



## REVIEW ARTICLE

### EFFECTIVENESS OF HOT WATER APPLICATION AND THERAPEUTIC EXERCISE IN REDUCING THE LEVEL OF OSTEOARTHRITIS AND JOINT PAIN AMONG ELDERLY IN SELECTED OLD AGE HOMES PUDUCHERRY

\*Lalithapriya, P., Nivethitha mahendran and Felicia chitra

Department of MSN, College of Nursing, MTPG & RIHS, Puducherry, India

#### ARTICLE INFO

##### Article History:

Received 10<sup>th</sup> September, 2019  
Received in revised form  
07<sup>th</sup> October, 2019  
Accepted 29<sup>th</sup> November, 2019  
Published online 30<sup>th</sup> December, 2019

##### Key words

Osteoarthritis, Joint pain, Elderly people, Numerical Rating pain Scale, WOMAC Index.

#### ABSTRACT

**Background:** Osteoarthritis will be the most common joint disease in the near future and is projected to be rank second for women and fourth for men in terms of years lived with disability. WHO (2011) reports that osteoarthritis affects 9.6% of men and 18% of women worldwide. **Aim:** This study was designed to compare the effectiveness of hot water application and therapeutic exercise in reducing the level of osteoarthritis and joint pain among elderly. **Subjects and methods:** Quasi- experimental non equivalent two group pre-test and post-test design was adopted for this Study. The study was conducted selected old age homes at Puducherry. A total of 60 participants were selected by purposive sampling technique and 30 were recruited to each group. The tool used for data collection was Numerical Rating pain Scale (NPS) and WOMAC INDEX (Western Ontario and McMaster Universities Osteoarthritis Index). Therapeutic exercise to experimental group-I and Hot application to experimental group-II for seven days was given to both groups. **Results:** After intervention post test mean level of osteoarthritis and joint pain is reduced in group I as well as in the group II. The post-test mean score of experimental group I  $22.13 \pm 3.78$  was higher than that of experimental group II  $13.53 \pm 2.28$  and the calculated 't' value 10.653 was significant at  $p < 0.001$  level. **Conclusion:** The study proved that the hot water application was effective than the Therapeutic exercise on reduction of joint pain and level of osteoarthritis among elderly in old age homes at Pondicherry.

Copyright © 2019, Lalithapriya et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

## INTRODUCTION

Aging has been defined as 'a progressive decline in the physiological capacity leading to a decreased ability to adapt to stressors'. Aging is a natural process with the changes in the human body, mind, thought process and living pattern that declines in the functional capacity of the senior citizens and which reduces life span. According to Government of India adopted 'National Policy on Older Persons' in January 2010, the policy provides broad guidelines to State Governments for taking action for welfare of older persons in a proactive manner by devising their own policies and plans of action. The policy defines 'senior citizen' as a person who is 60 years old or above. It strives to ensure well-being of senior citizens and improve quality of their lives through providing specific facilities, concessions, relief, services etc. and helping them cope with problems associated with old age. World elderly population has been growing for centuries. The size of the elderly population of age 60 years and above will cross one billion in 2020.

\*Corresponding author: Lalithapriya, P.,

Department of MSN, College of Nursing, MTPG & RIHS, Puducherry, India.

In India, since 1961, a sharp decline in the overall death rate, mortality levels in the older age group as well as increased life expectancy initiated a process of ageing. Census data in 2011 showed 55 million persons above the age of 60 representing 6.5% of total population. It has been estimated that nearly 75% of aged persons are living in villages. 48.2% of old aged people are women, among them 55% are widows. One third of the people are living below the poverty line. Nearly 66% of elderly people are living without adequate food, shelter and clothing. 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). The residents of old age homes feel depressed and anxious because of the fact that they have limited social activities. Lack of support and love of the families may be a major reason. The visits paid by the family members to old age homes were also minimal. Such circumstances have a profound effect on the psychological state of respondents, which made them feel isolated and lonely.

The extent of help or assistance in old age homes was also not provided to all the respondents, which forced them to indulge in activities, which needed mobility in spite of having joint pain. The uses of therapeutic exercise and heat application on improvement of physical function among patients with knee osteoarthritis. There were 90 osteoarthritis patients randomly selected and divided into three groups. Group 1 received training to use heat application with pharmacological treatment, group 2 received training of physical exercise with pharmacological treatment, and group 3 received a combination training of physical exercise and heat application with pharmacological treatment. The results showed that the use of a combination of therapeutic exercise and heat application together was effective. 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). During the experience, investigator witnessed that more number of elderly people expressed knee related symptoms and its serious impact on their quality of life and well being. The researcher identified the expressed need as an significant problem and based on the prevalence of osteoarthritis and feasibility of hot water application and therapeutic exercise the investigator was motivated to conduct a comparative study to assess the effectiveness of hot application and therapeutic exercise on reduction of the level of osteoarthritis and joint pain.

### Objectives

- To assess the existing level of osteoarthritis and joint pain among elderly
- To evaluate the effectiveness of hot water application and therapeutic exercise on level of osteoarthritis and joint pain among elderly.
- To compare the level of osteoarthritis and joint pain between the Experimental group I (Therapeutic exercise) Experimental group II (Hot water application) among elderly after the intervention.
- To associate the post test level of osteoarthritis and joint pain in selected demographic variables and clinical variables among elderly.

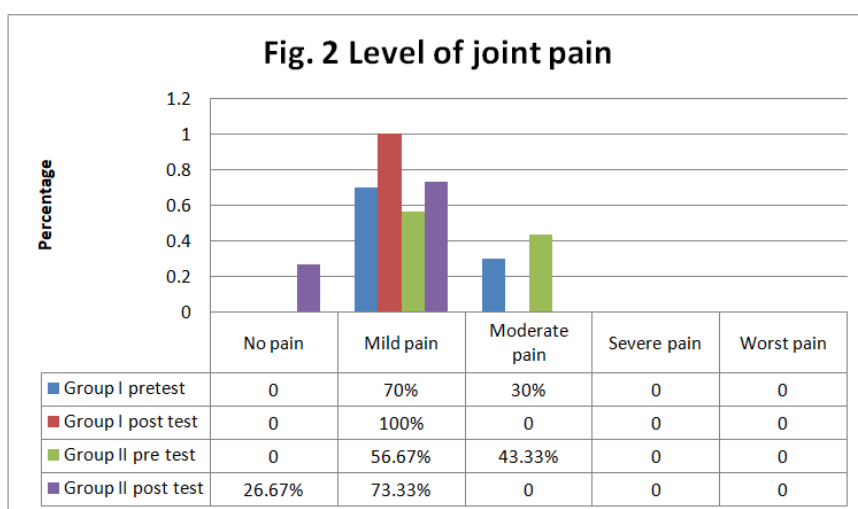
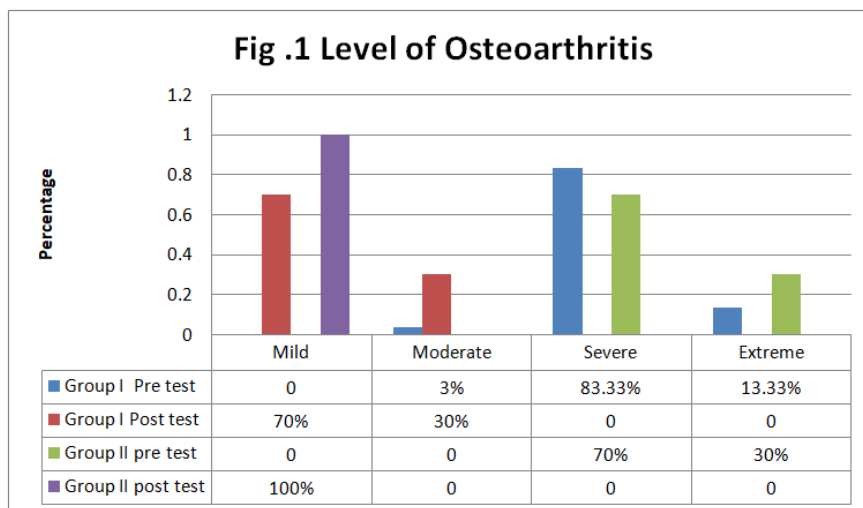
### METHODOLOGY

Research approach is the basic procedure for conducting the study, the present study aimed at comparing the effectiveness of hot application and therapeutic exercise in reducing the level of osteoarthritis and joint pain among elderly in selected old age homes Pondicherry. In order to achieve the objectives, a quantitative research approach was found to be appropriate. Research design used for this study quasi- experimental non equivalent two group pre-test and post-test design. In this study, Therapeutic exercise and hot water application are independent variables, and the dependent variables are level of osteoarthritis and joint pain.

The study was conducted selected old age homes at Puducherry. The population comprise of this study are elderly people with osteoarthritis and joint pain residing in a selected old age homes. The sample size comprised of 30 for group I therapeutic exercise and 30 for group II Hot water application. Purposive sampling technique was use for this study: Inclusion criteria of the study includes the age group 60 years and above, the samples with had both unilateral and bilateral knee joint pain due to osteoarthritis, the samples obtained mild, moderate, severe and extreme score in WOMAC Index assessment and the samples who are able to perform the exercise. The tool description was divided into three sections. Section A includes demographic variables (part I) and Clinical variables(part II). Section B includes assessment of level of pain by using Numerical Rating Pain Scale (NPS). Section C includes WOMAC Index scale (Western Ontario and McMaster Universities Osteoarthritis).Which of consists of 3 components such as Pain (5 Items), Stiffness (2 Items), and Physical Function (17 Items). The investigator obtained prior permission from concerned authority before the data collection.

### RESULTS AND DISCUSSION

Regarding demographic and clinical variables, Most of the elderly persons (20%, 56.67%) were in the age group of 60 - 65 years in both the Experimental group I and II. Most of the elderly (83%, 66%) were females in both the groups. The maximum of elderly (36%, 40%) were married in both groups. The majority of elderly (46%, 46%) were Hindu in group I and II respectively. There are 53%, 16% of elderly were illiterates in the both Experimental group I and II respectively. Most of the elderly (50%, 16%) were unemployed in both Experimental group I and II. Most of the elderly (60%, 50%) were non vegetarian in both Experimental group I and II. Most of the elderly (46%, 30%) were staying old age home more than 2 years in both of the Experimental group I and II respectively. The present study revealed that in experimental group I, there was only one (3.33%) sample had moderate level of osteoarthritis, 25(83.33%) samples had severe level of osteoarthritis, and 4(13.33%) samples had extreme level of osteoarthritis in pre-test. But, after the administration of therapeutic exercise, 21(70%) samples had mild level of osteoarthritis and 9(30%) samples had moderate level of osteoarthritis. None of them had severe level of osteoarthritis. In experimental group II 21(70%) samples had severe level of osteoarthritis, and 9(30%) samples had extreme level of osteoarthritis in pre-test. But, after the administration of hot water application, almost all 30(100%) samples had mild level of osteoarthritis and none of them found in the category of moderate, severe level of osteoarthritis. (Fig. 1). In the present study in experimental group I, the result of the study revealed that 21(70%) samples had mild joint pain and 9(30%) samples had moderate joint pain in the pre test. But whereas, in the post test all 30(100%) samples had mild joint pain. In experimental group II 1.7(56.67%) samples had moderate joint pain in the pre test. But in the post test 8(26.67%) samples had no joint pain and 22(73.33%) samples had mild joint pain. None of them had moderate and severe joint pain. Thus the study result shows that the interventions are effective in reducing the joint pain (Fig. 2). The study(table 1) results revealed that after the interventions the mean OA was reduced from 65.97±7.29 to 22.13±3.78 in group I, further the mean



**Table 1. Comparison of pre-test and post test level of osteoarthritis among elderly within and between Experimental Group I and Experimental Group II**

Group	Pretest		Post Test		Mean Diff. & %	Paired 't' Value
	Mean	S.D	Mean	S.D		
Experimental Group I	65.97	7.29	22.13	3.78	43.83 (45.66%)	t = 29.770 p = 0.001 S***
Experimental Group II	68.90	5.50	13.53	2.28	55.37 (57.68%)	t = 49.218 p = 0.001 S***
Mean Diff. & %	2.93 (3.05%)		8.60 (8.96%)		***p<0.001, S – Significant	
Student Independent 't' test Value	t = 1.757 p = 0.085 N.S		t = 10.653 p = 0.001, S***			

**Table 2. Comparison of pre-test and post test level of pain among elderly within and between Experimental Group I and Experimental Group II**

Group	Pre-test		Post Test		Mean Diff. & %	Paired 't' Value
	Mean	S.D	Mean	S.D		
Experimental Group I	3.13	0.68	1.67	0.61	1.46 (14.6%)	t = 10.351 p = 0.001 S***
Experimental Group II	3.13	0.94	0.90	0.66	2.23 (22.3%)	t = 11.077 p = 0.001 S***
Mean Diff. & %	0.00 (0%)		0.76 (7.6%)		***p<0.001, S – Significant	
Student Independent 't' test Value	t = 0.000 p = 1.000 N.S		t = 4.678 p = 0.001 S***			

difference between the pre and post test was analysed and it was found as 45.13% and it was also found to be significant at 'p' < 0.05. Like was in Experimental Group II, mean osteoarthritis was reduced from 68.90±5.50 to 13.53±2.28. And, the mean difference score was 57.68% which is little higher than the group I. Further calculated paired 't' test value for group I is  $t = 29.770$  and for group II, is  $t = 49.218$ . The data further analysed by using student 't' test to find the mean pre test difference and mean post test difference between both the groups. After the analysis it was found that the mean difference in the pre test between group I and group II was 2.93. In the group II the post test mean difference between both groups was 8.60 which is higher than the pre test means difference which also again found to be highly significant at  $p < 0.001$  by using student independent 't' test where as in the pre test mean difference there was no significance. Hence results reveals that the (interventional) are effective in reducing severity of OA. The study revealed that (table 2) the mean joint pain was reduced from 3.13±0.68 to 1.67±0.61 in experimental group I. After the interventions the mean difference score between pre and post test level of joint pain was 1.46 i.e., 14.6% in experimental group I. Like wise, in Experimental Group II, the mean pain was reduced from 3.13±0.94 to 0.90±0.66. The data was further analysed by using student independent 't' test to find the mean pre-test difference and post-test between two groups. After the analysis, it was found that there is no mean difference in the pre test between group I and II. But, where as in the post test there was a mean difference (0.76) between both the groups and also it was found to be highly significant at  $p < 0.001$ .

The findings of the present study results is supported by the study conducted by Hye-Young Shim et al. (2018) study on Physical activity status by pain severity in patients with knee osteoarthritis. Only 18.6% of KOA patients met the osteoarthritis expert panel recommendations, lower than in the general population (23.2%;  $p = 0.003$ ). The percentages that met the recommendations in the none mild pain group, moderate pain group, and severe pain group were 23.4%, 17.6%, and 18.3%, respectively ( $p = 0.341$ ). In terms of flexibility, a somewhat higher percentage of those with moderate pain engaged in physical activity compared to those with little or no pain (17.1% vs. 12.3%), but the difference was not significant ( $p = 0.585$ ). And also study results is supported another study conducted by Ayesha Zakir Syed Imran Ahmed et al. (2016) a study on effectiveness of manual therapy versus exercise therapy for the management of knee osteoarthritis in Karachi Pakistan and the study results concluded that was significant improvement in both groups with respect to pain subscale ( $p = 0.003$ ) and physical function subscale ( $p = 0.004$ ) after the intervention as like present study. The results of present study consistent with the similar study done by Parminder Kaur, et al. (2007) on a study to assess the effect of 'moist heat application' on the intensity of joint pain among the geriatric population residing in Dadu Majra Colony, Chandigarh. The results showed that ( $p < 0.05$ ) the intensity of joint pain was reduced significantly in the experimental group as compared to the control group. Then, the study was further analyzed find out the association between demographic variables and clinical variables with level of joint pain and level of OA.

The researcher used 'chi square' to find out the association. Finally it was found that there were only few demographic variables such as food habit and previous occupation in group I. Then, the clinical variables such as frequency of joint pain and BMI in experimental group II.

## Conclusion

Osteoarthritis is the most common musculoskeletal disorder worldwide and an increasingly important public health concern. The prevalence increases between 40 and 60 years, and there is a linear increase in the prevalence in later ages. The findings revealed that both the interventions such as therapeutic exercise and hot water application were effective in reducing osteoarthritis and joint pain. Further it was also found that hot water application was more effective than therapeutic exercise in reducing the severity of osteoarthritis and joint pain. Thus, the researcher concluded that alternative therapies prove in reducing joint pain and OA when occurring degenerative disorder in geriatric ages.

## REFERENCES

- Ayesha Zakir et al 2016. Effectiveness of manual therapy versus exercise therapy for the management of knee osteoarthritis in Karachi Pakistan International Journal Physiotherapy. Vol 3(1), 86-93,
- Barker K. 2003. Exercise for knee osteoarthritis, 1st edition. London: Curropin Rheumatol Company.
- Brunner and Siddarth's 2011. Text book of medical and Surgical Nursing. 12th edition New Delhi, Wolter and kluwer pvt ltd.
- Burke, M. 1997. Gerontological Nursing, 2nd edition. St. Louis: Mosby Publications.
- Davis, F.A. 1992. "Knee pain & Disability" 3rd Edition New Delhi Jaypee Brothers publications P.No.149-154
- Hye-Young Shim et al 2018. Physical activity status by pain severity in patients with knee osteoarthritis; BMC Musculoskeletal Disorders <https://doi.org/10.1186/s12891-018-2301-6>.
- John Crawford Adams, Davis L. Hamblen (2001) "Outlive of Orthopaedics, 13th edition P.No.126.128. Churchill Livingstone, Harcourt Publishers Limited.
- John Ebenezer 2000 Text Book of orthopedics 2nd edition New Delhi, Jaypee Brothers P.No.393.
- Joyce M. Black 2009. Medical-Surgical Nursing 8th edition. Missouri Elsevier Publications.
- Shun Suke Ochiai 2014. Effectiveness of Thermotherapy Using a Heat and Steam Generating Sheet for Cartilage in Knee Osteoarthritis Journal. Physical. Therapy. Science. Vol. 26,
- Syed Imran Ahmed, 2016. Quantifying Quadriceps Muscle Strength in Patients With ACL Injury, Focal Cartilage Lesions, and Degenerative Meniscus Tears The Orthopaedic Journal of Sports Medicine, 4(10), 2325967116667717 DOI: 10.1177/2325967116667717