

A STUDY TO ASSESS THE EFFECTIVENESS OF RANGE OF MOTION EXERCISES ON LEVEL OF KNEE PAIN AMONG THE OSTEOARTHRITIS PATINETS

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Abstract

Background: Osteoarthritis is the most common type of arthritis and is more common in older people . It occurs when the cartilage that cushions the ends of bones in the joints gradually deteriorates. If the cartilage wears down completely, bone will rub on bone. This study aimed to assess the effectiveness of range of motion exercises on level of knee pain among osteoarthritis patients. The main aim of the study were to assess the level ofknee pain among patient with osteoarthritis before and after intervention, to compare the level of knee pain among osteoarthritis patients in experimental and control group and to determine the association between the post test score of knee pain with selected demographic variables. The research design adopted for the study was quasi experimental non randomized control group design and 40 samples were selected by purposive sampling technique of which 20 belongs to each group. Two tools were used in the present study that is semi structured questionnaire to assess the demographic variables and modified WOMAC scale to assess the level of knee pain. Subjects in experimental group received intervention daily for 4 weeks. Findings revealed that 2 groups subjects were homogenous in their demographic and socio economic characteristics. The level of knee pain before and after intervention and association between post test score of knee pain with demographic variables were assessed and analyzed by using descriptive and inferential statistics. The mean post test score was significantly lower than mean pre test score . The t value of knee pain was 5.26 which was significant at 0.05 level. There was significant association was found between level of knee pain with age, gender, religion, occupation, diet pattern, marital status, BMI, history of trauma, type of treatment and comorbidities.

Keywords: Study results showed that range of motion exercises was effective in reducing knee pain among osteoarthritis patients.

Introduction

Osteo arthritis is a chronic degenerative disorder characterized by cartilage loss. It's prevalence is high, and it is a major cause of disability. The cause of OA is not known however, current evidence indicates that it is multifactorial. Major risk factors for osteoarthritis are increased age, female sex, obesity, previous damage, anatomic deformity, occupational knee-bending, physical labour, genetic factors, and race, joint trauma, vitamin D deficiency, and chondrocalcinosis. Osteo arthritis causes joint pain, stiffness and limitation of joint function. Knee involvement is the commonest presentation of this disease all over the world. Osteoarthritis is the most common arthritic disease in developing countries. 595 million people affected by osteoarthritis globally. In India, 43 million cases in 2020 and it is projected to 60 million cases in 2025.

Lifestyles predisposing to osteoarthritis in developing countries. Repetitive squatting, kneeling or heavy weight lifting are well-known risk factors for OA. Obese people with prolonged kneeling or squatting have a higher risk of OA as compared to non-obese people. It has been known for a long time that osteoarthritis has a strong genetic predisposition, especially in the case of hand osteoarthritis. Stecher showed that Heberden's nodes were three times more likely to be present in sisters of patients with Heberden's nodes. Pain relief and restoration of function remain the primary treatment objectives. Exercises and healthy eating to build strong muscle and keep a healthy weight can reduce symptoms. Surgery to replace joint is used in severe cases to reduce pain and regain mobility.

Materials and Methods

Research approach: Quantitative approach

Research design: quasi experimental – non randomized control grouppre testpost test design.

Research settings: the study was conducted in Siruganur, Trichy Dt.

Target population: target population were all the geriatric people residing in Siruganur.

Accessible population: people who are diagnosed as knee osteoarthritis.

Sample size and sampling technique: 40 samples selected by purposive sampling technique.

Tools: Two tools were used for this present study.

Section A – semi structured questionnaire about selected demographic variables such as age, gender, education, occupation, diet pattern, marital status, type of treatment, duration of treatment, history of trauma, BMI and comorbidities.

Section B – modified WOMAC scale to assess the level of knee pain.

Validity and reliability

The tool was validated by experts and reliability was measured by split half method and the score was $r=0.8$.

Data collection procedure

Formal permission was taken from village President, Siruganur. Prior information was given to the study participants, after explaining about the purpose, benefits and risks of the intervention, study participants were divided in to 2 groups that is experimental group and control group. Pre test was given to both the groups by using modified WOMAC scale. Range of motion exercises was implemented to experimental group for the duration of 20 mints daily for 4 weeks. No intervention was given to control group and they are just observed by

the investigator. At the end of 4th week post test was conducted with same tool. Collected data were analyzed by using descriptive and inferential statistics.

Plan for data analysis.

Data analysis	Method	Purpose
Descriptive statistics	Frequency & percentage	To describe demographic variables
Inferential statistics	Mean & standard deviation	To assess the effectiveness of ROM exercises
	Paired ‘t’ test	To find out the difference between pre test and post test score in experimental and control group.
	Unpaired “t” test	To find out the difference between post test score between experimental and control group
	Chi square test	To find out the association between post test score with selected demographic variables.

Analysis and Interpretation Table 1: Comparison between Experimental and Control group knee osteoarthritis subjects according to their socio demographic variables

S.No.	Demographic variables	Experimental(frequency)	Group (percentage)	Control (frequency)	Group(percentage)
1.	Age				
	45 – 55 years	1	5 %	3	15%
	56 – 65 years	8	40 %	6	30%
	66 – 75 years	9	45%	8	40%
	>75 years	2	10%	3	15%
2.	Sex				
	Male	6	30%	8	40%
	Female	14	70%	12	60%
3.	Religion				
	Hindus	16	80%	9	45%
	Christians	4	20%	6	30%
	Muslims	0	0	5	25%
4.	Education				
	Primary	6	30%	2	10%
	Secondary	5	25%	3	15%
	Higher secondary	1	5%	3	15%
	Graduate	1	5%	4	20%
	Illiterate	7	35%	8	40%
5.	Occupation				
	Daily wages	12	60%	16	80%
	Govt. Employee	1	5%	4	20%
	Private employee	2	10%	0	0
	House wives	5	25%	0	0
6.	Income				
	Rs.5000 – 10000	9	45%	5	25%
	Rs.10,001 – 15,000	7	35%	13	65%
	>15,000	4	20%	2	20%
7.	Type of family				
	Nuclear	11	55%	12	60%
	Joint family	9	45%	8	40%
8.	Marital Status				
	Married	20	100%	20	100%
9.	BMI				
	Normal BMI	7	35%	4	20%
	Over weight	14	70%	11	55%
	Obesity	2	10%	2	10%
10	Dietary pattern				
	Vegetarian	3	15%	0	0
	Mixed	17	85%	20	100%
11	Use of assistive devices				
	Walking Stick	14	70%	12	60%
	Walker	6	30%	8	40%
12.	Duration of knee pain				
	1 – 2 years	5	25%	6	30%
	3 – 5 years	15	75%	14	70%
13.	Previous history of trauma				

	No	4	20%	8	40%
	Yes	16	80%	12	60%
14.	Duration of taking treatment				
	1 – 2 years	14	70%	10	50%
	3 – 4 years	4	20%	5	25%
	5 – 6 years	2	10%	4	20%
	>6 years	0	0	1	5%
15.	Type of treatment				
	Drugs	10	50%	12	60%
	Exercises	0	0	0	0
	Hot/Cold application	3	15%	6	30%
	Oil massage	7	35%	2	10%
16.	Co morbidities				
	Diabetes	5	25%	8	40%
	Hypertension	10	50%	11	55%
	Heart disease	0	0	0	0
	Other medical conditions	5	25%	1	5%

Table 1 shows comparison between experimental and control group clients according to their socio demographic characteristics. The mean age of experimental and control group subjects was 66 to 75 years. More than half of the subjects in both the groups were (70% & 60%) females respectively. All clients in both the groups were married and belongs to mixed diet pattern. More than three quarters of subjects in control group and half of the subjects in experimental group were daily wages. In relation to income, more than half of the subjects belongs to Rs.5000 to 10000 economic group. Most of the subjects 11(55%) in experimental group and 13(65%) in control group are in nuclear family. With regard to BMI, 70% in experimental group and 55% in control group were over weight group. Most of the subjects(70% &60%) in both the groups using walking stick as

assistive device for walking. In relation to previous history of trauma, 16(80%) in experimental group and 12 (60%) in control group had past history of trauma. With regard to education, most of the subjects 7(35%) and 8 (40%) were illiterate respectively. Regarding duration of knee pain, 15(75%) in experimental and 14(60%) in control group had 3 to 5 years of knee pain. More than half of the subjects in both the groups (50% and 60%) took analgesics drugs as a type of treatment. 10(50%) and 11 (55%) had hypertension as comorbidities in experimental and control group.80 % in experimental and 45 % in control group geriatrics were Hindus. Higher percentage 75% and 60% of geriatrics clients had 3 to 5 years knee pain.

FIGURE 1. COMPARISON OF PRETEST SCORE OF EXPERIMENTAL AND CONTROL GROUP.

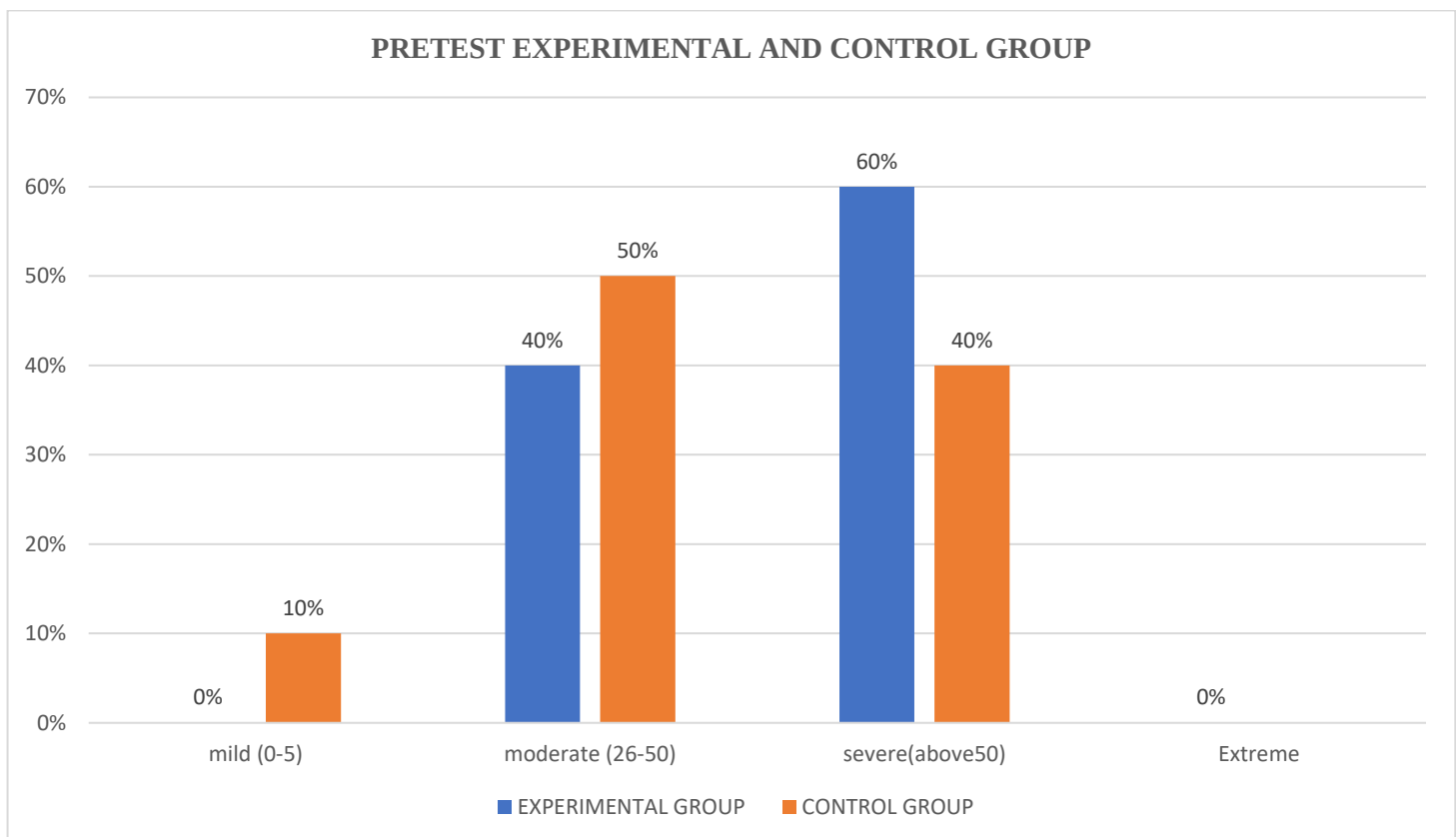


Figure 1 shows that in experimental group, 8(40%) have moderate level of knee pain, 12(60%) have severe level of knee pain and none

of them have mild knee pain .In control group 2(10%) have mild level of knee pain,10(50%) have moderate level of knee pain,8(40%) have

severe level of knee pain and none of them have extreme level of knee pain in both the groups

FIGURE 2. COMPARISON OF POST TEST SCORE OF EXPERIMENTAL AND CONTROL GROUP

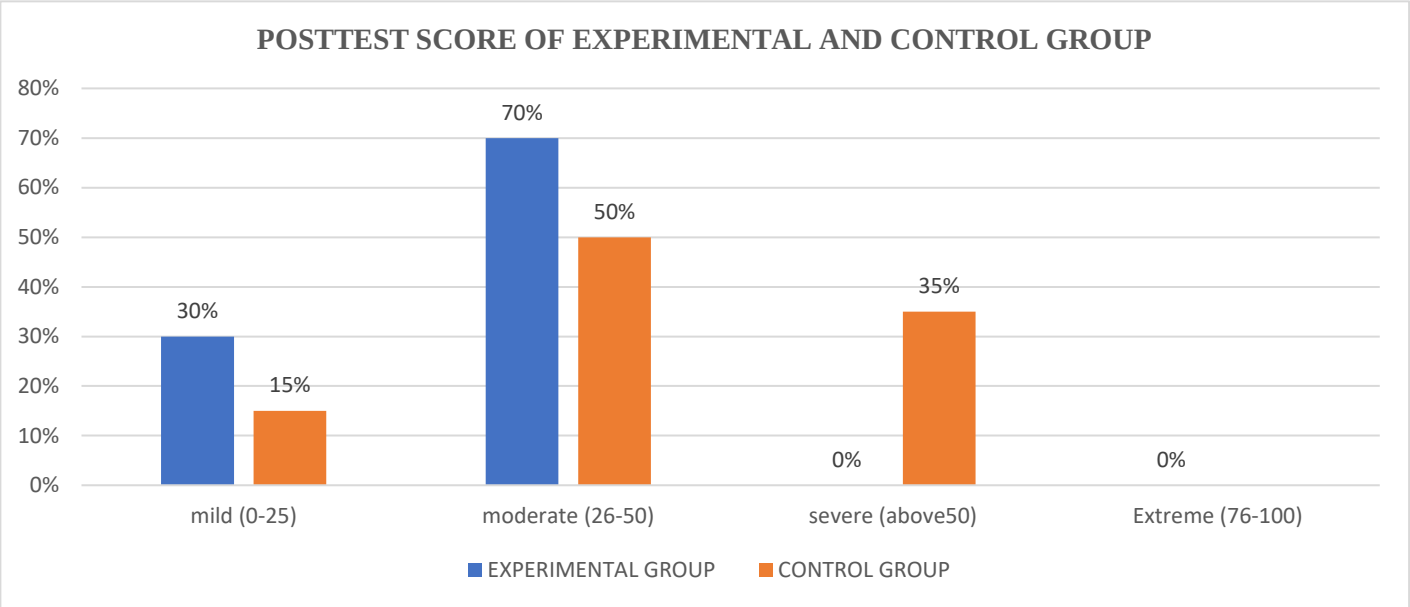


Figure 2 shows that in experimental group, 6(30%) have mild level of knee pain, 14(70%) have moderate level of knee pain and none of them have severe level of knee pain. In control group 4(20%) have mild knee pain,11(55%)moderate knee pain, 5(25%) have severe knee pain and none of them have extreme level of knee pain in both the groups.

TABLE 2. EFFECTIVENESS OF RANGE OF MOTION EXERCISE ON LEVEL OF KNEE PAIN AMONG OSTEOARTHRITIS PATIENT BY USING PAIRED “t” TEST.

OVER ALL SCORE	MEAN	SD	MEAN DIFFERENCE	PAIRED “T” VALUE	TABLE VALUE	Df
Pretest experimental group	41.32	17.30	24.38	5.26 S	2.02	39
Posttest experimental group	16.44	9.621				
Pretest control group	43.8	18.93	13.15	0.1 NS	2.02	39
Posttest control group	30.65	14.07				

Table 2. shows that paired t test value of experimental and control group.

In experimental group, pre test mean score is 41.32 and post test score is 16.44 .Mean difference is 24.38 .” t” value is 5.26. and table value is 2.02. So, “t” value is greater than table value .Thus it is statistically significant. In control group pre test mean score is 43.8 and post test score is 30.65 and mean difference is 13.65. this difference is small and not

significant. . “t” value is 0.1 and table value is 2.02 .So, “t” value is lesser than table value. Thus it is not statistically significant .By comparing the “t” value and table value of both the groups , it is well known that range of motion exercises is effective in reducing knee pain among the OA patients

OESTOARTHRITIS PATIENTS IN EXPERIMENTAL AND CONTROL GROUP BY USING UNPAIRED “t” TEST.

TABLE 3. EFFECTIVENESS OF RANGE OF MOTION EXERCISES ON LEVEL OF KNEE PAIN AMOMG

OVER ALL SCORE	UNPAIRED “T” TEST	TABLE VALUE	Df
POST TEST EXPERIMENTAL GROUP	4.90	2.02 S	38
POST TEST CONTROL GROUP			

Table 3.shows that unpaired “t” test value of experimental and control group.

Unpaired “t” test are calculated between post test score of experimental and control group. The calculated “t” value is 4.19 and table value is 2.02 .So , “t” value is greater than table value . Thus it is statistically significant.

TABLE 4.ASSOCIATION BETWEEN POST TEST SCORE OF KNEE PAIN WITH DEMOGRAPHIC VARIABLES .

S. No	VARIABLES	POST TEST SCORE LEVEL			TOTAL	X2	TABLE VALUE		df
1	AGE a) 45-55years b) 56-65years c) 66-75 years d) above 75years	1 2 5 0	3 3 1 5	0 0 0 0	4 5 6 5	6.08 *S	5.99		2
2	GENDER a) Male b) Female	1 7	6 6	0 0	7 13	6.90 *S	5.99		2
3	RELIGION a) Hindu b) Muslim c) Christian	7 8 1	8 0 4	0 0 0	15 0 5	14.71 *S	5.99		2
4	EDUCATIONAL STATUS a) primary b) secondary c) higher secondary d) graduate e) post graduate f) illiterate	2 3 0 1 0 2	5 2 1 0 0 4	0 0 0 0 0 0	7 5 1 1 0 6	10.51 NS	11.07		5
5	OCCUPATIONAL STATUS a) daily wages b) govt. employee c) private employee d) house wife	6 1 1 0	7 0 2 3	0 0 0 0	13 1 3 3	2.02 *S	1.82		6
6	INCOME a) below 5000 b) Rs .5001-10000 c) Rs.10001-15000 d) above 15000	0 4 1 3	0 4 7 12	0 0 0 0	0 8 8 4	3.04 NS	5.99		2
7	TYPE OF FAMILY a) joint family b) nuclear family c) extended family	3 5 0	7 5 0	0 0 0	10 10 0	4.96 NS	5.99		2
8	BODY MASS INDEX a) 18.5-24.9(normal) b) 25-29.9(over weight) c) above 30(obesity)	3 5 0	8 2 2	0 0 0	11 7 2	8.37 *S	5.99		2
9	MARITAL STATUS a) married b) unmarried c) widow/divorced	8 0 0	12 0 0	0 0 0	20 0 0	10.51 *S	5.99		2

10	DIETARY PATTERN a) vegetarian b) mixed dietary pattern	4 4	8 4	0 0	12 8	4.51 *S	3.84		1
11	USE OF ASSISTIVE DEVICES a) stick b) walker	2 6	7 5	0 0	9 11	1.02 NS	3.84		1
12	DURATION OF KNEE PAIN a) 1-2years b) 3-5 years c) 6- 10 years d) 10 years	5 3 0 0	10 2 0 0	0 0 0 0	15 5 0 0	2.58 NS	5.99		2
13	HISTORY OF TRAUMA a) no b) yes	2 6	2 10	0 0	14 16	16.03 *S	7.82		3
14	DURATION OF TAKING TRATMENT FOR KNEE PAIN a) 1-2years b) 3-4 years c) 5 - 6years d) above 6years	5 2 1 0	8 2 2 0	0 0 0 0	13 4 3 4	1.80 NS	7.82		3
15	TYPE OF TREATMENT a) drug b) exercise c) hot/cold application d) oil massage	4 0 0 4	4 0 3 5	0 0 0 0	8 0 3 9	9.43 *S	7.82		3
16	COMORBIDITIES a) Diabetes mellitus b) Hypertension c) Heart disease d) Other medical condition	4 4 0 0	4 4 0 4	0 0 0 0	8 8 0 4	8.59 *S	7.82		3

TABLE4. present chi square value of experimental group

The chi square value shows that there is significant relationship and association found between level of knee pain with age ,gender, religion, occupational status, body mass index, type of treatment , marital status , dietary pattern ,history of trauma and co-morbidities and there is no significant relationship and association found between level of knee pain with educational status , income , type of family , uses of assistive device , duration of knee pain and duration of taking treatment for knee pain.

Discussion

With respect to age, Anitha Bhaskar (2016) study results showed that, knee OA were found to be increasing age, family history of OA, attainment of menopause, BMI more than 30, history of trauma to knee joint. As age is the most significant risk factor for knee OA, the present study showed that, the majority of patient's age in experimental and control group is between 66 to 75 years. In another study conducted by Jayaseelan Venkatachalam in Kancheepuram District, showed that prevalence of OA knee was common among people aged more than 50 years

Regarding sex, the current study showed that more than three fourth of study subjects were females in both the groups. This is inconsistent with Marita Cross, Emma Smith et al (2014) found that prevalence of OA was higher in females than males. Another study conducted by A.Singh et al (2022) identified that prevalence, incidence and DALYs for OA was higher in females than male.

According to Q.Liu, S.Wanget al, (2018) study among Chinese elderly, lower education, increased age, female sex were associated with knee OA.

Based on the facts, other longitudinal study conducted by XU.Tangon prevalence of symptomatic knee OA in China stated that, prevalence of knee OA was lower among individual who had received more years of education.

The current study results showed that (60% &80%) of study subjects are daily wages, which is in contrast with Chandra Prakash Pal et al (2016) in their community based cross sectional study in India, which identified that prevalence of OA was lower among participants who worked as daily wages and high in participants who have a sedentary life style.

With respect to BMI, person with BMI of 30 to 35 kg/m² had higher risk for knee OA and hip OA than non obese people. In a study conducted by M.S.Radha et al (2015) in Karnataka, results showed that

35(23.3%) subjects belongs to overweight group of BMI. This result support the present study results by showing that 14(70%) subjects had BMI score of 25 to 29.9(over weight group.) If the overweight and obese people reduce their weight by 5kg, or by keeping the BMI with in normal range , the risk for surgery might be avoided.

Concerning co morbidities, Thomas Rosemann(2007) stated that high blood pressure and elevated cholesterol were the most common comorbid conditions. This supports the present study results, 11(55%) study subjects has hypertension.

When we compare the effectiveness of ROM exercises of present study (24.38) mean difference with other studies, it can be seen that they are comparable.

According to the study conducted by DM.Ottonello(2021) in Ohio among knee OA patients showed that combination of PROM(passive range of motion) and strengthening exercises help to increase Range Of Motion and improved patient gait. In another study conducted by Merci Ekaputri et al (2021) in SimpangEiga health centre identified that ROM exercise is effective in reducing the intensity of pain in elderly people having OA.

Conclusion

Knee pain is the serious and main risk factor in elderly especially with OA causes functional limitations and lead to diminished quality of life. Osteoarthritis was found to be common among elderly female population and hypertension is the most common comorbid condition seen in most of the OA patients. There was significant improvement was found between post test score of experimental and control group by using unpaired 't' test. So it was proved that experimental group has reduced knee pain compared with control group. There was significant association was found with age, gender, religion, occupation, BMI, type of treatment, diet, history of trauma and comorbidities. The effectiveness of ROM exercises found in this study was comparable with other studies. This study strongly demonstrated that ROM exercises is effective in reducing knee pain among knee OA patients.

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