

A Study to Assess the Effectiveness of Clay Therapy on Physical Function among Patients with Knee Osteoarthritis in Selected Hospitals, Erode

Dhanalakshmi.V.¹; Dr. P. Padmavathi²;
Chandramathi K.³; Prema Josphin S⁴; R. Revathi⁵

Lecturer¹, Principal², Professor^{3,4,5}
Dhanvantri College of Nursing, Namakkal, Tamil Nadu.

Publication Date: 2025/02/15

Abstract:

➤ Background:

About 10% of adults over 60 suffer from knee osteoarthritis (OA), one of the most prevalent types of arthritis is Knee osteoarthritis, with a prevalence of 22% to 39% in India, osteoarthritis is the most prevalent joint disease and the most common rheumatological issue. An alternate method of treating rheumatic conditions is mud pack therapy. Its foundation is the application of heated mud packs to the body as a whole or to particular regions, like the joints. The current study's objective was to assess the effectiveness of treatment using on physical function among patients with knee osteoarthritis.

➤ Design:

Quasi experimental-non-equivalent control group pre and post-test design was selected for the study. Purposive sampling technique was used in this study. Samples included in this study were both genders with Knee osteoarthritis, 30 years and above, and Stage 2, 3 & 4 Knee Osteoarthritis Standardized tool (WOMAC Scale) was used to assess the level of physical function among patients with knee osteoarthritis.

➤ Results:

The study's results indicate that, for the level of physical function assessment scale, the overall area-wise comparison between the experimental and control post-test mean percentage difference was 43%. The experimental group's pre and post test scores for patients with osteoarthritis in their knees showed highly significant variations. Paired t test value ($t=47.97$, $t=33.96$) was higher than the table value ($t=4.14$) at the level of significant ($P<0.0001$). Conclusion: Mud therapy was effective in improving the physical function among knee osteoarthritis patients, as used by WOMAC score scale.

Keyword: Effectiveness, Mud Therapy, Physical Function, Knee Osteoarthritis.

How to Cite: Dhanalakshmi.V.; Dr. P. Padmavathi; Chandramathi K.; Prema Josphin S; R. Revathi (2025) A Study to Assess the Effectiveness of Clay Therapy on Physical Function among Patients with Knee Osteoarthritis in Selected Hospitals, Erode.

International Journal of Innovative Science and Research Technology, 10(1), 2421-2427.

<https://doi.org/10.5281/zenodo.14874182>

I. INTRODUCTION

Globally, 3.3% to 3.6% of people suffer from osteoarthritis. It is the eleventh most debilitating disease in the world, causing moderate to severe disability in 43 million individuals. There were almost 1 million hospitalization for osteoarthritis with a total expense of almost 15 million ranking it as the second most costly illness observed in the United States. (Rouhinsen, 2019).

The main risk factors for knee osteoarthritis (OA) include being female, advancing age, obesity, previous knee injuries, and repetitive knee use. The rise in obesity has not only led to a higher occurrence of knee OA but has also contributed to an earlier onset and increased need for treatment; consequently, by the time those with knee OA reach the age for Medicare eligibility, the duration of their condition has extended, their cases have become more

severe, and the likelihood of requiring surgery has heightened.(Newberry SJ *et.al*, 2017).

Osteoarthritis (OA) is a condition characterized by the breakdown of cartilage, leading to discomfort in major joints, particularly the knee. Worldwide, OA ranks as the eighth most common disease, accounting for approximately 15% of all musculoskeletal issues. The diagnosis of OA is primarily based on clinical symptoms and radiographic evaluation. India is projected to have one of the highest rates of OA globally, potentially leading to it becoming the leading chronic illness by 2025. Within India, Andhra Pradesh exhibits the highest prevalence of OA. In both Andhra Pradesh and Bihar, the incidence of OA is notably higher in males compared to females. (Chandra Shekhar Azad, 2017).

The researcher has done meta-analysis study to examine the effect of mud therapy on pain relief in patients with knee osteoarthritis (OA). Research has looked into how mud therapy affects people with osteoarthritis in their knees, and it has been shown to help these patients with their knee pain. The results of the current meta-analysis showed that mud may have an effect on pain relief, and such effects are typically the consequence of its thermal effect. (Dr. Guang - hua Lei D, 2013)

➤ *Objectives:*

- To evaluate the level of physical function among patients with knee osteoarthritis before and after clay therapy in experimental and control group.
- To influence the effectiveness of clay therapy on physical function among patients with knee osteoarthritis in experimental and control group.
- To determine the relationship between the chosen demographic characteristics of the experimental and control groups and the post-test physical function scores of patients with osteoarthritis in the knee.

➤ *Hypotheses:*

- **H₁**. There is a notable degree of physical function among patients with knee osteoarthritis before and after clay therapy in experimental and control group.
- **H₂**. There is notable efficacy inof clay therapy on physical function among patients with knee osteoarthritis in experimental and control group.
- **H₃**. There is a significant association between post test scores of physical functions among patients with knee osteoarthritis and their selected demographic variables in experimental and control group.

II. REVIEW OF LITERATURE

A comprehensive analysis of research on spa therapy, mud-pack therapy, balneotherapy, and mud-bath therapy that was published between 2002 and 2017 in order to look into the evidence of how well these treatments work for knee osteoarthritis in terms of pain, functional limitation, medication use, and quality of life. Twelve of the 35 papers that were reviewed were chosen for inclusion in the review if they were trial comparative. The researcher employed the

same statistical technique, the student's t-test, which compares the means of two frequency distributions, to reevaluate the findings of the various investigations for the purposes of this review. Out of all the research, the VAS, Lequesne, and WOMAC Scale—the most pertinent indices used to gauge the efficacy of spa therapy were enhanced. Antonio Fraioli *et.al.*, (2018).

714 patients in all fulfilled the study's eligibility requirements and took part. Most patients (64.8%) had been in pain for less than a year, and 91.6 percent had previously been administered medicine, 68.6% had taken supplements, and 81.9 percent had used non-pharmacological methods to address their knee OA. Currently, intra-articular injections (29.8%), oral drugs (83.3%), and surgery (12.7%) were recommended as forms of treatment. Oral medicine prescription was associated with lower Kellgren-Lawrence grades, younger age, and absence of abnormalities ($p < 0.01$). Compared to patients receiving care at government hospitals, those receiving care at private hospitals were more likely to have previously received physical therapy (range, 61.8% to 84.8%; $p < 0.01$) and medicines (range, 84.3% to 92.6%; $p < 0.01$ Sancheti P (2017).

Quasi-experimental research – pre-test post-test comparison group design was adopted for the study. 60 samples were chosen by cluster sampling technique. The data were collected with structured questionnaire, modified WOMAC scale for osteoarthritis index and measurement of knee circumference for swelling. The natural clay therapy was implemented for experimental group whereas control group had conventional treatment. The pretest mean for pain, stiffness, physical functioning level was 16.73, 6.5, 51.37 respectively and median value of swelling was 2.5. The post-test mean for pain, stiffness, physical functioning level was 6.6, 2.73, 20.73 respectively and median value of swelling was 1 with the p-value (< 0.005) in experimental group and the control group showed no change in their post-test value. Thus, the result shows the effects of natural clay therapy on women with knee osteoarthritis' osteoarthritis index and swelling. Dr. Renuka (2017).

III. METHODOLOGY

The quasi - experimental, where a non-equivalent control group pretest post-test design was used to assess the efficacy of clay therapy on physical function among patients with knee osteoarthritis. Independent Variable in this present study was Clay therapy and the dependent variable was Knee Osteoarthritis. the Experimental group, sample was conducted in VSM Hospital, Erode which is 20 kms away from Dhanvantri College of Nursing. It is a 50 the bed hospital, on average 20 – 30 knee osteoarthritis patients were admitted per month. For the Control group, sample was selected in LKM Hospital which is 22 kms away from Dhanvantri College of Nursing. It is a 100 bed hospital, on average 30 – 40 knee osteoarthritis patients were admitted every month. The population for the present study was patients with knee osteoarthritis. The total sample size was 30 patients out of which experimental group was 15 and control group was 15. Purposive Sampling Technique was

used to select the patients. Samples included in the study are patients with knee osteoarthritis admitted in the VSM hospital & LKM hospital and present during the period of data collection. Samples included were both the Gender with Knee osteoarthritis, 30 years and above, and Knee Osteoarthritis in stage 2, 3 & 4.

Neoplasm, Pulmonary tuberculosis, Rheumatoid arthritis, decompensate heart disease, Thyrotoxicosis and Neurosis were excluded in the study. Data was collected for a period of one month. Clay therapy was given for 4 members per day. There are 2 sections of tools reused. They are, Section-A: Demographic Variables, Section-B: WOMAC Scale. It is a standardized tool used to assess the level of physical function among patients with knee osteoarthritis. It consists of 24 assessment parameters. These are, **for pain assessment**-Walking, Stair Climbing, Nocturnal, Rest, Weight bearing. **For Stiffness**- Morning stiffness, Stiffness occurring later in the day. **For physical function** -

Descending stairs, ascending stairs, rising from sitting, Standing, bending to floor, walking on flat surface, getting in/ out of car, going shopping, putting on socks, lying in bed, taking off socks, rising from bed, getting in/ out of bath, Sitting, Getting on/off toilet, Heavy domestic duties, Light domestic duties. Reliability of the tool was assessed by using Test- retest method and the value was found to be reliable. ($r^1 = 0.86$).

➤ Data Collection Procedure:

Before any data was collected, consent was acquired from administrator and the concerned authority of VSM and LKM hospitals, Erode. Data was collected for a period of one month. The Data was gathered by the researcher from both the experimental and control groups. For seven days, clay therapy was administered once daily for an hour. On the eighth day, a post-test was administered using the WOMAC scale to assess the physical function of the patients in the experimental and control groups.

IV. RESULTS

Table 1. Percentage and Frequency Distribution of Experimental and Control Group of Patients with Knee Osteoarthritis According to their Demographic Variables. ($N_1=15, N_2=15$)

S. No.	Demographic Variables	Investigational Group		Control group	
		Frequency N_1	Percentage %	Frequency N_2	Percentage %
1	Age in years				
	a)>30 to 40 year	4	27	3	20
	b)41 to 50 year	3	20	4	27
	c)51 to 60 year	6	40	5	33
	d)>60 year	2	13	3	20
2	Gender	3	20	6	40
	a)Male				
	b)Female	12	80	9	60
3	Dietary pattern				
	a)Vegetarian	3	20	2	13
	b)Non vegetarian	6	40	7	47
	c)Ova vegetarian	1	7	0	0
	d)Mixed	5	33	6	40
4	BMI				
	a)>18.5	2	13	2	13
	b)18.6 to 24.9	3	20	4	27
	c)25 to 29.9	6	40	7	47
	d)>30	4	27	2	13
5	Types of workers				
	a)Sedentary workers	7	47	8	53
	b)Moderate workers	2	13	3	20
	c)Heavy workers	6	40	4	27
6	Affected Knee				
	a)Right	5	33	3	20
	b)Left	6	40	5	33
	c)Both	4	27	7	47
7	Duration of illness				
	a)Less than 6 months	5	33	4	27
	b)1 to 3 years	7	47	9	60
	c)More than 3 years	3	20	2	13

8	Co-morbid illness				
	a)Endocrine	5	33	7	47
	b)Repeated trauma	3	20	1	7
	c)Others	4	27	2	13
	d)Nil	3	20	5	33

Table 2: Percentage and Frequency Distribution of the Experimental Group and Control Group Pretest and Post Test Scores on Level of Physical Function among Patients with Knee Osteoarthritis. (N₁=15,N₂=15)

Level of physical function	Experimental group				Control group			
	Pretest scores		Posttest scores		Pretest score		Posttest score	
	N ₁	%	N ₁	%	N ₂	%	N ₂	%
None	0	0	0	0	0	0	0	0
Slight	0	0	15	100	0	0	0	0
Moderate	3	20	0	0	0	0	2	13
Very	11	73	0	0	10	67	13	87
Extremely	1	7	0	0	5	33	0	0

Table 3: Area Wise Mean, SD, and Mean Percentage of Experimental Group Pre and Post Test Score on Level of Physical Function.

S. No	Level of Physical function	Maxi mum Score	Pretest			Posttest			Difference in mean %
			Mean	SD	Mean %	Mean	SD	Mean %	
1	Pain	20	13.6	2.52	68.3	6.53	1.64	32	36
2	Stiffness	8	5.06	1.57	63.2	1.93	0.96	24.1	39
3	Physical Function	68	48.8	5.87	71.7	15.8	3.68	23.2	48
	Total	96	67.46	9.96	70	24.26	6.28	25	45

Table-4.Area wise mean, SD, and mean percentage of control group pre and post test score on level of physical function.

S. No	Level of Physical function	Maxi mum scores	Pretest			Posttest			Difference in mean %
			Mean	SD	Mean %	Mean	SD	Mean %	
1	Pain	20	14.1	2.7	71	11.1	2.47	56	15
2	Stiffness	8	5.53	1.05	70	3.33	1.23	42	28
3	Physical function	68	56.2	5.03	83	50.7	4.9	75	8
	Total	96	75.8	8.78	79	65.1	8.6	68	11

Table-.5: Comparison of mean, SD and mean percentage of control and experimental group post test scores on knee osteoarthritis symptoms.

S. No	Level of physical function	Max. scores	Post test scores						Difference in mean%
			Control group			Experimental group			
			Mean	SD	Mean %	Mean	SD	Mean %	
1	Pain	20	11.13	2.47	56	6.53	1.64	32	24
2	Stiffness	8	3.33	1.23	42	1.93	0.96	24	18
3	Physical function	68	50.7	4.9	75	15.8	3.68	23	52
	Total	96	65.16	8.6	68	24.26	6.28	25	43

Table.6: Paired 't' test value of pre and post test scores of experimental and control group.

S. No	Level of Physical function	Paired 't' value		Table value	Level of Significance	
		Experimental Group	Control Group			
1	Pain	16.39	14.76	4.14	P<0.0001	Significant
2	Stiffness	14.55	8.40	4.14	P<0.0001	Significant
3	Physical function	17.03	10.8	4.14	P<0.0001	Significant
	Total	47.97	33.96	4.14	P<0.0001	Significant

Table: 7: Unpaired 't' test value of post test scores of experimental and control group.

S.no	Level of physical function	Unpaired 't' Test value	Table Value	Level of significance
1	Pain	5.99	3.67	P<0.0001
2	Stiffness	3.74	3.67	P<0.0001
3	Physical Function	21.89	3.67	P<0.0001
	Total	31.62	3.67	P<0.0001

DF:28

Table value: 3.67

p<0.0001 significant

Table-8: Chi-square value of Association between post test scores of physical function among patients in experimental group with their demographic variables.

S. No	Variables	Degree of freedom	χ^2	Level of significant
1	Age	3	1.25	Significant
2	Gender	1	0.26	Significant
3	Dietary pattern	3	1.62	Significant
4	BMI	3	2.34	Significant
5	Types of workers	2	0.77	Significant
6	Affected Knee	2	1.80	Significant
7	Duration of illness	2	0.64	Significant
8	Co-morbid illness	3	0.81	Significant

Table 9: Chi-square association between the post test scores of physical functions among patients in control group with their demographic variables.

S. No	Variables	Degree of freedom	χ^2	Level of significant
1	Age	3	1.89	Significant
2	Gender	1	0.04	Significant
3	Dietary pattern	3	0.07	Significant
4	BMI	3	4.16	Significant
5	Types of worker	2	3.43	Significant
6	Affected knee	2	3.45	Significant
7	Duration of illness	2	0.05	Significant
8	Co-morbid illness	3	3.06	Significant

V. DISCUSSION

Study was conducted to assess the effectiveness of clay therapy on physical function among patients with knee osteoarthritis at VSM hospital and LKM Hospital, Erode.

- Objective-1: To evaluate the level of physical function among patients with knee osteoarthritis before and after clay therapy in experimental and control group. The findings are, **in experimental group**, In pretest majority (73%) of patients had very low level of physical function

and (7%) of patients had extremely poor level physical function. In post-test, most of them (100%) had high level of physical function. In control group, in pretest majority (67%) had very poor level of physical function and (33%) of patients had extremely low level of physical function. In post test majority (87%) of patients had severe level of physical function and only (13 %) of patient's had moderate level of physical function.

- Hypothesis:1-There is a significant level of physical function among patients with knee osteoarthritis before and after clay therapy in experimental and control group. So the hypothesis was accepted. Knee osteoarthritis (OA) is a major public health issue because it causes chronic pain, reduces physical function and diminishes quality of life. To determine whether land-based therapeutic exercise is beneficial for people with knee OA in terms of reduced joint pain or improved physical function and quality of life. **(FransenM, 2015).**
- Objective 2: To determine the effectiveness of clay therapy on physical function among patients with knee osteoarthritis in experimental and control group.

In experimental group, Paired 't' test value of the level of physical function was (47.97), when compared to table value (4.14) it is high. Pretest the mean score of the level of physical function was (67.46±9.96), which is (70%) of mean percentage. In Post test the mean score of the level of physical function was (24.26 ± 6.28), which is (25%) high of mean percentage. Mean difference of the level of physical function was (45%). It seems that Clay therapy was highly effective on level of physical function among patient with knee osteoarthritis. The unpaired t test value was (31.62) in the level of physical function, when compared to table value (3.67), it was high. It seems that there was a significant effectiveness of Clay therapy on physical function among patients with Knee osteoarthritis. In control group, Paired 't' test value of the level of physical function was (33.96), when compared to table value (4.14), it is high. In Pretest the mean score of the level of physical function was (75.8±8.78), which is (79 %) of mean percentage. In Post test, the mean score of the level of physical function was (65.1 ± 8.6), which is (68 %) of mean percentage. Mean difference of the level of physical function was (7%), It seems that without intervention there was no change in the level of physical function among patients with Knee osteoarthritis.

- Hypothesis 2: There is significant effectiveness of clay therapy on physical function among patients with knee osteoarthritis in experimental and control group. So the hypothesis was accepted. Researcher conducted a systematic review of the studies published between 2002 and 2017 on spa therapy, mud-pack therapy, balneotherapy, and mud-bath therapy in the treatment of knee osteoarthritis in order to investigate the evidence of the efficacy of such treatment on pain, functional limitation, drug use, and quality of life. **(Antonio Fraioli *et al.*, 2018).**
- Objective - 3: To find out association between post test score of physical function among patient with knee osteoarthritis and their demographic variables in control and experimental group. Chi square test showed significant association ($P < 0.0001$) with the post test score of level of physical function in both experimental and control group with their demographic variables. Hence the differences observed in the mean score values were only by chance and not true difference. It seems

that Clay therapy was effective to all the patients with Knee osteoarthritis irrespective of their demographic variables.

- Hypothesis 3: There is a significant association between post test score of physical function among patients with knee osteoarthritis with their demographic variables in control and experimental group. So the hypothesis was accepted. Knee osteoarthritis (OA) is believed to be highly prevalent today because of recent increases in life expectancy and body mass index (BMI). **(Wallace IJ, 2017).**

VI. CONCLUSION

Based on the study's results, it can be said that, most of the knee osteoarthritis patients were females, were in the age group of 51-60 years, consumes non-vegetarian, BMI of 25-29.9, sedentary workers, duration of illness between 1 to 3 years and they have endocrine disorders. There was significant effectiveness of clay therapy on physical function among patients with knee osteoarthritis in experimental and control group. There was a significant association between post test scores of when compared with age, gender, dietary pattern, BMI, types of workers, affected knee, duration of illness, co-morbid illness in experimental and control group.

REFERENCES

- [1]. Antonio Fraioli *et al.*, 2018, BioMed Research International Volume 2018.
- [2]. Deepak Chandra Feb 16, 2017, Epidemiology of knee osteoarthritis in India and related factors.
- [3]. Chandra Prakash Pal, 2016, Epidemiology of knee osteoarthritis in India and related factors volume 50 Indian journal of orthopedics.
- [4]. Chandra Shekhar Azad October 2017, osteoarthritis in India: an epidemiologic aspect volume 8.
- [5]. Srinivasan S *et al.*, 2015, Diagnosis and Management of Hip Disease: Biological Bases of Clinical Care
- [6]. Hua Liu Sep 5, 2013 The effect of mud therapy on pain relief in patients with knee osteoarthritis: a meta-analysis of randomized controlled trials
- [7]. Dr. Guang - Hua Lei, D 2013 Effect of partial and complete posterior cruciate ligament transection on medial meniscus: Abiomechanical evaluation in a cadaveric model volume 47.
- [8]. David Zelman, MD, 2017, Evaluation of a "Just-in-Time" Nurse Consultation on Bone Health: A Pilot Randomized Controlled Trial
- [9]. Behzad Heidari, MD 2011 Knee osteoarthritis prevalence, risk factors, pathogenesis and features: Part I volume 2.
- [10]. Flusser D 2002, Therapy with mud compresses for knee osteoarthritis: comparison of natural mud preparations with mineral-depleted mud.
- [11]. Wallace IJ, 2017, Knee osteoarthritis has doubled in prevalence since the mid-20th century.
- [12]. NICE Clinical Guidelines, 2014, Osteoarthritis: care and management

- [13]. .David Nelson MD, (2017) Treatment of Osteoarthritis of the Knee: An Update Review
- [14]. Dr.Renuka (2017) Impact of natural clay therapy on osteoarthritis index and swelling among women with knee osteoarthritis, volume 5
- [15]. Luis Espejo Antúnez, 2012, Clinical effectiveness of mud pack therapy in knee osteoarthritis
- [16]. Amran Hassan, 2012, Clay Therapy: An Alternative Approach to Emotional Reduce Therapy in Fostering Psychological Well-Being among School Students
- [17]. OdabaşıErsin,2009,TheEffectofMudPackTreatmentinKnee Osteoarthritis.
- [18]. Pal CP,2016: Epidemiology of knee osteoarthritis in India and relatedfactors.
- [19]. B. C. Narasimha, 2016A study on knee joint osteoarthritis among the women aged above 40 years, residing in the urban field practice area at tertiary care centre, Bangalore, Karnataka, India
- [20]. Dr. K. S. Ravish , 2016: International Journal of Community Medicine and Public Health.