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ORIGINAL ARTICLE

Effects of Hot Packs on pain in patients with Osteoarthritis (OA) in Saidu Group of Teaching Hospital Swat: A Randomized Control Trial

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ABSTRACT

Objective: The main objective of this study was to evaluate the effect of heat packs on pain in patients with osteoarthritis.
Study design: A Randomized Control Trial
Place and duration: Saidu Group of Teaching Hospital Swat for the period of six months.
Methodology: Methods: This research employed a randomised controlled trial (RCT) design. A total of 60 patients met the inclusion criteria and were randomly assigned (30 in each) to either the experimental or control group. The severity of the pain was measured using a Visual Analog Scale. The patients in the control group received 20 minutes of heat therapy consisting of hot packs heated to 40 degrees Celsius administered to the affected joint. All patients were checked at day 0, day 3, day 8, and day 15 after treatment.
Results: On days 8 and 15, patients in the experimental group reported significantly less pain than those in the control group (p = 0.002 and p 0.001, respectively). Patients younger than 50 years old in the study group experienced less pain on day 8th and 15th than those in the control group.
Conclusion: As this study's findings indicate, using a hot pack can significantly reduce pain experienced by those suffering from osteoarthritis (OA). Further, it showed that the effectiveness of a hot pack on pain differed between patients based on factors including age and gender
Keywords: Osteoarthritis, Hot pack, Randomized Control Trial, significant, convenient, cost effective.

INTRODUCTION

In 2017, 303 million people all over the world suffered from osteoarthritis (OA), making it the most common form of Rheumatic Musculoskeletal Disorder. Both the individual suffering from osteoarthritis (OA) and society as a whole are severely affected by the disease. Osteoarthritis (OA) imposes a substantial monetary cost on sufferers and the general public. The Osteoarthritis Research Society International (OARSI) published a White Paper in 2016 titled Osteoarthritis as a Serious Condition due to the high prevalence of the disease.[1]

Globally, 9.61% of men and 18.0% of women over the age of 60 have symptomatic osteoarthritis; of those with osteoarthritis, 80% have mobility restrictions and 25% are unable to perform their usual daily activities, according to WHO estimates. [2]

Knee osteoarthritis (OA) is characterised by painful and stiff joints. Joint swelling, pain, and discomfort are common complaints from patients with advanced stages of this condition. The knee's proprioceptive acuity may be compromised, joint deformity may occur in the later stages, and the quadriceps muscles may become weak. Osteoarthritis (OA) has multiple causes, including synovial inflammation, articular cartilage deterioration, ligament and meniscus injury, and subchondral bone thickening. The quality of life for elderly people with knee OA is drastically reduced.[3]

Medication, physical therapy, surgery, and heat and cold therapy are only some of the options for care.[3] Osteoarthritis (OA) continues to lengthen a patient's life, therefore a variety of pharmacological and non-pharmacological therapy strategies are to be carried out for patients with OA, as recommended by the American College of Rheumatology/Arthritis Foundation Guidelines (2019).[4]

One non-invasive option for pain alleviation is thermotherapy.[5] One of the most common forms of thermal therapy is the use of hot packs. When it comes to raising the skin temperature, moist heat is far superior to its dry counterpart, making hot packs ideal. Furthermore, moist heat increases subcutaneous temperature more effectively than dry heat.[6]

MATERIAL AND METHODS

Study design: The current study design was prospective randomized control trial.
Place and duration: This study was conducted in orthopedic OPD and physiotherapy OPD of the Saidu Group of Teaching Hospital Swat Khyber Pakhtunkhwa. The current study was completed in 06 months after approval of the synopsis from synopsis review committee.
Sample size calculation method: The sample size means, the total number of participants who need to be studied in a research study (Polit and Beck 2008). The sample size was calculated by the following formula keeping the power of the study equal to 90% and the level of significance equal to 5% with expected pain scale (Visual Analog Scale) as in control group 5.4 ± 2.1 and in experimental group 3.4 ± 2.5. (Sarsan et al., 2012).

Desired power of study = 90% = 1.28
Desired level of significance = 5% = 1.96
Anticipated mean pain score on VAS (Visual Analog Scale) (Control) = 5.4
Anticipated mean pain score on VAS (Visual Analog Scale) (experimental) = 3.4
Standard deviation pain score on VAS (Visual Analog Scale) (Control) = 2.1
Standard deviation pain score on VAS (Visual Analog Scale) (experimental) = 2.5
n= calculated sample size in each group = 30

Inclusion criteria:
The criteria for inclusion were as follows:
- Patients who had been diagnosed with knee OA according to the American Rheumatology Association. These criteria included knee pain, age over 50, joint stiffness, crepitus, bony tenderness and/or enlargement, osteophytes, and no palpable warmth (Brosseau et al., 2003).
- X-ray or CT scan confirmation.
- Patients who had osteoarthritis (OA) for 1 year.
- Patients aged from 20 years to 50 years and above
- Patients who had pain > 4 on Visual analogue scale (VAS) (Sarsan et al., 2012).
- Patients who were taking only NSAIDs (Non-Steroidal Anti-inflammatory Drugs) for pain relief.

Exclusion criteria:
The criteria for exclusion were as follows:
- Patients with systemic or local diseases for whom hot pack application was contraindicated (Sarsan et al., 2012).

- Patients with dermatological diseases that prevent hot pack application (Sarsan et al., 2012).
- Patients with intra-articular drug injections for the past 3 months (Sarsan et al., 2012).
- Patients with knee joint effusion, knee arthroplasty, secondary OA causes, rheumatologic diseases, septic arthritis, neoplasms, severe and decompensated systemic diseases, severe cardiovascular diseases, or peripheral vascular diseases (Sarsan et al., 2012).

Data collection procedure: Total 60 participants were enrolled in this study based on inclusion criteria. They were then randomly distributed by using balloting method as 30 participants in the experimental group who received hot packs intervention with their baseline treatment and 30 participants in the control group who received only baseline treatment without hot packs interventions.Informed consent was taken from every participant prior to start of the study. The severity of pain was evaluated in both groups on initial meeting by Visual Analogue Scale (VAS).

The pharmacological treatment for pain relief of both groups was kept the same. Hot packs were applied to the experimental group at $40C^0$ for 20 minutes and then pain was reassessed by Visual Analogue Scale (VAS) (Sarsan et al., 2012). The patients were asked to mark a point on a 10 cm horizontal line (0=no pain; 10=most intense pain) according to the pain he/she felt (Sarsan et al., 2012).

Packs were provided and application was demonstrated to every participant for their understanding of self-application at home.Volunteers (health care providers) in the hospital and in community were trained to apply hot packs application for participants' compliance. All patients were examined on 0, 3rd, 8th, and 15th day after they received treatment (Dehghan and Farahbod, 2014).

Statistical analysis: All collected information were analyzed via Statistical Package for the Social Sciences (SPSS) version 20. Descriptive statistics were used for demographic data and Mann Whitney-U test was used for the comparison of pain level on visual analogue scale in both groups (Sarsan et al., 2012).

RESULTS

Out of the 60 patients, 29 (48.3%) belonged to the 50 years and above age group, 21 (35.0%) belonged to 41–50 years' age group, while 9 (15.0%) were in the 31–40 age group, and only 1 (1.7%) patient belonged to the 20–20 years' age group. There were 32 (53.3%) females and 28 (46.7%) male patients. Majority of the patients were married as shown in table 4.1.

Table 1: Distribution of patients according to age, gender, and marital status

Variables	Frequency	Percentage
Age groups		
20-30	1	1.7
31-40	9	15.0
41-50	21	35.0
50 and above	29	48.3
Gender		
Male	28	46.7
Female	32	53.3
Marital Status		
Married	52	86.7
Un-married	8	13.3

The normality of the data was assessed by the Shapiro Wilk test. Results revealed that the data were normally distributed. Therefore, an independent sample t-test was used to compare the pain score between experimental and control groups. There was no difference in mean pain score of patients on day 0 between the two groups ($p = 0.283$). Similarly, no difference was observed in mean pain score of patients on day 3 between the two groups ($p = 0.283$). On day 8, those patients who were in experimental group had lower pain score as compared to control group ($p = 0.002$). Similarly, significant difference in mean pain score was observed on day 15 between the two groups ($p < 0.001$).

Table 2: Comparison of pain score at day 0, 3, 8 and 15days between experimental and control groups

Group		Mean	SD	p-value
Pain-day 0	Experimental group	6.3	1.3	0.283
	Control group	5.9	1.6	
Pain-day 3	Experimental group	4.8	1.4	0.296
	Control group	5.2	1.3	
Pain-day 8	Experimental group	3.4	1.4	0.002*
	Control group	4.5	1.3	
Pain-day 15	Experimental group	2.3	0.8	< 0.001*
	Control group	4.0	1.4	

Data were further stratified into two groups i.e., ≤ 50years and > 50 years. An independent sample t-test was used to compare the pain score between experimental and control groups in different age groups. On day 0 and 3, there was no significant difference in the mean pain score of patients between the experimental and control groups in both age groups. On day 8, significant difference was observed in mean pain score between the experimental and control groups in patients who belonged to age group ≤ 50years while no difference was observed between the two groups in patients having age more than 50 years. On day 15, significant difference was also observed in the mean pain score between the experimental and control groups in both age groups.

Table 3: Comparison of pain score at day 0, 3, 8 and 15 days between experimental and control groups with respect to age groups

Age group		Group	n	Mean	SD	p-value
≤ 50years	Pain-day 0	Experimental	16	6.4	1.3	0.480
		Control	15	6.0	1.6	
	Pain-day 3	Experimental	16	4.6	1.3	0.234
		Control	15	5.2	1.4	
	Pain-day 8	Experimental	16	3.1	1.1	0.010*
		Control	15	4.4	1.5	
	Pain-day 15	Experimental	16	2.2	0.8	< 0.001*
		Control	15	3.9	1.5	
> 50 years	Pain-day 0	Experimental	14	6.3	1.3	0.443
		Control	15	5.9	1.6	
	Pain-day 3	Experimental	14	5.1	1.6	0.807
		Control	15	5.2	1.2	
	Pain-day 8	Experimental	14	3.7	1.6	0.099
		Control	15	4.6	1.2	
	Pain-day 15	Experimental	14	2.4	0.8	< 0.001*
		Control	15	4.1	1.2	

Table 4: Comparison of pain scores at day 0, 3, 8 and 15 days between experimental and control groups with respect to gender

Gender		Group	n	Mean	SD	p-value
Female	Pain-day 0	Experimental	13	6.6	1.6	0.608
		Control	19	6.3	1.6	
	Pain-day 3	Experimental	13	5.1	1.8	0.405
		Control	19	5.5	1.2	
	Pain-day 8	Experimental	13	3.5	1.2	0.006*
		Control	19	4.7	1.2	
	Pain-day 15	Experimental	13	2.5	0.8	0.001*
		Control	19	4.2	1.4	
Male	Pain-day 0	Experimental	17	6.1	1.0	0.060
		Control	11	5.3	1.3	
	Pain-day 3	Experimental	17	4.6	1.0	0.980
		Control	11	4.6	1.3	
	Pain-day 8	Experimental	17	3.4	1.5	0.208
		Control	11	4.1	1.4	
	Pain-day 15	Experimental	17	2.1	0.8	< 0.001*
		Control	11	3.7	1.3	

Independent sample t-test was used to compare the pain score between experimental and control groups in both genders. On day 0 and 3, there was no significant difference in mean pain score of patients between the experimental and control groups in male and female patients. On day 8, significant difference was observed in the mean pain score between the experimental and control groups in female patients, while no difference was observed between the two groups in male patients. On day 15, significant difference was observed in the mean pain score

between the experimental and control groups in both male and female groups.

DISCUSSION

In order to determine whether or not hot packs alleviate pain in people with osteoarthritis, the current study used a randomised controlled trial design with a total of 60 patients (30 in each of the experimental and control groups) (OA).

In 2003, the European Union Against Rheumatism (EULAR) recommended pharmaceutical, nonpharmaceutical, and surgical interventions for rheumatoid arthritis. While age and general health are taken into account when deciding on a conservative treatment plan, most patients do not consent to surgical intervention.[7] According to research conducted by Swärdh et al.,[8] in the year 2021, applying a hot pack can help alleviate discomfort and swelling in a variety of different types of muscles and joints. There is some debate as to whether or not cold packs should be used during the winter to reduce swelling and pain. Based on the results of this study, applying a hot pack is a viable and effective therapy option for persons of all ages suffering from osteoarthritis, especially those who are unwilling to undergo surgery.[8]

In 2021, researchers compared the efficacy of a cold rub gel for pain management and joint function in individuals with knee osteoarthritis to that of a local heat treatment. Findings indicated that both heat and cold therapy improved joint function and pain relief.[9] The majority of patients in the past have preferred heat over cold for the treatment of rheumatoid arthritis, and this preference may persist today if patients are given the option. Additionally, tests demonstrated that cold treatments were preferred and fruitful.[10]

CONCLUSION

The purpose of this research was to determine if applying hot packs alleviated pain in those who suffer from osteoarthritis (OA). Patients with osteoarthritis reported significant pain relief after using hot packs, according to one study (OA). Additionally, our findings suggested that the pain-relieving effects of a heated pack may vary depending on the patient's age and gender. Hot pack application is an effective, convenient, self-applicable, and cost-efficient therapy method, especially for patients who cannot afford more expensive options, as shown in the current study and consistent with the majority of the prevailing worldwide literature. Using a multi-center design, further research has to be done in Pakistan on the effects of using hot packs over extended periods of time.

Recommendation: Our study in the light of relevant literature revealed that pharmacological treatment and surgical option for Osteoarthritis patients are very costly and have multiple adverse effects. So hot pack application is effective, convenient, self-applicable and cost effective for all patients. It should be included in nursing practice to make nursing care more evidence based. Hot pack application can be safely used at homes to manage osteoarthritis in the current pandemic waves. Health care organizations should focus on hot pack application for pain management in Osteoarthritis (OA) as it's effective and affordable for most of the non-affordable patients. And this study also recommends that nurses are enough qualified and skilled to apply hot packs intervention and to train the patients and families for their home practices to prevent them from further complications and to improve their quality of life.

Conflicts of interest: The authors have no conflicts of interest to declare.

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Ethical Approval: Subjects were assured that their participation in the study was voluntary and that their identity will be kept anonymous. The participants were clarified about the aim and nature of the study and that they could withdraw from the study at any time. In view of the packed timetable and to avoid any disturbance in the schedule, data was collected in free time in the concerned hospital. An information sheet with details of the study was given to all participants who were assured that personal information collected will be kept strictly confidential and used solely for the purpose of this study. Ethical approval was taken from Ethical Review Committee University of Health Sciences (UHS) Lahore.

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