research design adopted for the study was quasi experimental pre-test and post-test control group design.

Group	Pretest	Intervention	Post-test
Experimental group	O1	X	O2
Control group	O3	-	O4

**Fig 1: Schematic representation of Research design**

#### Key:-

**O1** - Pre-test level of pain among osteoarthritis patients in experimental group.

**O2**- Post-test level of pain among osteoarthritis patients in experimental group.

**X** – Administering isometric exercise to experimental group.

**O3**- Pre-test level of pain among osteoarthritis patients in control group.

**O4** - Post-test level of pain among osteoarthritis patients in control group.

## **VARIABLES**

### **Independent variable:**

Isometric exercises

### **Dependent variable:**

Osteoarthritis knee Pain

## **SETTING OF THE STUDY:**

The setting of the study refers to the area, where the study was conducted. The study was conducted in two villages in Virudhunagar. In that Zaminkollankondan was selected for experimental group and Avarampatti was selected for control group. This arrangement helped the investigator to carry out the intervention for the experimental group and also reduced the interruption from the control group. Total population of the Zaminkollankondan village is 3964, among them 2352 were males and 1612 were females. The total population of Avarampatti village is 4200, among them 2206 were males and 1994 were females. The distance between the two villages from the college were 13 kilometers and 9 kilometers respectively. The peoples from both villages are getting medical care facilities from primary health centre. The primary health centre was providing the basic medical care facilities such as immunization, family planning, maternal and child health care.

## **POPULATION:**

Population of the study was patients with osteoarthritis, the age group between 30-70 years those who had mild and moderate osteoarthritis residing in Virudhunagar.

**SAMPLE:**

The patients who are all having mild and moderate osteoarthritis with mild, moderate and severe pain and the age group between 30 to 70 years residing in Zaminkollankondan village and Avarampatti village in Virudhunagar.

**SAMPLE SIZE:**

The total sample size for the study was 60. Among them 30 patients were in experimental group and 30 patients in control group selected based on inclusive criterias.

**SAMPLING TECHNIQUE:**

The non probability purposive sampling technique was adopted for the study.

**STEP-1:**

The investigator was selected Zaminkollankondan village for experimental group. Total population of the Zaminkollankondan village is 3964, among them 2352 were males and 1612 were females. From them 318 samples had osteoarthritis as per Lequence index observational checklist for osteoarthritis. The investigator gone home to home survey and identified the 208 patients with in the age group of 30-70 years. Among them 13 patients had mild osteoarthritis, 17 patients had moderate osteoarthritis, 22 patients had severe osteoarthritis, 58 patients had worst pain was assessed by numerical pain intensity rating scale and 31 patients are hypertensive and remaining patients were not willing to participate the study. From these 30 patients with mild and moderate osteoarthritis and who fulfill the inclusive criteria were selected for the experimental group by non probability purposive sampling method. Remaining samples were excluded from the study.

**STEP-2:**

The investigator was selected Avarampatti village for control group. The total population of the Avarampatti village is 4200, among them 2206 were males and 1994 were females. From them 357 samples had osteoarthritis as per Lequence index observational checklist for osteoarthritis. The investigator gone home to home survey and identified 205 patients were belongs to the age group of 30-70 years. In that 12 patients had mild osteoarthritis, 18 patients had moderate osteoarthritis, 78 patients had severe osteoarthritis and 33 patients had worst pain, was assessed by numerical pain intensity rating scale and 24 patients are hypertensive,7 patients had skeletal disability and the remaining patients were not willing to participate in the study. From these 30 patients with mild and moderate osteoarthritis and who fulfilled the inclusive criteria's were selected for the control group by non probability purposive sampling method. Remaining samples were excluded from the study.

**CRITERIA FOR SAMPLE SELECTION:**

The sample was selected on the basis of inclusive criteria and exclusive criterias.

**Inclusive Criteria:**

- \* Patients between the age group of 30 to 70 years.
- \* Patients with knee osteoarthritis.
- \* Patients who are having mild and moderate osteoarthritis.
- \* Patients who are having mild, moderate and severe pain.
- \* Patients who are suffering with knee osteoarthritis for less than 5 years.



**Exclusive criteria:**

- \* Patients who are already have Rheumatoid arthritis and Gout arthritis.
- \* Patients who have osteoarthritis associated with other systemic illness (Hypertension).
- \* Patients with severe osteoarthritis.
- \* Patients with worst pain.
- \* Patients who are not willing to participate in the study.
- \* Patients who are already received isometric exercise.

**DEVELOPMENT AND DESCRIPTION OF TOOLS:****SECTION:- A -Demographic variables:**

It consist of demographic data of the patients with osteoarthritis in include Age, Sex, Body mass index, Marital Status, Education, Occupation, Dietary pattern, Duration of illness and Duration of treatment.

**SECTION:-B – Modified Lequence Index observational checklist for osteoarthritis:**

It deals with Modified observational checklist for osteoarthritis to identifying the severity level of osteoarthritis patients. The observational checklist was developed by the investigator after reviewing the literature. The tool consists of three parameters such as pain and discomfort, maximum level of distance walking and activities of daily living. Based on the presence of symptoms patients were categorized in to different level of osteoarthritis (mild, moderate and severe). The investigator selected mild and moderate osteoarthritis.

### **SECTION: C – Modified Numerical Pain Intensity Rating Scale:**

It deals with modified Numerical Pain intensity Rating Scale to measure the level of pain among osteoarthritis patients. This is standardized scale. It consist of numerical values from 0-10 which denotes the different level of pain such as no pain, mild, moderate and severe pain.

### **SCORING PROCEDURE:**

#### **SECTION- A:**

Modified Lequence Index Observational checklist for identifying osteoarthritis patients. Total score is 17. If symptoms absent score is 0, the score 1-5 indicates mild osteoarthritis, 6-9 indicates moderate osteoarthritis and 10-17 indicates severe osteoarthritis.

#### **Scoring key:**

<b>SNO</b>	<b>INDEX SCORE</b>	<b>DISCRIPTION</b>
<b>1</b>	<b>0</b>	<b>None</b>
<b>2</b>	<b>1-5</b>	<b>Mild osteoarthritis.</b>
<b>3</b>	<b>6-9</b>	<b>Moderate osteoarthritis.</b>
<b>4</b>	<b>10-17</b>	<b>Severe osteoarthritis.</b>

#### **SECTION-C:**

Numerical pain intensity rating scale to find out the level of pain among osteoarthritis patients. Total score is 10. When the patients reports no pain, the pain score is 0, 1-3 indicates mild pain, it carries the score 1, 4-6 indicates moderate pain, it carries the score 2 and 7-10 indicates severe pain, it carries the score 3. The score was interpreted as,

**Scoring key:**

<b>DESCRIPTION</b>	<b>RATE</b>	<b>SCORE</b>
No pain	0	0
Mild pain	1-3	1
Moderate pain	4-6	2
Severe pain	7-10	3

**DESCRIPTION OF INTERVENTION :****DESCRIPTION:**

An isometric exercise is a non pharmacological management used to reduce osteoarthritis pain. The simple verbal explanation concerning advised to take deep breath and relax during the muscle contraction. The Isometric exercise was performed twice a day. The total duration of isometric exercise was 30 minutes per time for two times a day administered subsequently for 7 days.

**INTERVENTION:****ISOMETRIC QUADRICEPS STRENGTHENING TECHNIQUE:****ISSTRAIGHT LEG RAISING (SLR) EXERCISE:****A) IN SUPINE POSITION**

- Advised the patient to lie flat or sit with leg straight.
- Instruct them to tighten the muscles in front of thigh as much as she / he can, Pushing the back of the knee flat against the floor/bed.
- Lift the leg/heel 4 to 6 inches off the floor/bed. After 5 seconds.
- Bring leg/heel back to the floor. Keep the muscle in front of the thigh as tight as possible as lower the leg , then relax.
- Repeat the exercise 10 times for 2 times per day.

**B) HIGH SITTING POSITION:**

- Advise the Patients to sit at the edge of bed with the hanging of legs.
- Instruct them to pull the toes up, tighten the thigh muscles and straighten the knee of the legs.
- Lift the straighten leg individually to be equal to hip level for a second and bring back to same position.
- Repeat the exercise 5 times for each legs and follow for two times a day.

**II. STEP-UP AND STEP DOWN EXERCISE:**

- Stand on the edge of step.
- Place the foot on the step approximately 7 inches in height. Hold on to a hand walls, chair or other objects for balance if needed.
- Slowly step-up and down. Make sure that kneecap is always in line with the second toe and hips are level.
- Lightly touch the heel of the opposite legs to the floor and return to the starting position.
- Repeat exercise ten times, 2 times per day.

**III. WALL SLIDE EXERCISE:**

- Stand with back against the wall. The feet should be shoulder width apart and approximately 18 to 24 inches away from the wall. Kneecap should be line with the tip of second toe/shoes
- Slowly slide down the wall so that 75to90 degree bend the knees.
- Hold this position for 5 seconds. stand up and rest for 5 seconds.
- Repeat exercise 10 times for 2 time/day

#### **IV. HIP ADDUCTION EXERCISE:**

- Advise the patient to lie flat or sit with leg straight.
- Place a inch roll under knee, allowing it to be bend.
- Tighten the muscle in front of knee as much as can, and lift the heel off the floor.
- Hold this position for 10 seconds.
- Repeat exercise for 10 times, 2 times/day.

#### **CONTENT VALIDITY:**

The content validity of the tool was established on the basic opinion of one medical expert and four nursing experts in the field of medical surgical nursing.

#### **RELIABILITY OF THE TOOL :**

The researcher was used Numerical Pain Intensity Rating Scale. It is standardized and universally acceptable one. Reliability of Lequence index observational checklist of osteoarthritis patients was established by test and retest method by using karlperson's correlation of the tool. The reliability score was  $r=0.9$ . Hence the total was considered reliable for preceding the main study.

#### **PILOT STUDY**

It is a rehearsal of the main study. The pilot study was conducted after obtaining formal permission from the Principal, Head of the department of medical surgical Nursing and research ethical committee of Sri. K. Ramachandran Naidu college of Nursing. A formal permission was obtained from the Panchayath board of the selected villages and block medical officer. The pilot study was conducted at two villages in Karivallamvanthanallur and Desigapuram from 9-2-16 to 18-2-16. The total number of samples were 6, who fulfill for the criteria selection for pilot study.

In Karrivallamvanthanallur village the total population is 4028, Among that 2011 were males and 2017 were females. Totally 354 patients had osteoarthritis. Among them 45 patients had mild osteoarthritis, 52 patients had moderate osteoarthritis, 58 patients had severe osteoarthritis. Finally 3 patients were selected for experimental group based on inclusive criteria by using non probability purposive sampling technique.

In Desigapuram village, The total population is 3018, among them 2602 were males and 1917 were females. Totally 305 patients had osteoarthritis. Among them patients had 35 patients had mild osteoarthritis, 49 patients had moderate osteoarthritis, 58 patients had severe osteoarthritis. Finally 3 patients were selected for control group based on inclusive criteria by using non probability purposive sampling technique.

Rapport was established with the patients and selected osteoarthritis patients by using Modified Lequnce Index Observational checklist. A brief introduction about the study was given. Informed oral consent was obtained from the patients and reassurance was provided, that the collected data should be kept confidential. Demographic variables were collected by the interview method and pre-test level of pain was assessed by using Numerical pain intensity rating scale for both control group and experimental group. The investigator gathered the experimental samples in common hall. The isometric exercise was demonstrated by the investigator and motivated the samples to do the exercise in everyday morning 7 am and evening 5 pm for the period of 7 days under the supervision of investigator. The total duration of isometric exercise was 30 minutes per time for two times a day administered subsequently for 7 days to experimental group and no intervention was given to control group, After the 7<sup>th</sup> day, post-test level of pain was assessed by using

numerical pain intensity rating scale for both control group and experimental group. The data analysis was done by using inferential and descriptive statistics. The samples selected for pilot study was not included for the main study.

### **DATA COLLECTION PROCEDURE :**

A researcher got permission from the principal, Head of the Department of medical surgical Nursing and research ethical committee of Sri.K.Ramachandran Naidu College of Nursing. The data collection procedure was started from 15-2-16 to 15-3-16. A formal permission was obtained from the Block Medical Officer of primary health centre of the two villages. In that Avarampatti was selected for experimental group and Zaminkollankondan was selected for control group, with the use of purposive sampling method. The investigator was introduced herself to the participants and explained the purpose of the study and established rapport with them and got informed oral consent from the participants. The participants were assured that the information provided by them would be kept confidential.

**PHASE I :**The investigator was selected Zaminkollankondan village for experimental group. Total population of the Zaminkollankondan village is 3964, among them 2352 were males and 1612 were females. From them 318 samples had osteoarthritis as per Lequence index observational checklist for osteoarthritis. The investigator gone home to home survey and identified the 208 osteoarthritis patients were belongs to the age group of 30-70 years. Among them 13 patients had mild osteoarthritis, 17 patients had moderate osteoarthritis, 22 patients had severe osteoarthritis, 58 patients had worst pain was assessed by numerical pain intensity rating scale and 31 patients are hypertensive and remaining patients were not willing to participate the study. From these 30 patients with mild and moderate osteoarthritis and who fulfill the inclusive

criteria were selected for the experimental group by non probability purposive sampling method. Remaining samples were excluded from the study.

The investigator was selected Avarampatti village for control group. The total population of the Avarampatti village is 4200, among them 2206 were males and 1994 were females. From them 357 samples had osteoarthritis as per Lequence index observational checklist. The investigator gone home to home survey and identified 205 osteoarthritis patients were belongs to the age group of 30-70 years. In that 12 patients had mild osteoarthritis, 18 patients had moderate osteoarthritis, 78 patients had severe osteoarthritis and 33 patients had worst pain was assessed by numerical pain intensity rating scale and 24 patients are hypertensive, 7 patients had skeletal disability and remaining patients were not willing to participate in the study. From these 30 patients with mild and moderate osteoarthritis and who fulfill the inclusive criteria were selected for the control group by non probability purposive sampling method. Remaining samples were excluded from the study.

**PHASE II:** Data pertaining to the demographic variables were collected by interview method. The investigator was assessed the pre-test level of pain for experimental group with Numerical pain intensity rating scale. Followed with pretest, the investigator gathered 7 to 8 samples in common hall. The isometric exercise was demonstrated by the investigator and motivated the samples to do the exercise for 30-minutes per time for two times a day administered subsequently for 7 days (everyday morning 7 am and evening 5 pm) under the supervision of investigator. On the 7th day, the investigator was assessed the post-test level of pain by using Numerical pain intensity rating scale for experimental group.

The researcher was assessed the pre-test level of pain with Numerical pain intensity rating scale for control group. There is no intervention was given to control



group. On 7th day the investigator was assessed the post-test level of pain in control group.

### **PLAN FOR DATA ANALYSIS:**

The data was going to analyzed according to objectives of study by descriptive and inferential statistics .

#### **Descriptive statistics:**

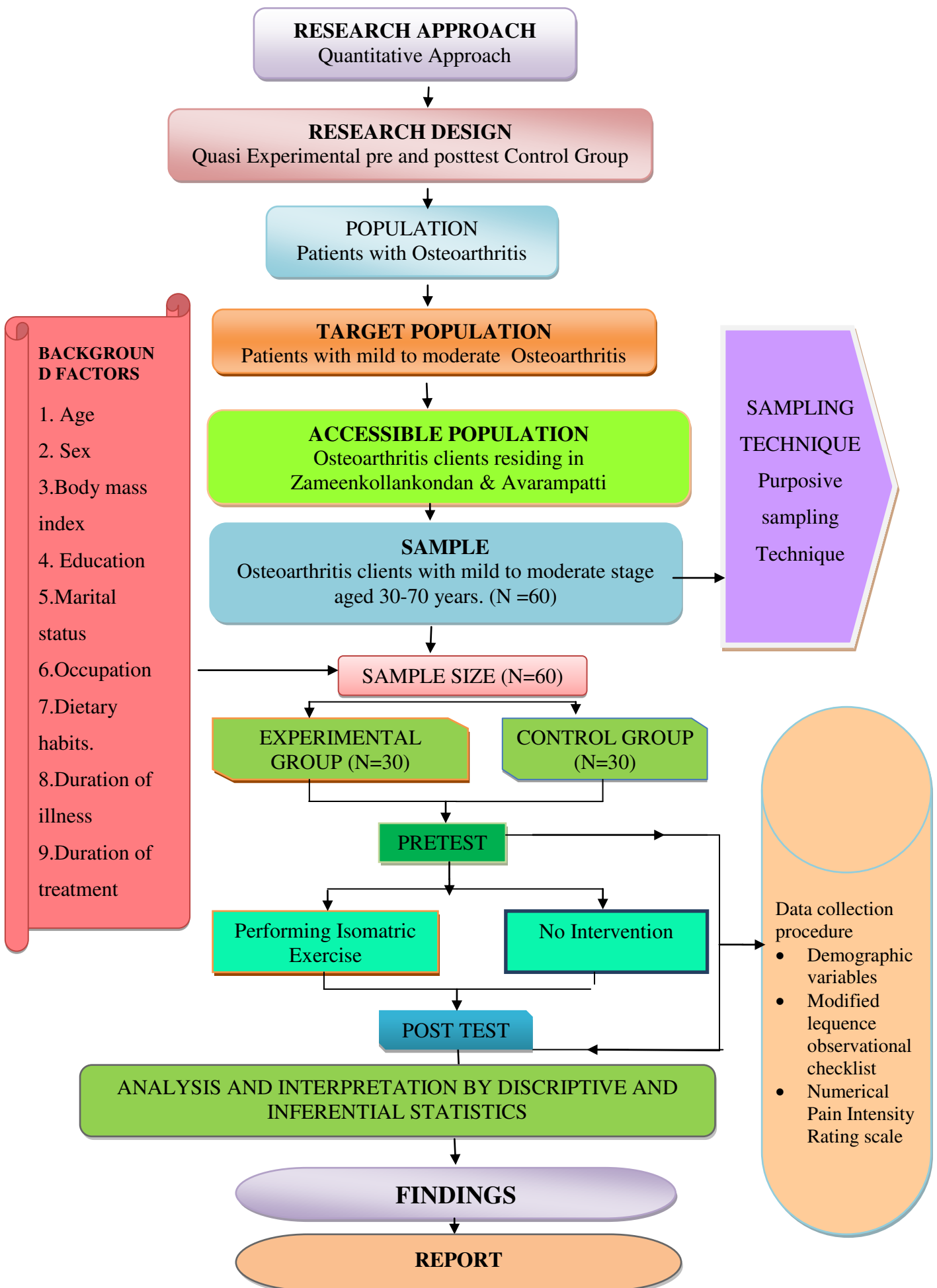
- Frequency and percentage distribution was used to assess the demographic variables. (Age, Sex, Body mass index, Marital Status, Education, Occupation, Dietary pattern, Duration of illness and Duration of treatment).
- Frequency and percentage distribution was used to assess the level of pain.
- Mean and standard deviation was used to compare the pre-test and post-test level of pain with osteoarthritis patients.

#### **Inferential statistics:**

- Paired “t” test was used to compare the pre-test and post-test level of pain among experimental group and control group.
- Unpaired “t” test was used to compare the post-test level of pain between experimental group and control group.
- Chi-square test was used to find out the association of pre-test level of pain among experimental group and control group with their selected demographic variable (Age, Sex, Body mass index, Marital Status, Education, Occupation, Dietary pattern, Duration of illness and Duration of treatment)

## **PROTECTION OF HUMAN RIGHTS**

Ethical clearance was obtained from Principal, Research and ethical committee of Sri Ramachandran Naidu College of nursing and got formal permission from HOD of Medical Surgical Nursing, Sri. K. Ramachandran Naidu College of Nursing and the Block Medical Officer of the Zaminkollankondan and Avarampatti primary health centre. Informed oral consent was obtained from each participants. Rapport was established with the participants and a brief introduction about the study was given. The informed consent was obtained from each study participants and reassurance was provided that the collected data would be kept confidential. Throughout the data collection period, the study participants were safe and had no adverse effects because of the intervention done by the investigator.



**FIGURE 2: SCHEMATIC REPRESENTATION OF RESEARCH METHODOLOGY**

## **CHAPTER-IV**

### **DATA ANALYSIS AND INTERPRETATION**

This Chapter deals with the analysis and interpretation of the data collected from the samples to assess the effectiveness of Isometric Exercise on level of pain among osteoarthritis patients. Analysis is the method of organizing scrutinizing and sorting the data in such a way that research questions can be answered. (Polit, Hungler (2009)). The analysis and interpretation of data is based on data collection, The result are computed by using descriptive (mean, Frequency, percentage distribution and standard deviation) and inferential ('t'- test and chi square test) statistics. The data has been tabulated and organized as follows.

#### **ORGANIZATION OF DATA**

##### **Section I: Identification of severity level of osteoarthritis patients.**

- Frequency and percentage distribution of osteoarthritis patients based on severity from Zaminkollankondan and Avarampatti villages.

##### **Section II: Assessment of demographic variables of the samples.**

- Frequency and percentage distribution of samples based on demographic variables such as age, sex, body mass index, marital status, education, occupation, dietary habits, duration of illness and duration of treatment in the experimental and control group.

**Section III: Assessment of the level pain among osteoarthritis patients in the experimental and control group.**

- Frequency and percentage distribution of pre and post-test level of pain among osteoarthritis patients in experimental group.
- Frequency and percentage distribution of pre and post-test level of pain among osteoarthritis patients in control group.

**Section IV: Comparison of level of pain among osteoarthritis patients between experimental group and control group.**

- Comparison of pre and post-test level of pain among osteoarthritis patients in experimental group and control group.
- Comparison of post-test level of pain between control group and experimental group.

**Section V: Association of pre-test level of pain with the selected demographic variables among osteoarthritis patients in experimental and control group.**

- Association of pre-test level of pain among osteoarthritis patients in experimental group with their selected demographic variables.
- Association of pre-test level of pain among osteoarthritis patients in control group with their selected demographic variables.

## PRESENTATION OF DATA

### SECTION I: ASSESSMENT OF DEMOGRAPHIC VARIABLES OF PATIENTS WITH OSTEOARTHRITIS

**TABLE 1: Frequency and percentage distribution of the samples based on demographic variables in experimental group and control group.**

(N=60)

S. No	Demographic variables	Experimental Group (N=30)		Control Group (N=30)	
		f	%	f	%
<b>1.</b>	<b>Age</b>				
	30-40 years	10	33	8	26
	41-50 years	9	30	11	37
	51-60 years	8	27	6	20
	61-70 years	3	10	5	17
<b>2.</b>	<b>Sex</b>				
	Male	15	50	14	47
	Female	15	50	16	53
<b>3.</b>	<b>Body mass index</b>				
	Underweight	6	20	4	13
	Normal weight	8	27	11	37
	Overweight	16	53	11	37
	Obese	0	0	4	13
<b>4</b>	<b>Marital status</b>				
	Married	17	57	0	0
	Unmarried	4	13	22	73
	Widow	3	10	0	0
	Divorced	6	20	8	27

S. No	Demographic variables	Experimental Group (N=30)		Control Group (N=30)	
		f	%	f	%
<b>5.</b>	<b>Education</b>				
	No formal education	12	40	4	13.33
	Primary education	8	27	13	43.33
	Secondary education	1	3	13	43.33
	Degree and above	9	30	0	0
<b>6</b>	<b>Occupation</b>				
	Cooley	8	27	10	33
	Sedentary worker	16	53	13	44
	Business	6	20	7	23
	Professional worker	0	0	0	0
<b>7</b>	<b>Dietary habits</b>				
	Vegetarian	21	70	4	13
	Non vegetarian	9	30	26	87
<b>8</b>	<b>Duration of illness</b>				
	6months-1 year	11	37	8	27
	More than 1year-2 years	12	40	14	46
	More than 2years-5 years	7	23	8	27
<b>9</b>	<b>Duration of treatment</b>				
	6 months-1 year	5	17	16	54
	More than 1year-2 years	16	53	10	33
	More than 2years-5 years	9	30	4	13

Table 1 denotes the frequency percentage and distribution of the samples based on demographic variables such as age, sex, body mass index, marital status, education, occupation, dietary habits, duration of illness and duration of treatment in the experimental and control group.

While considering the age, in the experimental group out of 30 patients, 10 (33%) of them were between the age group of 30-40 years 9 (30%) of patients

belongs to 41-50 years 8(27%) of patients belongs to 51-60 years and 3(10%) of patients belongs to 51-60 years. Whereas in control group out of 30 patients 8(26%) of them were between the age group of 30-40 years, 11(37%) of patients belongs to 41-50 years, 6(20%) of patients belongs to 51-60 years and 5(17%) of them were in 61-70 years.

With respect to sex in the experimental group, out of 30 patients, 15(50%) of the samples were males and 15(50%) of them were females, whereas in the control group out of 30 patients 14(47%) of them were males and 16(53%) of patients were females.

With regard to body mass index, in the experimental group out of 30 patients, 6(20%) of patients were in underweight 8(27%) of patients were normal weight, 16 (53%) of them were overweight and no one is obese, whereas in the control group out of 30 patients 4(13%) of patients had underweight,11(37%) had normal weight 11(37%) of them had overweight and 4(13%) were obese category.

With regard to marital status, in the experimental group out of 30 patients, 17(57%) were belongs to married and 4 (13%) of them were unmarried, 3(10%) of patients were widow,6(20%) of them were divorced, whereas in the control group also majority of patients were 22(73%) in unmarried group, and no one is widow and married, 8(27%) of them were divorced.

Based on the educational status, in the experimental group out of 30 patients, 12(40%) were belongs to no formal education, 8(27%) of them were completed primary education, 1(3%) of them were completed secondary education, 9(30%) of them were completed degree and above and whereas in the control group 4(13.33%) were belongs to no formal education,13(43.33%)of them were in primary education, 13(43.33%) of them were secondary education, no one is degree and above.

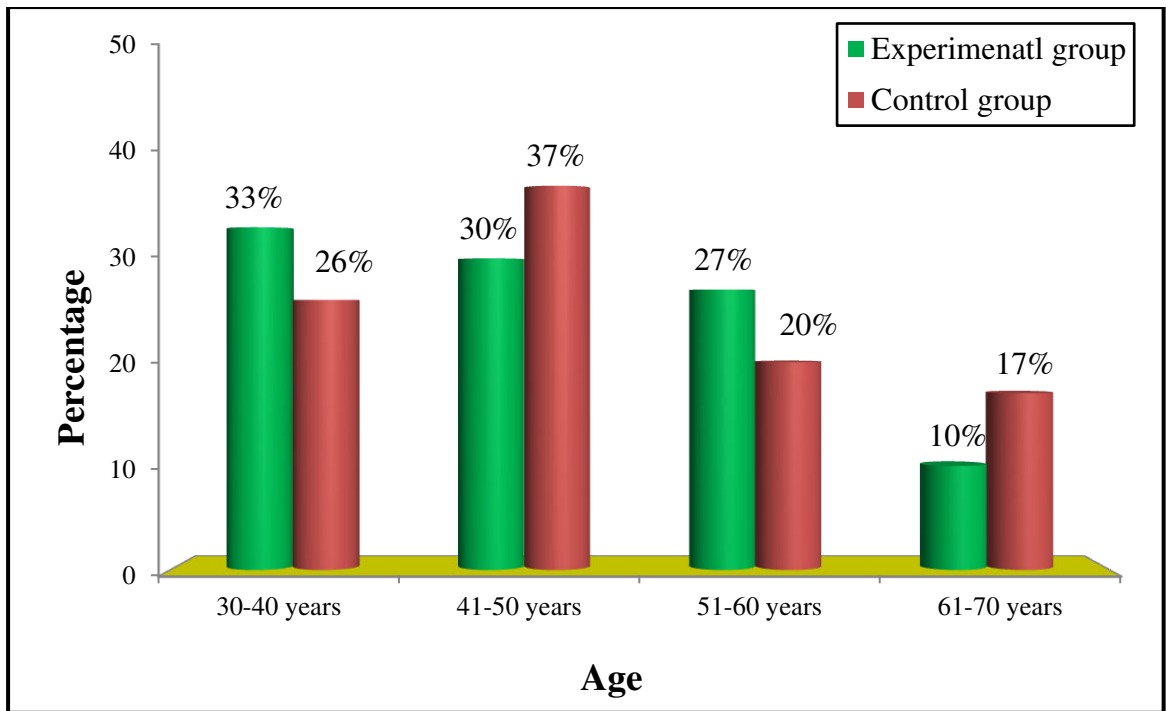


In relation with occupation, in the experimental out of 30 patients of osteoarthritis, 8(27%) of them cooley, 16(53%) of them were sedentary workers, 6(20%) of them were business peoples 0(0%)of patients were professional workers, whereas in the control group out of 30 patients, 10(33%) of them were cooley, 13(44%) of them were sedentary workers, 7(23%) of patients were bissiness,0(0%) of patients had professional workers.

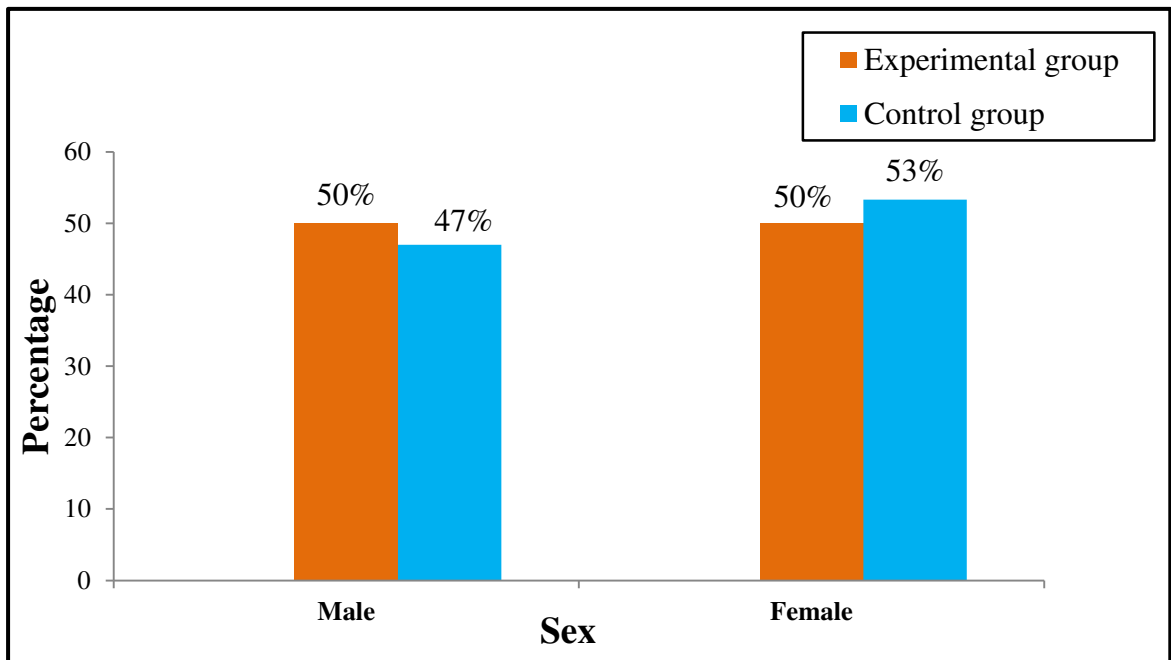
In relation with dietary habits, in the experimental group out of 30 patients of osteoarthritis, 21(70%) of them vegetarian, 9(30%) of them were non vegetarian. Were as in the control group out of 30 patients, 4(13%) of them vegetarian, 26(87%) of them were non vegetarian.

In relation with duration of illness, in the experimental group among 30 patients of osteoarthritis 11(37%) of them having 6months-1 year of illness, 12(40%) of having 1year-2 years of illness, and 7(23%) were having illness for 2years-5 years Whereas in control group 8(27%) of them were having 6months-1 year of illness, 14(46%) of them were suffering with osteoarthritis for more than 1years-2 years of illness, and 8(27%) were suffering more than 2years-5 years of illness.

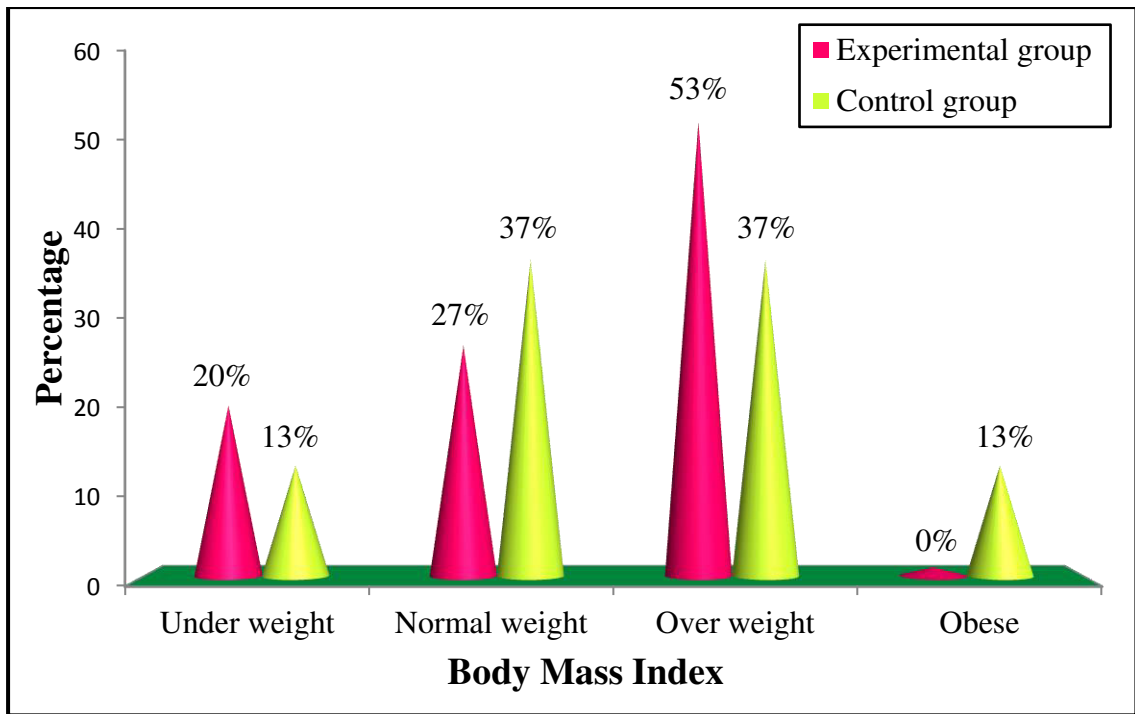
Regarding duration of treatment, 5(17%) of them were on treatment for 6months-1 year, 16(53%) were for in more than 1-2 years, and 9(30%) were for more than 2-5 years of duration of treatment. Whereas in control group 16(54%) were for 6 months-1 year of treatment, 10(33%) of them were for more than 1-2 years of treatment, and 4(13%) were for more than 2-5 years of duration of treatment.



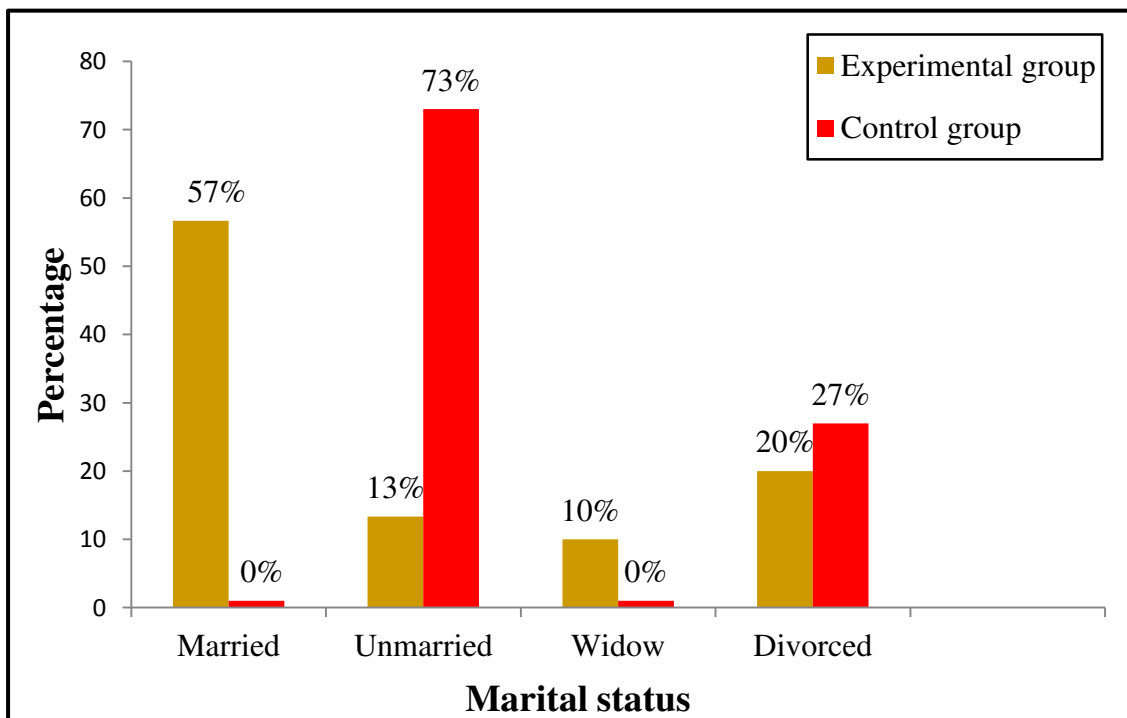
**Figure 3: Percentage distribution of age in experimental and control group**



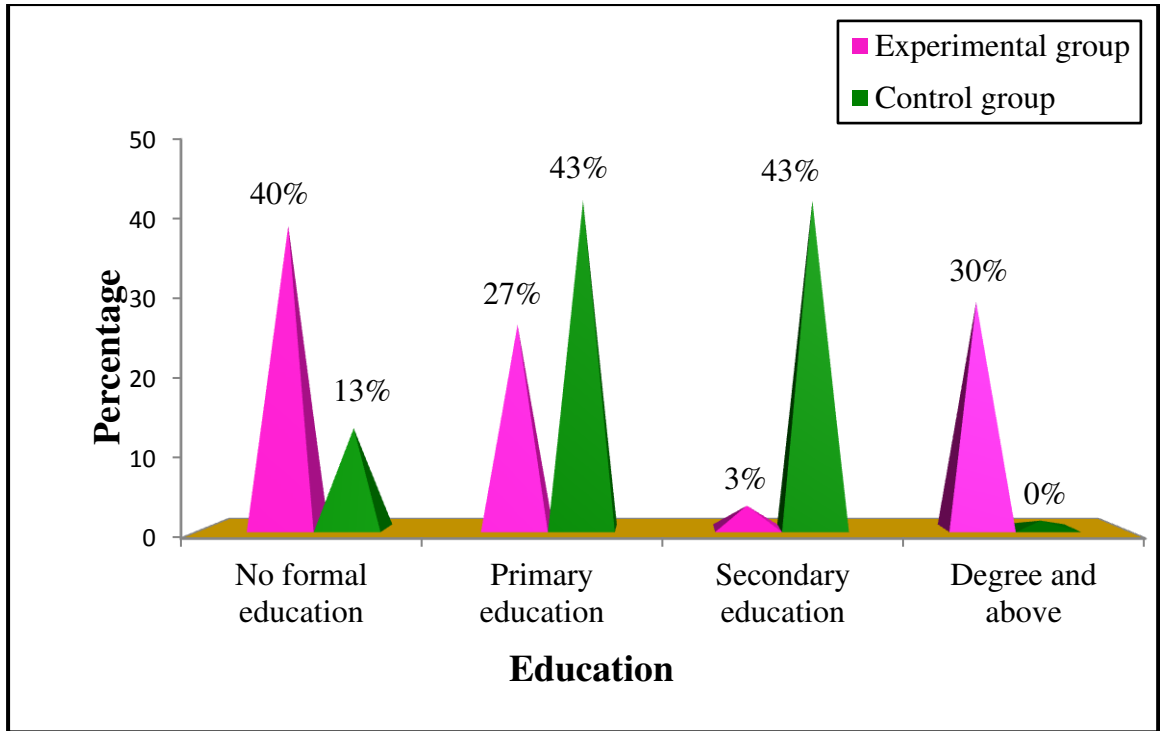
**Figure 4: Percentage distribution of sex in experimental group and Control group**



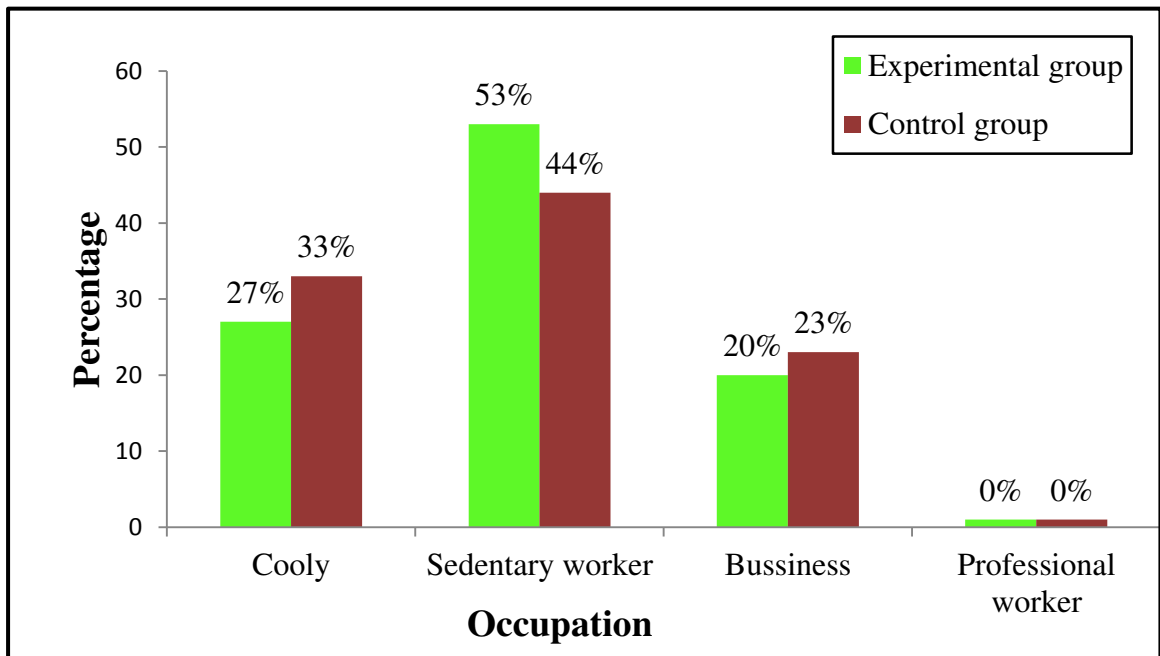
**Figure 5: Percentage distribution of Body Mass Index in experimental group and control group**



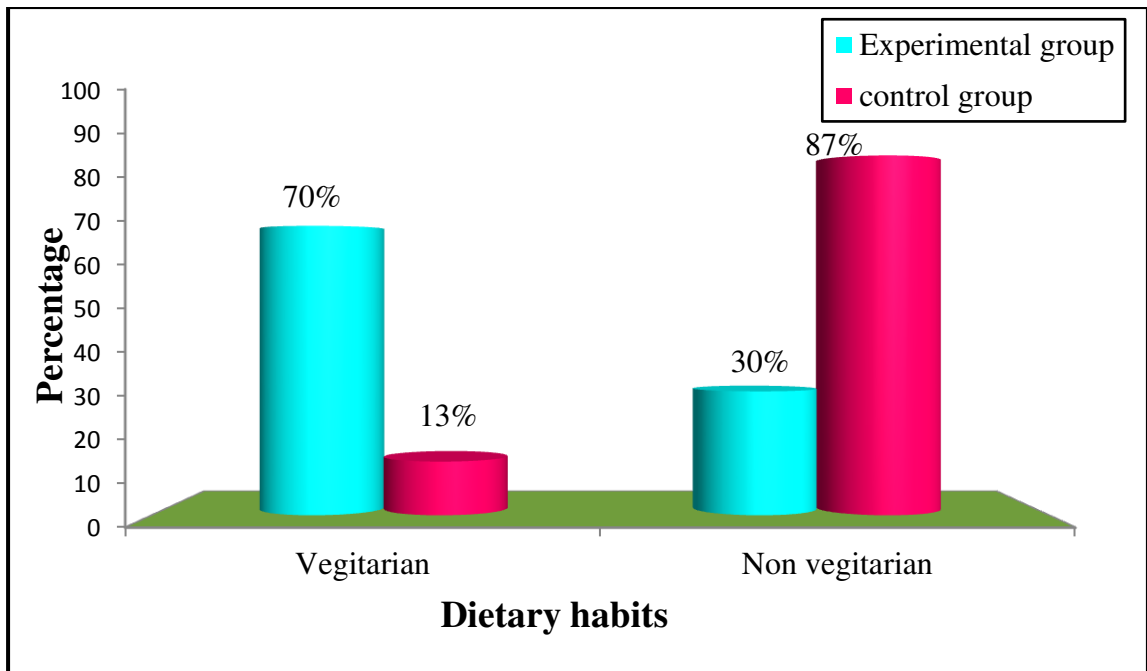
**Figure 6 : Percentage distribution of marital status in experimental group and control group**



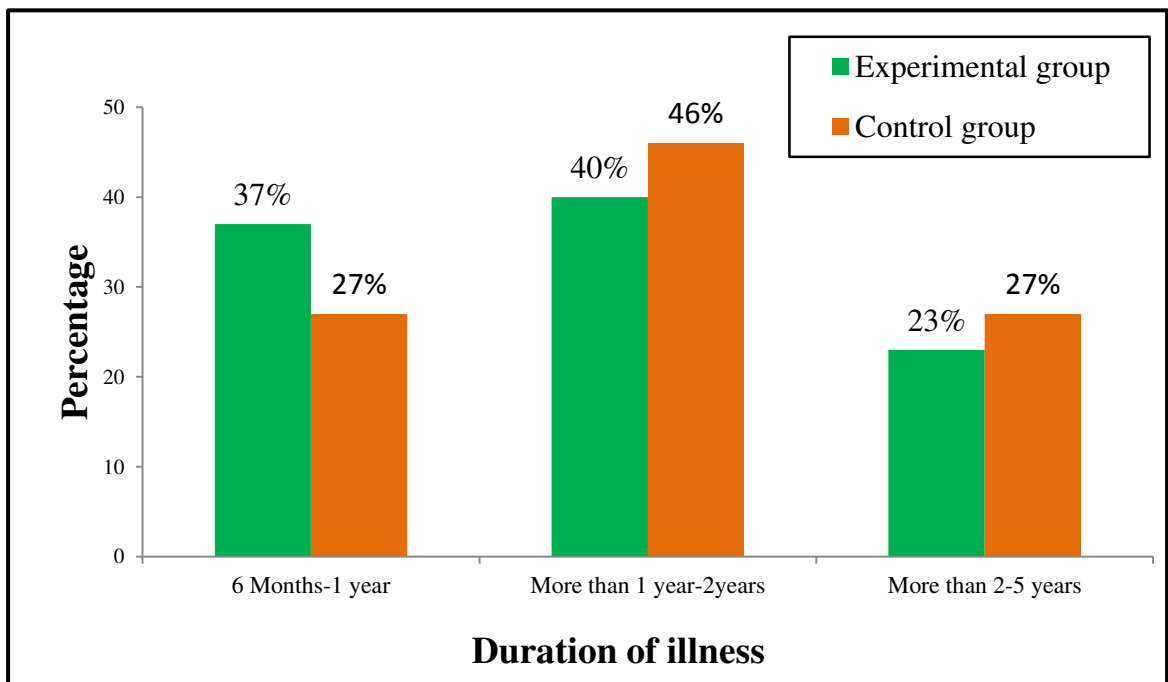
**Figure 7: Percentage distribution of education in experimental group and control group**



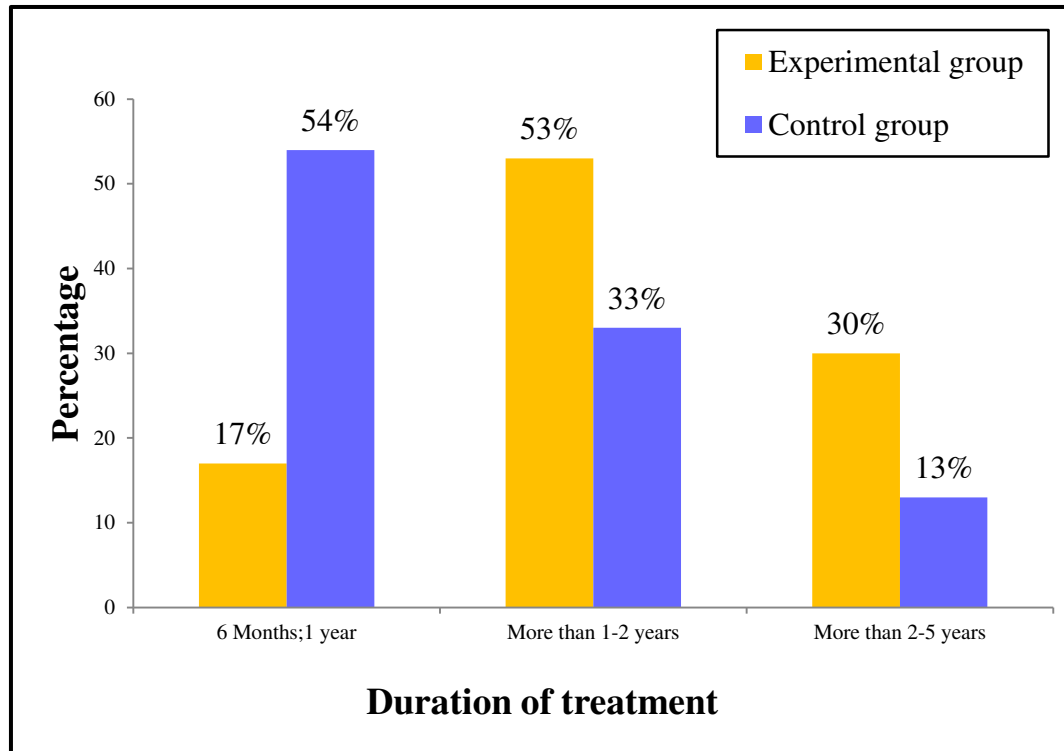
**Figure 8: Percentage distribution of occupation in experimental group and control group**



**Figure 9: Percentage distribution of dietary habits in experimental group and control group**



**Figure 10: Percentage distribution of duration of illness in experimental group and control group**

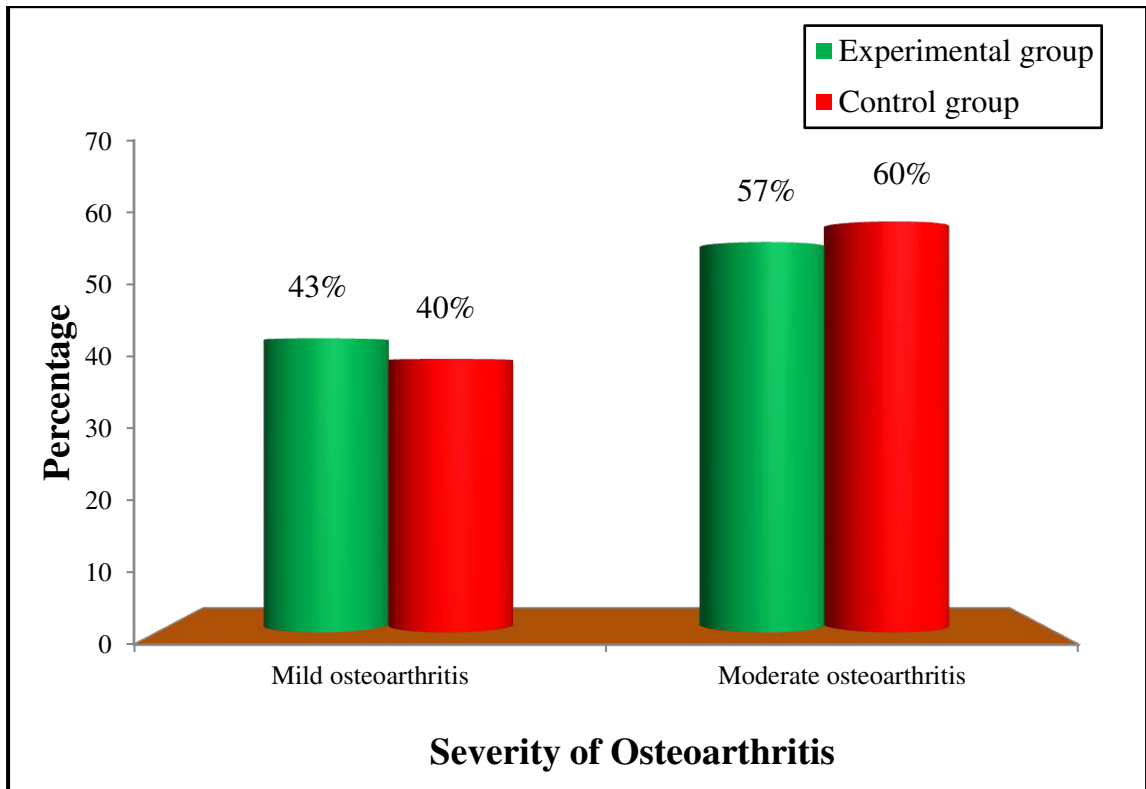


**Figure: 11 Percentage distribution of duration of treatment in experimental group and control group**

**SECTION II: IDENTIFICATION OF OSTEOARTHRITIS PATIENTS.****TABLE 2: Frequency and percentage distribution of samples based on severity form of osteoarthritis patients in experimental group and control group****(N=60)**

<b>S.No</b>	<b>Severity of osteoarthritis</b>	<b>Experimental Group</b>		<b>Control Group</b>	
		<b>Frequency (f)</b>	<b>Percentage (%)</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
1.	Mild osteoarthritis	13	43	12	40
2.	Moderate osteoarthritis	17	57	18	60

Table 2 denotes that, the total number of osteoarthritis patients in experimental group and control group. Out of 30 patients in experimental group 13(43%) were mild osteoarthritis, 17(57%) were moderate osteoarthritis. In control group Out of 30 patients 12(40%) were mild osteoarthritis, 18(60%) were moderate osteoarthritis.



**Figure 12: Percentage distribution of patients based on severity of osteoarthritis in experimental group and control group**



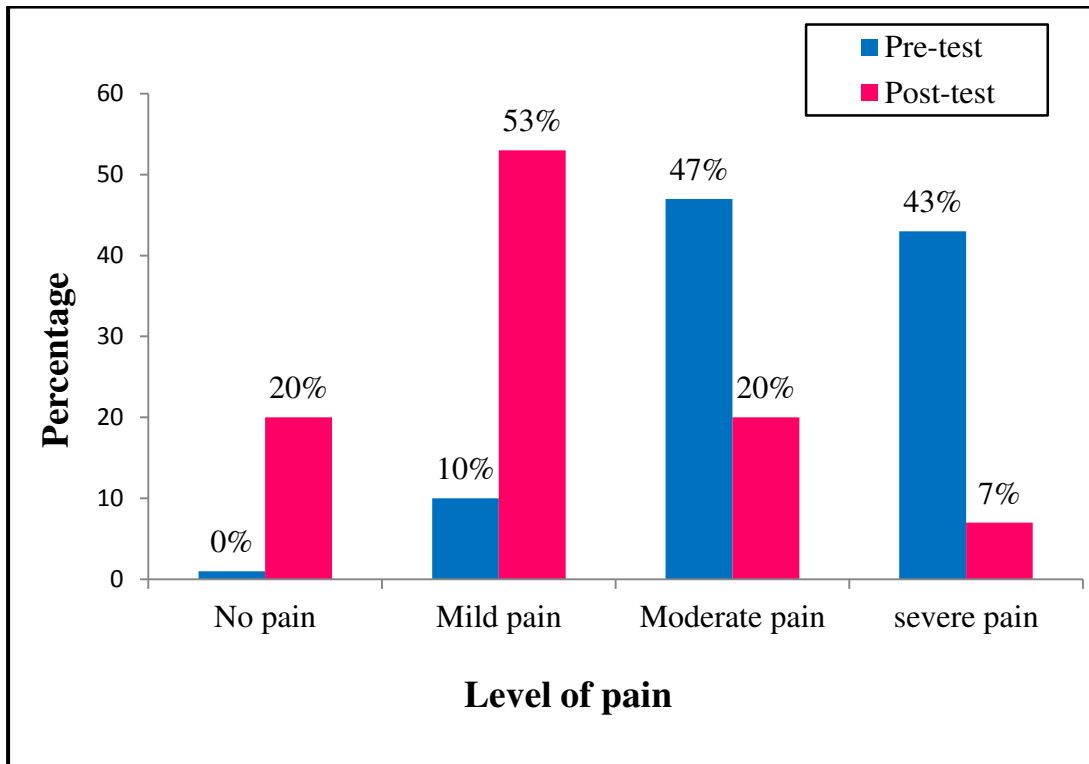
**SECTION III: ASSESSMENT OF THE LEVEL OF PAIN AMONG OSTEOARTHRITIS PATIENTS AMONG EXPERIMENTAL AND CONTROL GROUP.**

**TABLE 3: Frequency and percentage distribution of pre and post-test level of pain among osteoarthritis patients in experimental Group.**

(N = 30)

S.No	Level of pain	Pre-test		Post-test	
		f	%	f	%
1	No pain	-	-	6	20
2	Mild pain	3	10	16	53
3	Moderate pain	14	47	6	20
4	Severe pain	13	43	2	7

Table 3 reveals the frequency and percentage distribution of pre and posttest level of pain among osteoarthritis patients in experimental group. It is evident from the above table that, pretest level of pain among the experimental group, none of the patients had no pain, 3(10%) of the patients had mild pain, 14(47%) of them had moderate pain,13(43%) of them had severe pain, where as in the posttest level of pain among the experimental group 6(20%) of the patients had no pain and 16(53%) of them had moderate pain, 6(20%) of them had moderate pain, and 2(7%) of them had severe pain



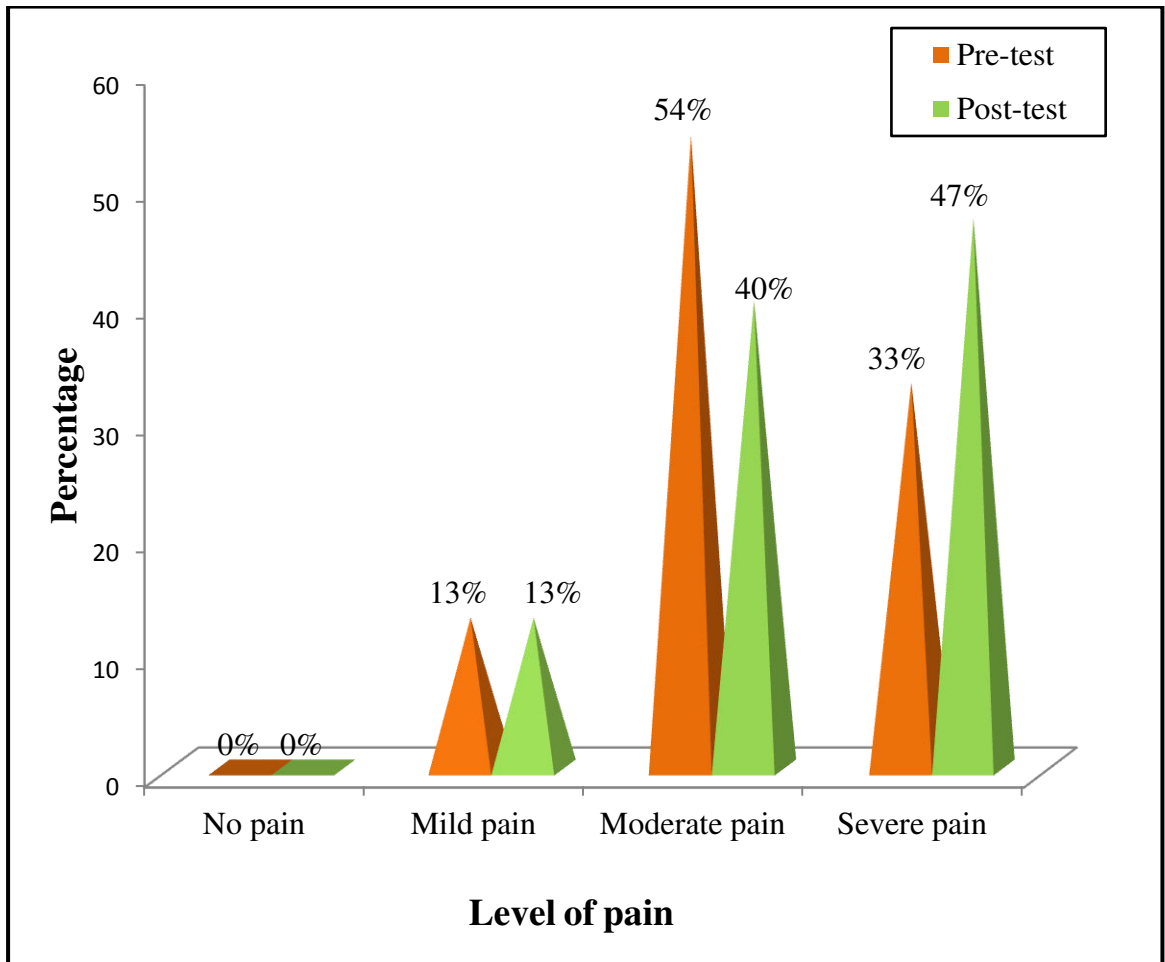
**Figure 13: Percentage distribution of pre and post-test level of pain among osteoarthritis patients in experimental group**

**TABLE 4: Frequency and percentage distribution of pre and post-test level of pain among osteoarthritis patients in control group.**

(N = 30)

S.No	Level of pain	Pre-test		Post-test	
		f	%	f	%
1	No pain	-	-	-	-
2	Mild pain	4	13	4	13
3	Moderate pain	16	54	12	40
4	Severe pain	10	33	14	47

Table 4 shows the frequency and percentage distribution of pre and posttest level of pain among control group. It is revealed that in the pretest level of pain among the control group, none of them had no pain, 4 (13%) of them had mild pain, 16(54%) of them had moderate pain,10(33%) of them had severe pain, whereas in the posttest level of pain among the control group, none of the patients had no pain, 4(13%) of them had mild pain 12(40%) of them had moderate pain, 14(47%) of them had severe pain.



**Figure 14: Percentage distribution of pre and post-test level of pain among osteoarthritis patients in control group**

**SECTION IV: COMPARISON OF THE PRE AND POST-TEST LEVEL OF PAIN AMONG OSTEOARTHRITIS PATIENTS IN EXPERIMENTAL GROUP AND CONTROL GROUP**

**TABLE 5 : Comparison of the pre and post-test level of pain among osteoarthritis patients in experimental group.**

**(N=30)**

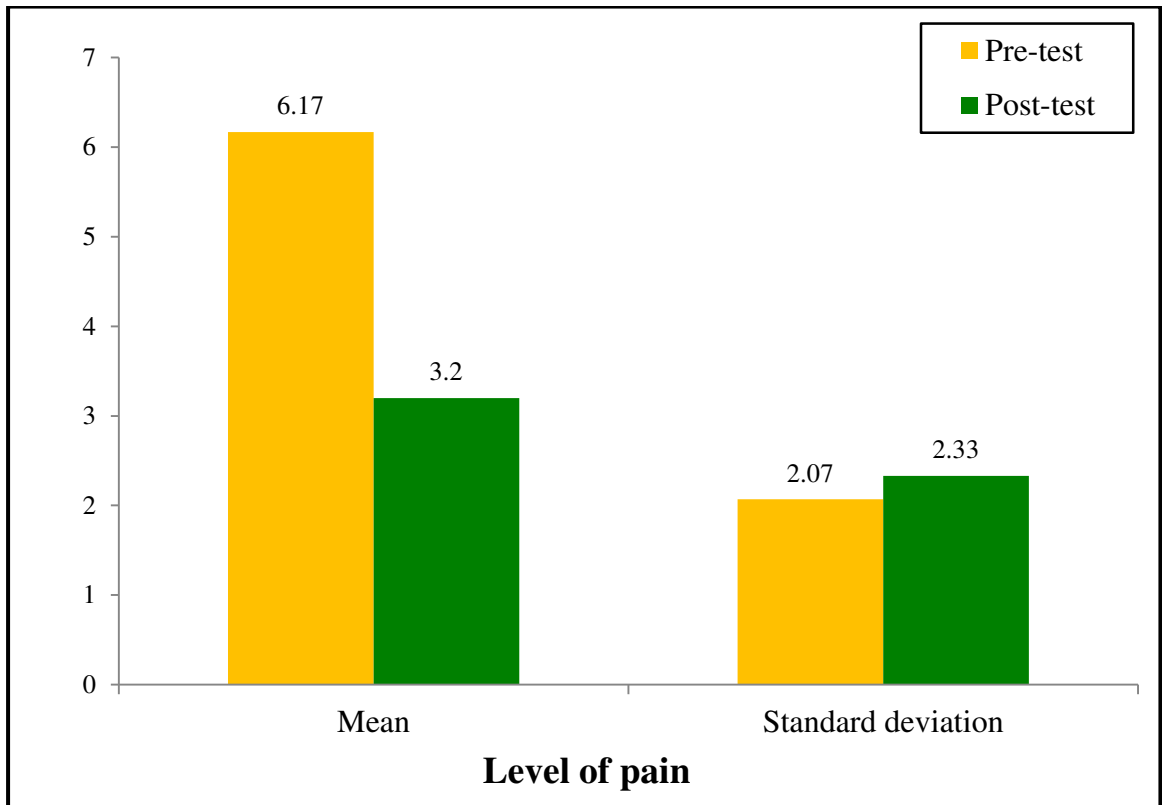
S.No	Assessment character	Experimental Group				Mean difference	't' value
		Pre-test		Post-test			
		Mean	Standard Deviation	Mean	Standard Deviation		
1	Pain	6.17	2.07	3.2	2.33	2.97	7.77 d(f)=58 S*

**S\* = Significance**

**P<0.05**

Table- 5 reveals the paired 't' test value to compare with regard to the pre and post-test level of pain among experimental group, it was found that the pre-test mean was 6.17, standard deviation 2.07 and mean difference was 2.97 and post-test level of mean value was 3.2 standard deviation 2.33 and it was found that the mean difference was 2.97 and the t value was 7.77 indicating that the table value is highly than calculated value. It was found that there is significant reduction in post-test level of pain in the experimental group than the pre-test level of pain at p<0.05 level.

Hence the stated hypothesis "the mean post-test level of pain among osteoarthritis patients in experimental group will be lower than the pre-test level of pain.



**Figure 15: Comparison of the pre and post-test level of pain among osteoarthritis patients in experimental group**

**TABLE 6 : Comparison of the pre and post-test level of pain among osteoarthritis patients in control group.**

(N=30)

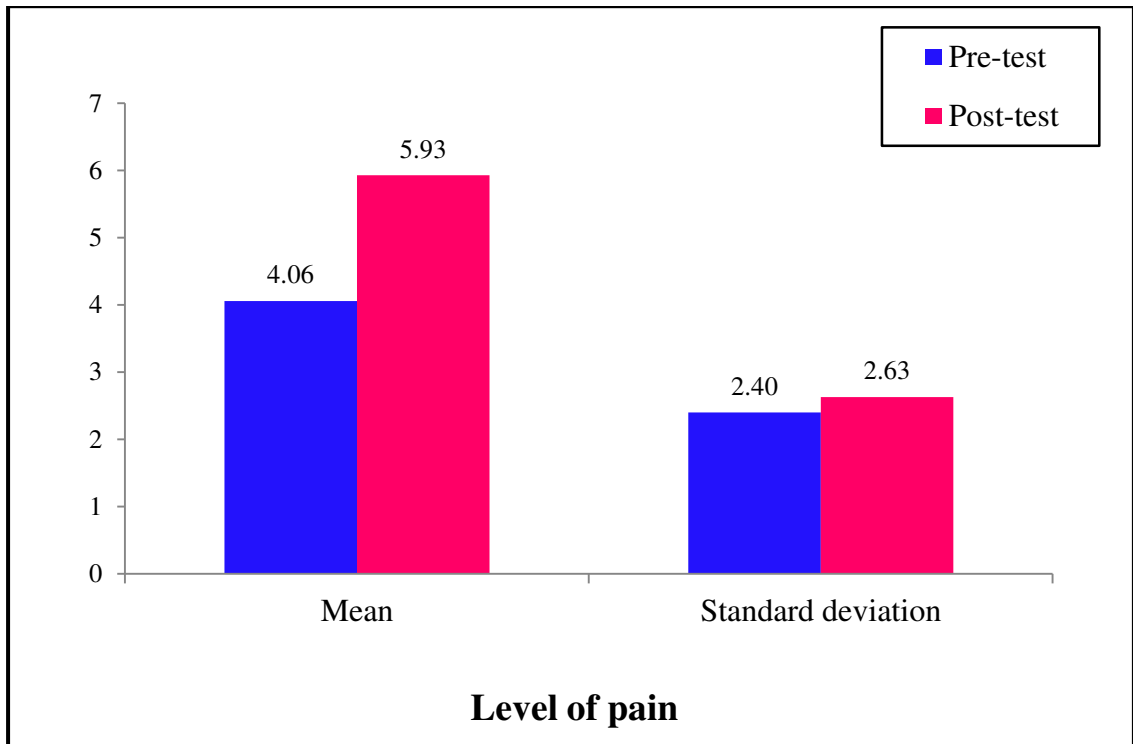
S.No	Assessment character	Control Group				Mean difference	't' value
		Pre-test		Post-test			
		Mean	Standard Deviation	Mean	Standard Deviation		
1	Pain	4.06	2.40	5.93	2.63	-1.87	2.87 d(f)=58 NS#

NS#-Non-significance

P<0.05

Table- 6 reveals the paired 't' test value to compare the pre and post-test level of pain in control group, with regard to the pre-test level of pain in control group the mean value was 4.06 with standard deviation of 2.40 and the post-test mean value was 5.93 standard deviation 2.63. The mean difference was -1.87 and calculated 't' value was 2.87 which showed that there was no significant reduction of post-test level of pain than the pre-test level of pain in control group at  $p < 0.05$  level.

Hence the stated hypothesis "the mean post-test level of pain in control group will be lower than the mean pre-test level of pain" was rejected.



**Figure 16: Comparison of the pre and post-test level of pain among osteoarthritis patients in control group.**



**TABLE 7 : Comparison of the post-test level of pain among osteoarthritis patients in experimental group and control group**

(N=60)

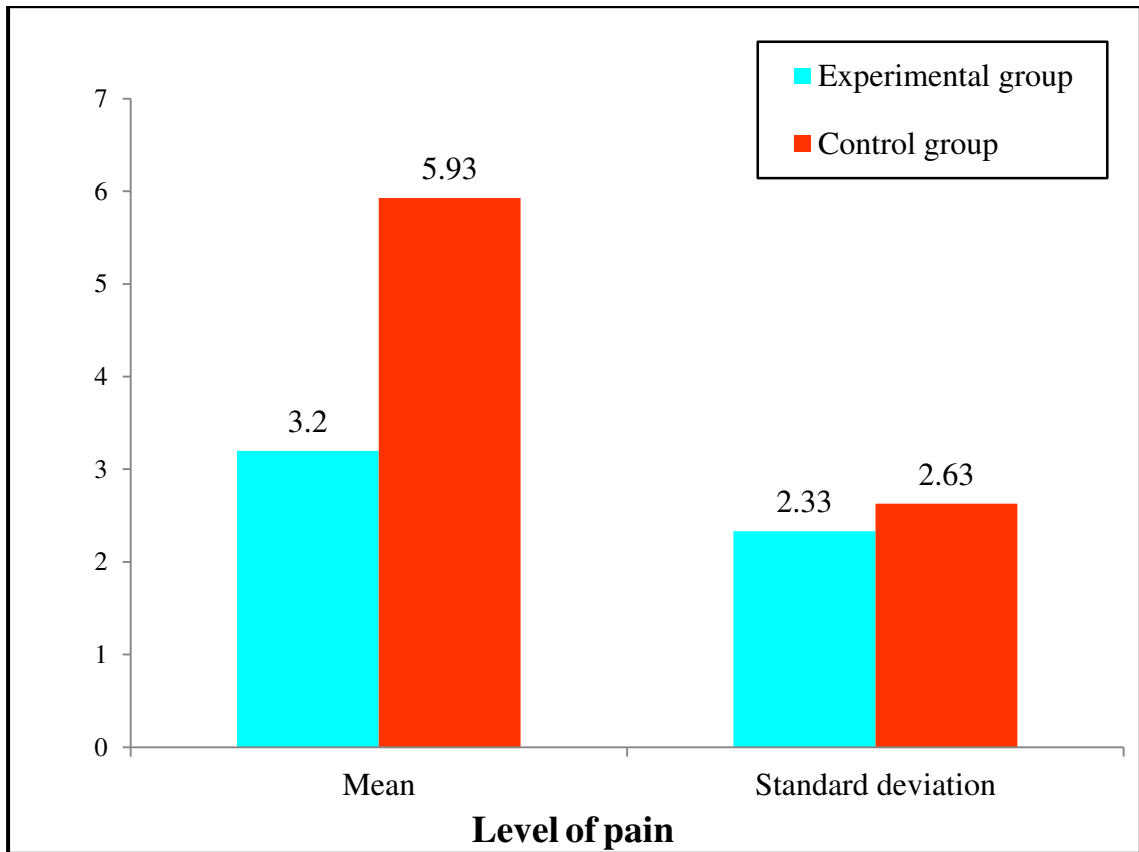
S.No	Assessment character	Experimental Group		Control Group		't' value
		Mean	Standard Deviation	Mean	Standard Deviation	
1	Pain	3.2	2.33	5.93	2.63	7.01 d(f)=58 S*

**S\* = Significance**

**P<0.05**

**NS # = Non Significance**

Table- 7 reveals the unpaired 't' test value to compare the post-test level of pain among experimental group and control group. With regard to the post-test level of pain among experimental group, it was found that the mean value is 3.2 and the standard deviation is 2.33, where as in control group mean value is 5.93, standard deviation is 2.63 and the 't' value was 7.01, it shows that there is significant reduction in post-test level of pain in experimental group than post-test level of pain in control group at  $p<0.05$  level. Thus the hypothesis was accepted.



**Figure 17: Comparison of the post-test level of pain among osteoarthritis patients in experimental group and control group**

**SECTION V: ASSOCIATION OF PRE-TEST LEVEL OF PAIN WITH THE SELECTED DEMOGRAPHIC VARIABLES AMONG OSTEOARTHRITIS PATIENTS IN EXPERIMENTAL AND CONTROL GROUP.**

**TABLE-8 : Association of pre-test level of pain among osteoarthritis patients in experimental group with their selected demographic variables**

(N=30)

S. No.	Demographic Variables	Level of pain						$\chi^2$ value
		Mild pain		Moderate pain		Severe pain		
		f	%	f	%	f	%	
1	<b>Age</b>							<b>0.830</b> <b>d(f)=6</b> <b>S *</b>
	a) 30 – 40years	0	0	7	23	3	10	
	b) 41 – 50 years	2	7	5	17	2	7	
	c) 51 – 60 years	1	3	2	7	5	16	
	d) 61-70years	0	0	0	0	3	10	
2	<b>Sex</b>							<b>0.058</b> <b>d(f)=2</b> <b>S *</b>
	a) Male	2	7	7	23	6	20	
	b) Female	1	3	7	23	7	23	
3	<b>Body mass index</b>							<b>0.61</b> <b>d(f)=6</b> <b>S *</b>
	a) Underweight	2	7	4	13	0	0	
	b) Normal weight	1	3	6	23	1	3	
	c) Overweight	0	0	4	13	12	40	
	d) Obese	0	0	0	0	0	0	
4	<b>Marital status</b>							<b>0.52</b> <b>d(f)=6</b> <b>S *</b>
	A) Married	2	7	10	33	5	83	
	B) Unmarried	0	0	2	7	2	7	
	C) Widow	1	3	2	7	0	0	
	D) Divorced	0	0	4	13	6	20	

5	<b>Education</b>							
	a)No formal education	2	7	7	23	3	10	<b>0.50</b> <b>d(f)=6</b> <b>S *</b>
	b)Primary education	0	0	2	7	6	20	
	c)Secondary education	1	3	0	0	0	0	
	d) Degree and above	0	0	5	83	4	13	
6	<b>Occupation</b>							
	a)Cooley	2	7	2	7	2	7	<b>0.75</b> <b>d(f)=6</b> <b>S *</b>
	b)Sedentary	0	0	12	40	4	13	
	c) Business	0	0	0	0	6	20	
	d) Professional	1	3	0	0	1	3	
7	<b>Dietary habits</b>							
	a)Vegetarian	2	7	12	40	7	23	<b>0.11</b> <b>d(f)=2</b> <b>S *</b>
	b)Non vegetarian	1	3	2	7	6	20	
8	<b>Duration of illness</b>							
	a) 6months-1 year	2	7	2	7	7	23	<b>0.540</b> <b>d(f)=4</b> <b>S *</b>
	b)More than 1years-2 years	0	0	11	37	1	3	
	c)More than 2years-5years	1	3	1	3	5	17	
9	<b>Duration of treatment</b>							
	a) 6months - 1years	0	0	2	7	3	10	<b>0.732</b> <b>d(f)=4</b> <b>S*</b>
	b) More than 1years-2 years	3	10	12	40	1	3	
	c) More than 2 years-5years	0	0	0	0	9	0	

S\* Significance

p&lt;0.05

Table 8 reveals that the association between the pre-test level of pain with the selected demographic variables like age, sex, body mass index, marital status, education, occupation, dietary habits, duration of illness, duration of treatment in the experimental group. While analyzing the statistical significance at ( $P < 0.05$ ) level it shows that there a significant association of the pre-test level pain with all demographic variables of osteoarthritis patients in experimental group. Hence the hypothesis was accepted.

**TABLE: 9- Association of pre-test level of pain among osteoarthritis patients in control group with their selected demographic variable.**

(N=30)

S. No.	Demographic Variables	Level of pain						$\chi^2$ Value
		Mild pain		Moderate pain		Severe pain		
		f	%	f	%	f	%	
1	<b>Age</b>							<b>0.149</b> <b>d(f)=6</b> <b>S *</b>
	a) 30 – 40years	2	7	3	10	3	10	
	b) 41 – 50 years	2	7	7	23	2	7	
	c) 51 – 60 years	0	0	3	10	3	10	
	d)61-70years	0	0	3	10	2	7	
2	<b>Sex</b>							<b>0.055</b> <b>d(f)=2</b> <b>S *</b>
	a) Male	2	7	9	30	3	10	
	b) Female	2	7	7	23	7	23	
3	<b>Body mass index</b>							<b>0.444</b> <b>d(f)=6</b> <b>S *</b>
	a) Underweight	1	3	3	10	0	0	
	b)Normal weight	2	7	7	23	2	7	
	c) Overweight	1	3	6	20	4	13	
	d) Obese	0	0	0	0	4	13	
4	<b>Marital status</b>							<b>0.555</b> <b>d(f)=6</b> <b>S *</b>
	A)Married	0	0	0	0	0	0	
	B)Unmarried	4	13	13	43	5	17	
	C)Widow	0	0	0	0	0	0	
	D)Divorced	0	0	3	10	5	17	

5	<b>Education</b> a)No formal education b)Primary education c)Secondary education d)Degree and above	2 1 1 0	7 3 3 0	0 6 10 0	0 20 33 0	2 6 2 0	7 20 7 0	<b>0.60</b> <b>d(f)=6</b> <b>S *</b>
6	<b>Occupation</b> a) Cooley a)Sedentary workers b) Business workers c) Professional workers	2 0 2 0	7 0 7 0	6 8 2 0	20 27 7 0	2 5 3 0	7 16 10 0	<b>0.170</b> <b>d(f)=6</b> <b>S *</b>
7	<b>Dietary habits</b> a)Vegetarian b)Non vegetarian	0 4	0 13	4 12	13 40	0 10	0 33	<b>0.1187</b> <b>d(f)=2</b> <b>S *</b>
8	<b>Duration of illness</b> a)6months-1years b)More than-1years-2 years c)More than-2years-5years	2 1 1	7 3 3	2 7 7	7 23 23	4 6 0	13 20 0	<b>0.837</b> <b>d(f)=4</b> <b>S *</b>

9	<b>Duration of treatment</b>									
	a)6months-1years	0	0	2	7	14	47	0	0	<b>2.929</b> <b>d(f)=6</b> <b>S *</b>
	b)More than-1years-2 years	0	0	2	7	0	0	8	27	
	c) More than-2years-5years	0	0	0	0	2	7	2	7	

**S\* Significance**

**(P<0.05)**

Table-9 reveals that the association between the pretest level of pain in control group with the selected demographic variables like age, sex, body mass index, marital status, education, occupation, dietary habits, duration of illness, duration of treatment. While analyzing the statistical significance at (P<0.05) level it shows that there was a significant association between the pre-test level pain in control group with all the selected demographic variables of osteoarthritis patients. Hence the hypothesis was accepted.



## **CHAPTER-V**

### **DISCUSSION**

This chapter deals with the discussion of the result of the data analysis to evaluate the effectiveness of isometric exercise on reduction of pain among osteoarthritis patients. The discussion is based on the objectives of the study and the hypotheses specified in the study.

#### **MAJOR FINDINGS OF THE STUDY WERE:**

On analysis of frequency and percentage of demographic variables,

- Majority of Patients 10 (33.3%) were between the age group of 30 - 40years of osteoarthritis clients in experimental group. Where as in control group majority of clients 11(37%) were in the age group of 41-50 years.
- With regard to sex classification, majority of clients 15 (50%) were female and 15 (50%) were male in the experimental group, whereas in control group also majority of clients 16(53.3%) were female.
- With respect to Body Mass Index, majority of the clients 16(53%) were belongs to Overweight in the experimental group. Whereas in control group also majority of clients 11 (37%) were belongs to normal weight and 11 (37%)were belongs to Overweight category.

#### **DESCRIPTION OF POPULATIONS:**

The sample comprised of 60 patients, 30 in experimental group and 30 in the control group.

## **DISCUSSION IS BASED ON THE OBJECTIVES:**

**The first objective is to assess the pre and post-test level of pain among Patients with osteoarthritis in experimental group and control group.**

Table 3 reveals the frequency and percentage distribution of pre and post-test level of pain among osteoarthritis patients in experimental group. It is evident from the above table showed that, pre-test level of pain among the experimental group, none of the patients had no pain, 3(10%) of the patients had mild pain, 14(47%) of them had moderate pain, 13(43%) of them had severe pain, where as in the posttest level of pain in the experimental group 6(20%) of the patients had no pain and 16(53%) of them had mild pain, 6(20%) of them had moderate pain, and 2(7%) of them had severe pain

Table 4 shows that frequency and percentage distribution of pre and post-test level of pain in control group. It is revealed that in the pre-test level of pain among the control group, none of them had no pain, 4 (13%) of them had mild pain, 16(54%) of them had moderate pain, 10(33%) of them had severe pain, whereas in the posttest level of pain among the control group, none of the patients had no pain, 4(13%) of them had mild pain 12(40%) of them had moderate pain, 14(47%) of them had severe pain.

These findings are similar to the study conducted by Junlwamote et al., [2011] to assess the functional ability of 60 elderly people with Osteoarthritis from Maryland University Hospital which concludes that the osteoarthritis of the knee is the mostcommon type of arthritis and the major cause of chronic musculoskeletal pain which leads to functional disability in elderly and less level of activity.

**The second objectives is to compare the pre-test and post-test level of pain among osteoarthritis Patients in experimental group and control group.**

Table- 5 reveals the paired 't' test value to compare with regard to the pre and post-test level of pain among experimental group, it was found that the pre-test mean was 6.17, standard deviation 2.07 and mean difference was 2.97 and post-test level of mean value was 3.2 standard deviation 2.33 and it was found that the mean difference was 2.97 and the t value was 7.77 indicating that the table value is highly than calculated value. It was found that there is significant reduction in post-test level of pain in the experimental group than the pre-test level of pain at  $p < 0.05$  level.

Hence the stated hypothesis "the mean post-test level of pain among osteoarthritis patients in experimental group will be lower than the pre-test level of pain.

Table- 6 reveals the paired 't' test value to compare the pre and post-test level of pain in control group, with regard to the pre-test level of pain in control group the mean value was 4.06 with standard deviation of 2.40 and the post-test mean value was 5.93 standard deviation 2.63. The mean difference was -1.87 and calculated 't' value was 2.87 which showed that there was no significant reduction of post-test level of pain than the pre-test level of pain in control group at  $p < 0.05$  level.

Hence the stated hypothesis "the mean post-test level of pain in control group will be lower than the mean pre-test level of pain" was rejected.

These findings are similar to the study of Dr.Kunio Takaoke (2003) he conducted a study in Japan among 17 osteoarthritis knee patients. They were given isometric quadriceps exercise for 8 weeks. The result of the study showed that isometric exercise was clinically effective. Pain relief was observed within 4 weeks. Pain score decreased from 3.9 to 2.3. The study also analyzed the corresponding changes in joint fluid.

**The third objective was to compare the effectiveness of isometric exercise on level of pain among osteoarthritis Patients in experimental group and control group.**

Table- 7 reveals the un-paired 't' test value to compare the post-test level of pain among experimental group and control group. With regard to the post-test level of pain among experimental group it was found that the mean value is 3.2 and the standard deviation is 2.33, where as in control group mean value is 5.93 and standard deviation is 2.63 and the 't' value was 7.01, it shows that there is significant reduction in post-test level of pain in experimental group than post-test level of pain in control group at  $p < 0.05$  level. Thus the hypothesis was accepted.

These findings were supported by an analysis study conducted by C.H. Nanden [2000] regarding the effects of isometric exercise regimen on pain and physical functioning in 64 patients above 60 years with active knee osteoarthritis were assigned to an isometric exercise programme for 14 days, 5times a week. It was concluded that a short term intensive exercise programme in knee osteoarthritis is more effective in improving the muscle strength and functional activity.

**The fourth objective was to associate the pre-test level of pain among patients with osteoarthritis in experimental group and control group with their selected demographic variables.**

Table 8 reveals that the association between the pre-test level of pain with the selected demographic variables like age, sex, body mass index, marital status, education, occupation, dietary habits, duration of illness, duration of treatment in the experimental group. While analyzing the statistical significance at ( $P < 0.05$ ) level it shows that there was a significant association of the pre-test level pain with all

demographic variables of osteoarthritis patients in experimental group. Hence the hypothesis was accepted.

Table-9 reveals that the association between the pre-test level of pain in control group with the selected demographic variables like age, sex, body mass index, marital status, education, occupation, dietary habits, duration of illness, duration of treatment. While analyzing the statistical significance at ( $P < 0.05$ ) level it shows that there was a significant association between the pre test level pain in control group with all the selected demographic variables of osteoarthritis patients. Hence the hypothesis was accepted.

From the above analysis and interpretation, the hypothesis (H1), “Mean post-test level of pain among patients with osteoarthritis in experimental group was significantly lower than the mean pre-test level of pain in experimental group” was accepted and the hypothesis (H2) the stated hypothesis “the mean post-test level of pain in control group will be lower than the mean pre-test level of pain” was rejected. The hypothesis (H3) the stated hypothesis “the mean post-test level of pain among osteoarthritis patients in experimental group will be significantly lower than the mean post-test level of pain in the control group was accepted. The hypothesis (H4) “There was significant association between the pre-test level of pain among patients with osteoarthritis in experimental and control group with their selected demographic variables such as Age, Sex, Body mass index, Marital Status, Education, Occupation, Dietary pattern, Duration of illness and Duration of treatment.

## **CHAPTER-VI**

### **SUMMARY, CONCLUSION, LIMITATIONS, NURSING IMPLICATION AND RECOMMENDATIONS**

This chapter deals with the summary, conclusion, limitations, nursing implication and recommendations.

This study to evaluate the effectiveness of isometric exercise on level of pain suffering from osteoarthritis. A modified Lequence index observational checklist was used to assess the severity of osteoarthritis before teaching isometric exercise. The exercise schedule was conducted only the experimental group. The statistical analysis showed that the experimental group.

#### **THE OBJECTIVES OF THE STUDY WERE**

- To assess the pre and post-test level of pain among patients with osteoarthritis in experimental group and control group.
- To compare the pre-test and post-test level of pain among osteoarthritis patients in experimental group and control group
- To compare the effectiveness of isometric exercise on level of pain among osteoarthritis patients in experimental group and control group.
- To associate the pre-test level of pain among patients with osteoarthritis in experimental group and control group with their selected demographic variables. (Age, Sex, Body mass index, Marital Status, Education, Occupation, Dietary pattern, Duration of illness and Duration of treatment)

### **THE RESEARCH HYPOTHESES STATED WERE,**

All hypotheses were tested at p 0.05 level of significance.

- H1:** Mean post-test level of pain among osteoarthritis patients in experimental group will be significantly lower than the mean pre-test level of pain in experimental group.
- H2:** Mean post-test level of pain among osteoarthritis patients in control group will be significantly lower than the mean pre-test level of pain in control group.
- H3:** Mean post-test level of pain among osteoarthritis patients in experimental group will be significantly lower than the mean post-test level of pain in control group.
- H4:** There will be a significant association between the pre-test level of pain among Patients with osteoarthritis in experimental and control group with their selected demographics variables. (Age, Sex, Body mass index, Marital Status, Education, Occupation, Dietary pattern, Duration of illness and Duration of treatment)

### **THE ASSUMPTION WERE,**

- Pain tolerance level may differ from individual to individual.
- Osteoarthritis is common in old age people.
- Isometric exercise may reduce the pain of osteoarthritis.

### **THE REVIEW OF LITERATURE COLLECTED FOR THE STUDIES WERE**

**Section A:** Studies related to prevalence and risk factors of osteoarthritis.

**Section B:** Studies related to effects of osteoarthritis in Activity of Daily Living

**Section C:** Studies related to effectiveness of isometric exercise on osteoarthritis.

**Section D:** Studies related to effectiveness of other therapies on osteoarthritis.

The study was based on the CIPP (Context, Input, Process, Product Model). The quantitative approach was used for this study. The study was conducted in Zaminkollankondan and Avarampatti village in Virudhunagar. The design adopted for this study was Quasi experimental Pre-test and Posttest control group design to assess the effectiveness of Isometric exercises on level of pain among osteoarthritis patients. Non probability purposive sampling technique was used to select 30 samples for experimental group from zaminkollankondan village and the same method was used to select 30 samples for control group from avarampatti.

The data collection tool used for the study modified Lequence observational checklist for osteoarthritis to identify the severity of patients. The content validity of the tool was obtained from four nursing experts and one medical expert in the field of medical and surgical nursing. The reliability of the tool ( $r=0.9$ ) was established by test and retest method by using Karl Pearson's correlation coefficient. The tool was accepted as reliable by the clinical experts. Pilot study was conducted to find out the feasibility and the data analysis was done.

Data collection was done by using the modified Lequence observational checklist to identify the severity of osteoarthritis and pre and post-test level of pain was measured by Numerical pain intensity rating scale for experimental and control group. The data obtained were analyzed both in terms of descriptive and inferential statistics.

#### **The significant Findings of the study were**

- Majority of patients 10 (33.3%) were between the age group of 30 - 40 years in experimental group. Whereas in control group majority of patients 11 (37%) were in the age group of 41-50 years.



- With respect to sex classification, majority of patients 15 (50%) were female and 15 (50%) were male in the experimental group, whereas in control group majority of patients 16(53.3%) were female.
- With regard to body Mass Index (BMI), majority of the patients 16(53%) were belongs to Overweight, whereas in control group, majority of patients 11 (37%) were belongs to normal weight and Overweight category.
- With regard to marital status, majority of patients 17(57%) were belongs to married in experimental group,where as in control group majority of patients 22(73%) were in unmarried group.
- Based on the educational status, majority of patients 12(40%) were belongs to no formal education in experimental group where as in control group majority of patients 13(44%)were completed primary education.
- With respect to occupation majority of patients 16(53%) were belongs to sedentary worker in experimental group and control group also majority of patients 13(44%) were in sedentary worker.
- With regard to dietary habits classification, majority of patients 21 (70%) were belongs vegetarian in the experimental group, whereas in control group majority of patients 26(87%) were non vegetarian .
- With regard to duration of illness,majority of patients 12(40%) were in more than 1 year to 2 years of illness, whereas in control group also the majority of patients were in 14(46%) were in more than 1 year to 2 years of illness.
- With regard to duration of treatment, majority of patients 16(53%) were in more than 1 year to 2 years of treatment, whereas in control group also the majority of patients were in 16(54%) were in the category of 6months -1year of treatment.

- With regard to the pre and post-test level of pain among experimental group, it was found that the pre-test mean was 6.17, standard deviation 2.07 and mean difference was 2.97 and post-test level of mean value was 3.2 standard deviation 2.35 and it was found that the mean difference was 2.97 and the 't' value was 7.77 indicating that the table value is highly than calculated value. It was found that there is significant reduction in post-test level of pain in the experimental group than the pre-test level of pain at  $p < 0.05$  level.
- With regard to the pre-test mean value was 4.06 with standard deviation of 2.40 and the post-test mean value was 5.93 standard deviation 2.63. The mean difference was -1.87 and calculated 't' value was 2.87 which showed that there was a no significant difference between pre-test and post-test level of pain among osteoarthritis patients in control group at  $p < 0.05$  level of significance. Hence hypothesis was rejected.
- With regard to the post-test level of pain among experimental group it was found that the mean value is 3.2 and the standard deviation is 2.35, where as in control group mean value is 5.93 and standard deviation is 2.63 and the 't' value was 7.01, it shows that there is significant reduction in post-test level of pain in experimental group than post-test level of pain in control group at  $p < 0.05$  level.

The association between the pre-test level of pain in control group with the selected demographic variables like age, sex, body mass index, marital status, education, occupation, dietary habits, duration of illness, duration of treatment. While analyzing the statistical significance at ( $P < 0.05$ ) level it shows that there was a significant association between the pre test level pain in control group with all the selected demographic variables of osteoarthritis patients. Hence the hypothesis was accepted.

## **CONCLUSION :**

From the result of the study it was concluded that there was a significant reduction on level of pain among osteoarthritis patients who received isometric exercises easy to follow and potentially risk free intervention. As by concluding that the hypothesis stated is accepted.

## **IMPLICATIONS :**

The findings of the study have practical application in the field of nursing. The implication of the study could be discussed in four areas namely: Nursing practice, nursing administration, nursing education and nursing research.

## **IMPLICATIONS FOR NURSING PRACTICE :**

The findings of the study was help the nurse in the following ways:

1. Early identification of the risk factors and prevention of osteoarthritis in elderly patients.
2. Encouraging the senior citizen to follow proper diet and exercise programme and to improve their functional ability.

## **IMPLICATIONS FOR NURSING ADMINISTRATION :**

1. It helps to provide critical thinking regarding osteoarthritis and its management.
2. These findings help the administration to arrange continuing education programme for nurses regarding osteoarthritis in elderly its complication and its management.
3. It can motivate the administration to conduct awareness programmes about osteoarthritis and physical disability among elderly population in the community.

4. Nurse administrator can arrange seminars and workshops to educate the learners and staff nurses regarding the importance of geriatric care.
5. Screening programmes can be arranged in the community for identifying the vulnerable group for osteoarthritis.

### **IMPLICATIONS FOR NURSING EDUCATION :**

1. This study helps the nursing students to acquire knowledge regarding assessment of elderly patients and helps them in performing isometric exercises.
2. This study enhances the student to think comprehensively in planning the intervention in preventing complication of osteoarthritis.
3. This study helps the nurse educator to plan classes to teach the student about geriatric care.
4. In the curriculum, the geriatric care especially the prevention of disability and management of geriatric patients problems can be included.

### **IMPLICATIONS FOR NURSING RESEARCH :**

1. This study motivates nursing personnel to do further studies related to this field.
2. This study gives way for further study on other therapies to reduce pain in patients with osteoarthritis.
3. This study was help the researcher to formulate new methods to prevent complication in old age due to osteoarthritis.

**LIMITATION:**

During the period of study the limitation faced by the investigator were as follows

1. Only limited studies were obtained from the Indian context.
2. Due to time constraints, the investigator was unable to take larger samples for the study.

**RECOMMENDATIONS:**

The following recommendations were made by the researcher after the study.

1. A similar study can be conducted on a larger scale to generalize the study findings.
2. An explorative study can be done at various settings like in hospitals or in orthoclinics to identify factors influencing osteoarthritis among elderly age.
3. A similar study can be conducted to find out the effectiveness of other therapies like yoga and muscle relaxation technique.
4. A comparative study can be done between aerobic exercise and isometric exercise for osteoarthritis.
5. A study can be conducted to evaluate the knowledge and attitude of nurses regarding isometric exercises for osteoarthritis.

# **BIBLIOGRAPHY**

## **BOOK REFERENCE**

1. Adrienne Dill Linton, (2007), Introduction to Medical Surgical Nursing (5<sup>th</sup> ed) New Delhi : Elsevier publication.
2. Basavanthappa, B.T. (2003). Medical Surgical Nursing. (1<sup>st</sup> ed). New Delhi : (3rd ed). London : Mosby Publications.
3. Brunner & Suddarth (2004) Text Book of Medical Surgical Nursing 10th Edition, Philadelphia Lippincott Williams & Wilkins P.No.1627.1628
4. Black, M., & Hawks, J. (2005). Medical Surgical Nursing, clinical management for positive outcomes. (7<sup>th</sup> edition). Missouri: Saunders Publishers.
5. Brunner and Siddarth's (2011), Text book of medical and Surgical Nursing. (12th ed) : New Delhi, Wolter and Kluwer Pvt Ltd.
6. F.A. Davis (1992) "Knee pain & Disability" 3rd Edition New Delhi Jaypee Brothers Publications P.No.149-154
7. John Crawford Adams, Davis L. Hamblen (2001) "Outline of Orthopaedics, 13<sup>th</sup> edition P.No.126.128. Churchill Livingstone, Harcourt Publishers Limited.
8. John Ebenezer (2000) Text Book of orthopedics 2nd edition New Delhi, Jaypee Brothers P.No.393.
9. Joyce M. Black (2009) Medical-Surgical Nursing 8th edition. Missouri Elsevier Publications.
10. Jones A. Dorothy, (1978). Medical Surgical Nursing (1<sup>st</sup> ed). Mumbai: Gramhill publications.
11. Judith, A.S., Casy, Patricia. (2006). Lippincott Manual of Nursing Practice. (8th ed) Los Angeles Williams & Wilkins.

12. Lewis, et al; "Medical Surgical Nursing" 7th edition Missouri Mosby Elsevier Publications P.No. 1693-1702.
13. Linda S. William., and Taula D. Hoppler, (2008). Understanding Medical Surgical nursing (1<sup>st</sup> ed). New Delhi : Jaypee Publications.
14. Long C Barbara, (1993). Medical Surgical Nursing. A Nursing process approach (3<sup>rd</sup> ed). Chicago Alison Millers Pvt. Ltd.
15. Phipps. J. Wilma, (1999). Medical Surgical Nursing Health and Illness Perspective (7<sup>th</sup> ed). Philadelphia : Mosby Publications.
16. Phipps (2009) Medical Surgical Nursing 8th edition Published by Elsevier U.P.India P.No. 1618-1638.
17. Prakash P.Kotwal, Mayilvahanan Natarajan (2005) Text Book of Orthopedics, 2nd edition New Delhi, Jaypee Brothers .P.No.393.
18. Politdanise,(2011) .Nursing Research.(9th ed) Philadelphia: J.B Lippincott company.
19. Rick Daniales., laura john Nosek.,(2007) Contemporary Medical surgical nursing (1<sup>st</sup> ed). Haryana: Thomson publication.
20. Ross and Wilson,(2005). Anatomy and Physiology in health and illness. (9th ed) , Philadelphia: Elsevier Publications
21. Royal A. John, (1998), Medical Surgical Nursing related physiology (4th edition) London: W.b. Saunders Company.
22. Selwyn Taylor, G.D., Chisolmn, N.O. Higgins, (1984) Surgical Management (1<sup>st</sup> ed) London : William Heinemann Medical Books.
23. Srinivasan, S. T.M. Jeyashree (2015) International Journal of Biological and Pharmaceutical Research for Prevalence of Osteoarthritis of The knee joint among elderly population in a rural area, IJBPR Publication.

24. Sharma, text book for nursing research Jaypee Brothers Publication.
25. Sharon Lewis, (2011), Medical Surgical Nursing. (7th edition), New delhi: Elsevier Publications.
26. Spring House (1997) Mastering Medical Surgical Nursing New Delhi Elsevier Publications, P.No. 546.549.
27. S.Sunder (2002) “Text book of Rehabilitation 2nd edition New Delhi Jaypee Brothers Medical Publication.
28. Wesly.R. (1994).nursing Theories and models. (2nd ed). Pensylvania: Spring Corporation.

## **JOURNAL REFERENCE**

29. Abdul Kalam Azad.et al.,[2011] Role of muscle strengthening exercise onosteoarthritis” Indian Journal of Physitheraphy,vol.5P.No.50-52.
30. A.Mahajan S.Verma, V.Tandon (2005),: Osteoarthritis –Jammu Physiotherapy India Journal- vol 53, P.No-634-638”
31. Aparna Sarkar, Nitish Bansal (2010) Effects of obesity on quadriceps dynamic strengthening and isometrics exercise for the treatment of knee osteoarthritis”. British Journal of Sports Medicine vol .44 .No. 13-
32. Berman BM.(2204) “Effectiveness of acupuncture as adjunctive therapy in osteoarthritis of the knee”. American Journal of Rheumatology vol 12P.No.141
33. Brenda Good Man (2011) “Risk of knee Osteoarthritis is greater then the lifetime risk of diabetes” Arthritis Today vol 4 P.No. 250-252Carol Eustine, [2008], Resistance exercise can improve muscle strength and physical function in knee osteoarthritis patients” British Journal of Physiotherapy, vol 5, P.No,16-18.



34. Centre for Disease Control and Prevention,[2001]Epidemiology of Knee osteoarthritis”.
35. C.Helmick,et al (2010) “ Effect of age and activity on knee joint proprioception. AMJ.Phys-Med-Rehabil 76.P.No. 235-41
36. Cicuttini, Spector: (2002),”Osteoarthritis and Exercise British Journal of Epidemiology vol 14 P.No.138-142
37. Cooper.C, et al;(2007), “Osteoarthritis and the impact on quality of life health indicators. Rheumatology International Magazine vol 27.P.No. 315-321.
38. Cooper.C.et al:(1998) “Individual risk factors for hip osteoarthritis”, American Journal of Epidemiology vol 15 P.No.516-22
39. Denise Mann(2011) “Alternative Treatment for Arthritis: Arthritis Health Centre Med. Magazine”.
40. Deyle G.D.Henderson.N.E,(2000), “Effectiveness of manual physical therapy and exercise in osteoarthritis of the knee”. Annals Internal Medicine,vol 132.P.No.173-81
41. Donna MURQUHARB,[2008]|Effect of Physical activity on the knee joint British Journal of Physiotherapy,vol,4,P.No.124
42. Dr.Davis T.Felson and Dr Mc Alison.[2000]Relationship of weight and Body Mass Index have greater prevalence of osteoarthritis”. American Arthritis and Rheumatism Journal,vol.56, P.No.10-13.
43. Dr Gail.D.Deyle.[2000],’The effects of a Physical Training Programme on Patients with osteoarthritis of the knees”. Journal of Rheumatology. Vol.22, P.No.921-25
44. Dr.Leena Sharma,[2008],Impact of osteoarthritis on disability is substantial”. Indian Journal of Community Medicine,vol.30,P.No.200-212

45. Dr.Shishiri Rastogi (2007), "Osteoarthritis in India" No.1.ailment Times of India Article.
46. Felson D.T."Zhangy, (1998) "An update on the epidemiology of knee and hip osteoarthritis: vol.41.P.No.1343-55.
47. Gopal K.Ingle and Anita Nath (2008), "Geriatric Health in India, concerns and solutions, Indian Journal of Community Medicine, vol 33, P.No. 214 -218.
48. Helmick, C.,et al (2008) "Estimates of the Prevalence of Arthritis and other Rheumatic condition in the United States. Arthritis and Rheumatism Journal vol.58 P.No.15-25.
49. Harvey Simon,[2006], "Effects of stretching Exercise on Knee osteoarthritis". Journal of clinical Rheumatology vil.11: P.No.303-310.
50. Jarret Morrow (2007) :Osteoarthritis and knee pain increase risk of falls in elderly". Arthritis Rheumatology, vol.15: 55:610-615.
51. Jordon J.M.Kington RS.et al (2000) ,"Osteoarthritis New insights. Part 1: The disease and its Risk Factors". Annals Internal Medicine. Vol.133.P.No.637-639
52. Khan KM(2004),"Exercise Prescription:, Journal of the American Academy of Orthopedic Surgery vol-12,P.No.21-27
53. Lamb, J.Gunalink.et.al,[200]"Management of osteoarthritis in primary care setting an evidence based approach to treatment. American Journal of Medicine,vol-103.6 P.No.125-30
54. National Institute of Arthritis and Musculoskeletal and Skin Diseases (2002), "Osteoarthritis Knee, Isometric Exercises for Home Use".
55. Patrick M.Foyel (2004), "Exercise therapy for people with osteoarthritis." Scandinavian Journal of Medicine and Science in Sport, vol.14.P.No.138-142.

56. Ragini Sinha (2010) "Knowledge of osteoarthritis" This is My India Magazine article
57. Raj Marks (2010) "Comparing the short term versus long term training Effect on Quadriceps Exercises for osteoarthritis of the knee". Physiotherapy Journal of Canada vol.159.P.No.160-162.
58. Richard Sandusky. (2000), "Risk factors for the incidence and progression Of radiographic knee osteoarthritis". Arthritis Rheumatology. Vol.43: P.No.995-1000.
59. Robert J. Golden, et al: (2003) "Rehabilitation of the osteoarthritis patients focuses the knee. Clinical Sports Magazine P.No.101-113.
60. Sharma.L' et al: (1998) "Is knee joint proprioception worse in the arthritic knee versus the unaffected knee". Arthritis Rheumatology Journal, vol;40, P.no.1518-25
61. Shanawaz Anwar, Mohamed Miraj et al: (2011) "Effectiveness of electromyography biofeed back training on quadriceps muscle strength in osteoarthritis of knee." Hong Kong Physiotherapy Journal, vol:29.P.No.86
62. Sheila.C,et.al,[1998],Effect of a home based exercise programme to improve quadriceps strength on knee pain and disability' Indian orthopaedic Journal.
63. Smith J. "Physical therapy for early knee osteoarthritis". Mayo clinic. Comprehensive review of upper and lower extremity. Mayo Press (2001)
64. Spector T.D.(1994) "Incidence and Progression of osteoarthritis in women with unilateral knee disease in the general population, the effect of obesity" Rheumatology Journal London.vol.53, P.No.565-68
65. Stephen Barrett (2006) "Glucosamine and Chondratin for Arthritis". New England Journal of Medicine. Vol.354 P.No. 795-808.
66. T.Asotai,(2011),Ageing and Health". Health Action India. vol.36.P.No.4-5

## **INTERNET REFERENCE**

67. Paulo June 2013 text book for osteoarthritis  
<http://www.interscience.urtey.com/ogi.bis>
68. Shahnawaz 2014 osteoarthritis guidelines  
<http://www.emedicine.ehealth.com/osteoarthritis>
69. Chaitow 2011 online content for osteoarthritis  
[http://www.osteoarthritis.research\\_today.net](http://www.osteoarthritis.research_today.net)  
William 2011 incidence report on osteoarthritis
70. Baker, Kristin et al., 2005 isometric exercise for osteoarthritis  
<http://www.clinicaltrials.gov>
71. Christopher M. Powers online reference of osteoarthritis  
<http://www.sportsmed.theclinics.com>
72. Ronald Melzack alternative treatment for knee pain  
<http://www.emedicine.medscape.com>
73. Ashraf 2011, arthritis treatment  
<http://www.arthritis-treatment-advice.com>
74. <http://www.pubmed.gov>
75. <http://www.mayoclinic.com/health/osteoarthritis>

## APPENDIX – A

### LETTER SEEKING AND GRANTING PERMISSION FOR CONDUCTING THE STUDY



## SRI K. RAMACHANDRAN NAIDU COLLEGE OF NURSING

Approved by Govt. of Tamilnadu and Indian Nursing Council / T.N.C  
Affiliated to the Tamilnadu Dr. M.G.R. Medical University

K.R. Naidu Nagar - 627 753, Paruvakudi Village, Post Bag No.1, Karivalam (via)  
Sankarankovil (Tk), Tirunelveli (Dt), Ph. : 04636 - 260950, Fax : 04636 - 260377.  
E - Mail : srikncon@yahoo.com Web : srikmaiducollegeofnursing.org

### LETTER SEEKING AND GRANTING PERMISSION FOR CONDUCTING THE STUDY

To:

The Medical Officer,  
Zaminkollamkondan Primary Health Centre,  
Rajapalayam (Taluk),  
Virudhunagar (Dist).

Respected Sir/Madam,

Miss J.Grena is a bonafide student of our college studying in M.Sc (N) programme. As a partial fulfilment of the university requirement for the award of the M.Sc (N) degree, she need to conduct research project.

Her chosen research project is as follows "A study to assess the effectiveness of Isometric Exercises on reduction of pain among osteoarthritis patients in selected villages at Virudhunagar".

She will be abide by the rules and regulations of the primary health centre and adhere to the policies during her period of data collection from 15.02.2016 to 19.03.2016 Permission may kindly be granted to her for conduction of the study at your esteemed villages.

Further details of the proposal project will be furnished by the student personally, confidentiality will be ensured in the research project.

Thanking you

*Sri K. Ramachandran Naidu*  
5/2/16

**MEDICAL OFFICER  
GOVT. PRIMARY HEALTH CENTRE  
ZAMIN KOLLANKONDAN-626 142.  
VIRUDHUNAGAR DISTRICT.  
ISO 9001 : 2008**

Yours faithfully  
*Sankarankovil*  
Principal  
Sri K. Ramachandran Naidu  
College of Nursing  
K.R. Naidu Nagar - 627 753, Karivalam (Via)  
Sankarankovil (T.K.) Tirunelveli Dt.,



# SRI K. RAMACHANDRAN NAIDU COLLEGE OF NURSING

Approved by Govt. of Tamilnadu and Indian Nursing Council / T.N.C  
Affiliated to the Tamilnadu Dr. M.G.R. Medical University

K.R. Naidu Nagar - 627 753, Paruvakudi Village, Post Bag No.1, Karivalam (via)  
Sankarankovil (Tk), Tirunelveli (Dt), Ph. : 04636 - 260950, Fax : 04636 - 260377.  
E - Mail : srikncon@yahoo.com Web : srikmaiducollegeofnursing.org

## LETTER SEEKING AND GRANTING PERMISSION FOR CONDUCTING THE STUDY

To:

The Medical Officer,  
Avarampatti Primary Health Centre,  
Rajapalayam (Taluk),  
Virudhunagar (Dist).

Respected Sir/Madam,

Miss J.Grena is a bonafide student of our college studying in M.Sc (N) programme. As a partial fulfilment of the university requirement for the award of the M.Sc (N) degree, she need to conduct research project.

Her chosen research project is as follows "A study to assess the effectiveness of Isometric Exercises on reduction of pain among osteoarthritis patients in selected villages at Virudhunagar".

She will be abide by the rules and regulations of the primary health centre and adhere to the policies during her period of data collection from 15.02.2016 to 19.03.2016 Permission may kindly be granted to her for conduction of the study at your esteemed villages.

Further details of the proposal project will be furnished by the student personally, confidentiality will be ensured in the research project.

Thanking you

*D. S. K. Srinivasan*  
21/2/16

**MEDICAL OFFICER  
GOVT. URBAN PRIMARY HEALTH CENTRE  
Madassamy Kovil Street,  
RAJAPALAYAM**

Yours faithfully,  
*Srinivasan*  
Principal  
Sri K. Ramachandran Naidu  
College of Nursing  
K.R. Naidu Nagar - 627 753, Karivalam (Via)  
Sankarankovil (T.K.) Tirunelveli Dt.,

## APPENDIX - B

### LETTER SEEKING AND EXPERT'S OPINION FOR THE VALIDITY OF TOOL

**From**

J.Grena  
MSc (N) II year,  
Sri.K.Ramachandran Naidu College of Nursing,  
Sankarankovil,(Tk), Thirunelveli ( Dist).

**To**

-----,

Medical surgical nursing,

Subject: Seeking validation of tool and content validity.

**Respected Sir/Madam,**

I am II<sup>nd</sup> year M.sc Nursing student studying (Medical and Surgical Nursing) at Sri.K.Ramachandra College Of Nursing. Sankarankovil, Tamilnadu Dr. M.G.R. Medical University working on dissertation titled. "A study to assess the effectiveness of Isometric exercise on reduction of pain among osteoarthritis patients in selected villages in Virudhunagar". To be submitted to Dr.M.G.R.Medical University, Chennai as a partial fulfilment for the requirement for award of Master of Nursing degree. I humbly request you to kindly visible the tool and valuable suggestions for improvement of this tool. I would be highly obliged and thankful to hear from you.

Thanking you in anticipation,

Place:

Yours faithfully,

Date:

(J.Grena)

**Enclosure:**

- Content validation certificate
- Statement of problem,
- Research tool
- Criteria checklist for validation of tool.

**APPENDIX - C**  
**LIST OF EXPERTS FOR CONTENT VALIDITY**

**MEDICAL EXPERT**

**Dr.D.Muralidharen**, MS.,Ortho surg,  
Government Hospital,  
Rajapalyam,  
Virudhunagar Dist.

**NURSING EXPERTS**

**Dr.Pro.S.Chandrakala**,M.Sc(N),PHD (N)  
Vice Principal,  
Medical Surgical Nursing,  
Sacred Heart College of Nursing,  
Madurai.

**Dr.Mrs.E.Devakirubai**, M.Sc(N) Ph.D (N)  
Professor,  
Medical Surgical Nursing,  
Sacred Heart College of Nursing,  
Madurai.

**Dr.Mrs.Jeya Thangaselvi**, M.Sc(N), Ph.D (N)  
Associate Professor,  
Medical Surgical Nursing,  
CSI College of Nursing,  
Madurai.

**Mrs.T.Avudai Selvi**, M.Sc(N),  
Reader,  
Medical Surgical Nursing,  
St. Ann's College of Nursing,  
Thutukorin.



# CONTENT VALIDITY CERTIFICATE

## CERTIFICATE FOR CONTENT VALIDITY

I Dr. J. Muralidharan hereby certify that I have validated the tool of

Miss.J.Grena II year M.sc Nursing student of Sri.K. Ramachandran Naidu college of Nursing Sankarankovil,who is undertaking the following study.

**“A study to assess the effectiveness of isometric exercise on level of pain among osteoarthritis patients in selected villages at Virudhunagar”**

  
Signature of the expert  
Dr. J. MURALIDHARAN, M.B.B.S., D.Ortho.,  
CONSULTANT ORTHOPAEDIC &  
TRAUMA SURGEON,  
ASSISTANT SURGEON,  
G.H., RAJAPALAYAM - 626 117.  
REG. No: 66302

Place: Rajapalayam  
Date: 2-16



# CONTENT VALIDITY CERTIFICATE

## CERTIFICATE FOR CONTENT VALIDITY

I Dr. S. Chandrakala hereby certify that I have validated the tool of Miss.J.Grena II year M.sc Nursing student of Sri.K. Ramachandran Naidu college of Nursing, Sankarankovil, who is undertaking the following study.

**“A study to assess the effectiveness of isometric exercise on level of pain among osteoarthritis patients in selected villages at Virudhunagar”**



Signature of the expert

PIV. S. CHANDRAKALA MSc  
WIFE PRINCIPAL, SACRED HEART NURSING COLLEGE  
SACRED HEART NURSING COLLEGE  
ULTRA, TRUST, MADURAI

Place: Madurai

Date: 8/2/16

**APPENDIX - D**

**CERTIFICATE FOR ENGLISH EDITING**

**TO WHOM SO EVER IT MAY CONCERN**

This to certify that the dissertation work "A study to assess the effectiveness of isometric exercise on level of pain among osteoarthritis patients in selected villages at Virudhunagar" done by Ms.J. Grena, II year M.Sc (Nursing) student of Sri. Ramachandran College of Nursing, Sankarankovil Taluk, Thirunelveli district, October 2016.

This study was edited for English language appropriateness by Prof. L. Arun M.A., M.L.,



**L. ARUN, f**  
ASSISTANT PROFESSOR  
GOVERNMENT LAW COLLEGE  
MADURAI

## **APPENDIX - E**

### **CERTIFICATE FOR TAMIL EDITING**

#### **TO WHOM SO EVER IT MAY CONCERN**

This to certify that the dissertation work **“A study to assess the effectiveness of isometric exercise on level of pain among osteoarthritis patients in selected villages at Virudhunagar”** done by **Ms.J. Grena, II year M.Sc (Nursing)** student of Sri. Ramachandran Naidu College of Nursing, Sankarankovil Taluk, Thirunelveli district, October 2016. This study was edited for Tamil language appropriateness by \_\_\_\_\_

**APPENDIX - F**  
**INFORMED CONSENT**

Dear patients,

I **Ms. J.Grena, MSc (N) II Year** Student of Sri. Ramachandran Naidu college of nursing, conducting “a study to assess the effectiveness of isometric exercise on level of pain among osteoarthritis patients aged between 30-70 years” as a partial fulfillment of the requirement for the degree of M.Sc. Nursing under the Tamilnadu Dr.M.G.R Medical University. The exercise will be provided 30 minutes per time for two times a day (morning 7 am and evening 5 pm) for the period of 7 days. I assure you that information obtained will be kept confidential. So, I request you to kindly Cooperate with me and participate in this study by giving your frank and voluntary consent.

Thank you,

Signature:

## **APPENDIX – G**

### **COPY OF THE TOOL**

#### **SECTION A**

It consists of structured interview schedule, it has questions related to demographic data of a patient:

##### **1. AGE**

- A) 30-40 years
- B) 41-50 years
- C) 51-60 years
- D) 61-70 years

##### **2. SEX**

- A) Male
- B) Female

##### **3. BODY MASS INDEX**

- A) Underweight
- B) Normal weight
- C) Overweight
- D) Obese

##### **4. MARRITAL STATUS**

- A) Married
- B) Unmarried
- C) Widow
- D) Divorced

##### **5. EDUCATION:**

- A) No formal Education
- B) Primary Education
- C) Secondary Education
- D) Degree and above

**6. OCCUPATION**

- A) Cooley
- B) Sedentary worker
- C) Business
- D) Professional worker

**7. DIETARY HABITS**

- A) Vegetarian
- B) Non vegetarian

**8. DURATION OF ILLNESS**

- A) 6Months-1 year
- B) More than1-2 years
- C) More than 2-5 years

**9. DURATION OF TREATEMENT**

- A) 6Months-1 year
- B) More than1-2 years
- C) More than 2-5 years

## SECTION B

It consists of index of modified Lequence Osteoarthritis of the knee  
Observational check list to identify the severity of osteoarthritis patients.

### I.PAIN

S. N	PARAMETER	FINDINGS	POIN TS
1	Duration of morning stiffness or pain after getting up	None	0
		<15 minutes	1
		>=15 minutes	2
2	Knee pain on walking	None	0
		Only after walking some distance	1
		Early after starting	2
3	Remaining standing for 30 minutes to increases pain at knee joint.	No	0
		Yes	1
4	Knee pain or discomfort in sitting position for 2 hours.	No	0
		Yes	1



## II. Maximum distance walked

1	Maximum distance walked	Unlimited	0
		>1 kilometer but limited (about 15 minutes)	1
		From 501-900 meters (about 8-15 minutes)	2
		100-500 meters	3
2	Walking aids Required		
		None	0
		1 walking sticks or crutch	1
		2 walking sticks or crutches	2

## III. Activities of daily living

1	Can you pick up an objects from the floor.	Easily	0
		With mild difficulty	1
		Impossible	2
2	Can you go up and down a standing flight of stairs.	Easily	0
		With mild difficulty	1
		Impossible	2

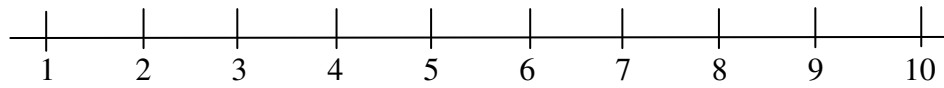
3	Can you put on socks by bending forward.	Easily	0
		Difficulty	1
		Impossible	2

**SCORING INTERPRETATION:**

<b>SNO</b>	<b>INDEX SCORE</b>	<b>DISCRIPTION</b>
1	0	None
2	1-5	Mild
3	6-9	Moderate
4	10-17	Severe

**SECTION C**

**NUMERICAL PAIN INTENSITY RATING SCALE :**



**Scoring key:**

<b>DESCRIPTION</b>	<b>RATE</b>	<b>SCORE</b>
No pain	0	0
Mild pain	1-3	1
Moderate pain	4-6	2
Severe pain	7-10	3

## APPENDIX –H

### gFâ m

#### òŸË ÉtuşfŸ

##### 1. taJ

m) 30 - 40 taJ

M) 41 – 50 taJ

ï) 51- 60 taJ

<) 61 – 70 taJ

##### 2. ghÈd«

m) M©

M) bg...©

##### 3. vil... cau« É»j FçpL

m) vil...Fiw...î

M) ruhrÇ clş vil...

ï) mâfkhd clş vil...

<) clş gUk«

##### 4. âUkzÃiy...

m) âUkzkhdt®

M) âUkzkhfjt®

ï) Étfhuçjhdt®

<) jÅik...ŸgLçjŸgfltt®

##### 5. fšÉ Ãiy...

m) goŸgçÉçik...

M) moŸgil...fšÉ

ï) iil...Ãiy...fšÉ

<) fšŸÇgoŸò

##### 6. bjhÊšÃiy...

m) TÈ

M) Étrha k%W« bjhÊ%orhiy...Æš nt...iy...

ï) RabjhÊš

<) bjhÊšrh@aj nt...iy...fÿ

### 7. czîgH;f«

m) ir...t«

M) mir...t«

### 8. nehÆ< fhymšî

m) 6khj« - 1 tUl« tiu...

M) 1 tUlâ%F nk...š - 2 tUl« tiu...

ï) 2 tUlâ%F nk...š - 5 tUl« tiu...

### 9. á»çir... fhymâ< msî

m) 6khj« - 1 tUl« tiu...

M) 1 tUlâ%F nk...š - 2 tUl« tiu...

ï) 2 tUlâ%F nk...š - 5 tUl« tiu...

**gFjp – M**

**khw;wpaikf;fg;gl;l ypa+f;fd;]pd; %l;L Kl;F thjj;jpdhy; Vw;gLk; jPtpu;ij**

**mwpAk; ml;ltid**

**1.typ**

<b>t. vz;</b>	<b>msTU</b>	<b>fz;lwpjy;</b>	<b>kjpg;ngz;fs;</b>
1.	vOe;jjw;F gpwF	,y;iy	0
	vt;tsT Neuk;	≥ 15 epkplq;fs;	1
	Koq;fhypy; rij ,Wf;fk; my;yJ Koq;fhy; typ Vw;gLfpwJ?	≤ 15 epkplq;fs;	2
2	elf;Fk;NghJ Koq;fhy; typ Vw;gLfpwjh?	,y;iy	0
		rpwpJ J}uk; elf;Fk; NghJ kl;Lk; %l;L typ Njhd;Wk;.	1
		elf;f Muk;gpj;jTld; %l;L typ Njhd;Wk;	2
3	30 epkplj;jpw;F Nky; epw;Fk; NghJ typapd; msT mjpfkhfpwjh?	,y;iy	0
		Mk;	1

4	,uz;L kzp Neuk;	,y;iy	0
	mkh;e;jpUf;Fk;NghJ Koq;fhypy; typ my;yJ njhe;juT VNjDk; Vw;gLfpwjh?	Mk;	1

**2) mjpfgl;rkhd J}uk; elg;gJ:**

t. vz;	msTU	fz;lwpjy;	kjpg;ngz;fs;
1.	vt;tsT J}uk; mjpfgl;rkhf elf;f KbAk;?	tiuKiwapd;wp	0
		xU fpNyh kPI;IUf;Fk; Nky; Mdhy; msTId; (15 epkplq;fSf;Fs;)	1
		501 Kjy; 900 kPI;lh; J}uk; (8 Kjy; 15 epkplj;jpw;Fs;)	2
		100 Kjy; 500 kPI;lh; J}uk; tiu	3
2	Cd;WNfhyp;d; Njit	,y;iy	0
		xU Cd;WNfhy; Njit	1
		,uz;L Cd;WNfhy; Njit	2

**3) jpdrrhp tho;f;ifapd; nray;ghLfs;:**

t. vz;	msTU	fz;lwpjy;	kjpg;ngz;fs;
1.	Kd;Ndhf;fp tise;J fhYiw mzpa Kbfpwjh?	vspjhf KbAk;	0
		rpwpJ fbdj;Jld; KbAk;	1
		,ayhJ	2

2	jiuapy; ,Uf;Fk; nghUI;fis	vspjhf KbAk;	0
	Kd;Ndhf;fp tise;J vLf;f	rpwpJ fbdj;Jld;; KbAk;	1
	Kbfpwjh?	,ayhJ	2
3.	NkYk; fPOkhf gbf;fl;by; Vwp	vspjhf KbAk;	0
	,wq;f Kbfpwjh?	rpwpJ fbdj;Jld;; KbAk;	1
		,ayhJ	2

## **APPENDIX - I**

### **SREPS OF INTERVENTION:**

### **ISOMETRIC QUADRICEPS STRENGTHENING TECHNIQUE:**

#### **I.STRAIGHT LEG RAISING (SLR) EXERCISE:**

##### **A) IN SUPINE POSITION**

- Advise the patient to lie flat or sit with leg straight.
- Instruct them to tighten the muscles in front of thigh as much as she / he can, pushing the back of the knee flat against the floor/bed.
- Lift the leg/heel 4 to 6 inches off the floor/bed. After 5 seconds.
- Bring leg/heel back to the floor. Keep the muscle in front of the thigh as tight as possible as lower the leg, then relax.
- Repeat the exercise 10 times for 2 times per day.

##### **B) HIGH SITTING POSITION:**

- Advise the Patients to sit at the edge of bed with the hanging of legs.
- Instruct them to pull the toes up, tighten the thigh muscles and straighten the knee of the legs.



- Lift the straighten leg individually to be equal to hip level for a second and bring back to same position.
- Repeat the exercise 5 times for each legs and follow for two times a day.

## **II. STEP-UP AND STEP DOWN EXERCISRE:**

- Stand on the edge of step.
- Place the foot on the step approximately 7 inches in high. Hold on to a hand walls, chair or other objects for balance if needed.
- Slowly step-up and down. Make sure that kneecap is always in line with the second toe and hips are level.
- Lightly touch the heel of the opposite legs to the floor and return to the starting position.
- Repeat exercise ten times,2 times per day.

## **III. WALL SLIDE EXERCISE:**

- Stand with back against the wall. The feet should be shoulder with apart and approximately 18 to 24 inches away from the wall. Kneecap should be line with the tip of second toe.
- Slowly slide down the wall so that 75to90 degree bend the knees.
- Hold this position for 5 seconds. Stand up and rest for 5 seconds.
- Repeat exercise 10 times, 2 time/day

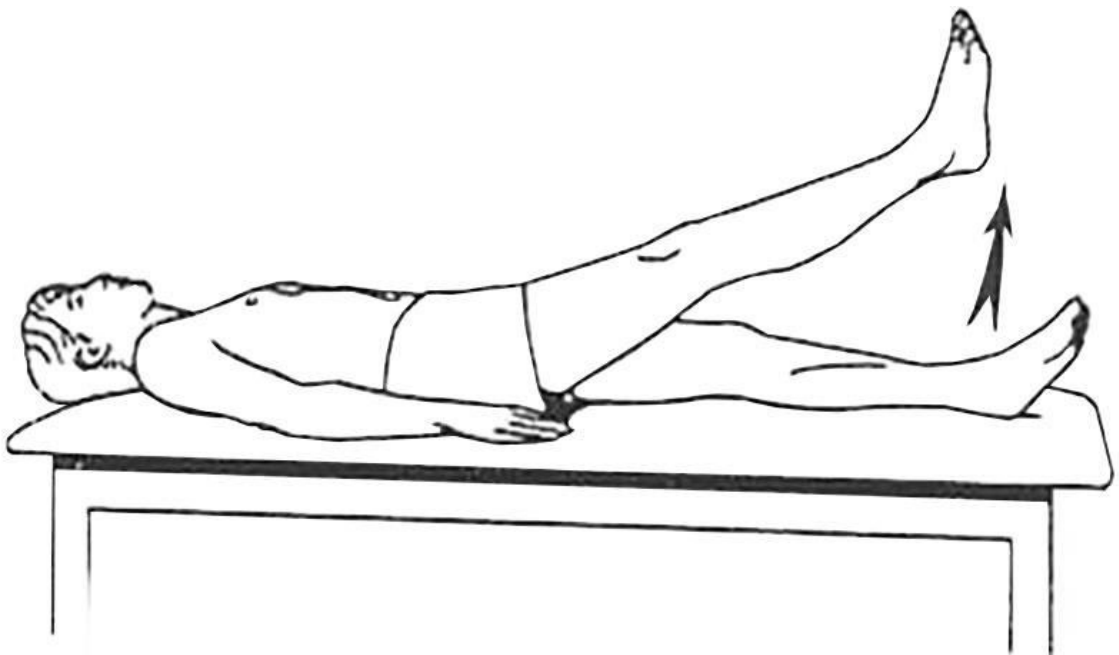
## **IV. HIP ADDUCTION EXERCISE:**

- Advise the patient to lie flat or sit with leg straight.
- Place a inch roll under knee, allowing it to be bend.
- Tighten the muscle in front of knee as much as can, and lift the heel off the floor.

- Hold this position for 10 seconds.
- Repeat exercise for 10 times, 2 times/day.

## **I. STRAIGHT LEG RAISING EXERCISE**

### **A) SUPINE POSITION:**



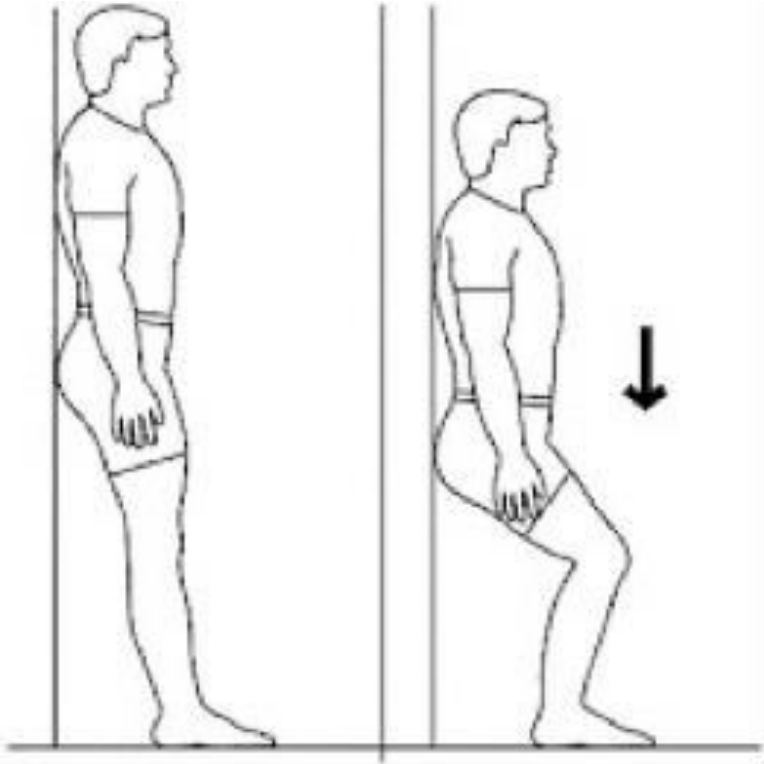
### **B) HIGH SITTING POSITION:**



**II.STEP-UP AND STEP DOWN EXERCISE:**



**III. WALL SLIDE EXERCISE:**



**IV. HIP ADDUCTION EXERCISE:**



## APPENDIX – J

### CRITERIA CHECK LIST FOR VALIDATION OF THE TOOL

Instruction: Please review the items in the tool and give your valuable suggestions regarding accuracy, relevance and appropriateness of the content. Kindly place a tick mark in the appropriate column. If there any suggestion or comments please mention in column.

#### Demographic Performa

Q.No	Demographic Detail	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Remarks
<b>1.</b>	<b>Age</b>						
	30-40 years						
	41-50 years						
	51-60 years						
	61-70 years						
<b>2.</b>	<b>Sex</b>						
	Male						
	Female						
<b>3.</b>	<b>Body mass index</b>						
	Underweight						
	Normal weight						
	Overweight						
	Obese						
<b>4</b>	<b>Marital status</b>						
	Married						
	Unmarried						
	Widow						
	Divorced						
<b>5</b>	<b>Education</b>						
	No formal education						
	Primary education						
	Secondary education						
	Degree and above						
<b>6</b>	<b>Occupation</b>						
	Cooley						

	Sedentary worker						
	Business						
	Professional worker						
7	<b>Dietary habits</b>						
	Vegetarian						
	Non vegetarian						
8	<b>Duration of illness</b>						
	6months-1 year						
	More than 1year-2 years						
	More than 2year-5 years						
9	<b>Duration of treatment</b>						
	6months-1 year						
	More than 1-2 years						
	More than 2-5 years						