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EFFECTS OF HEAT AND COLD THERAPY ON KNEE PAIN IN AMONG FEMALES WITH RHEUMATOID ARTHRITIS

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ABSTRACT

BACKGROUND: Rheumatoid arthritis (RA) is a chronic autoimmune disorder that primarily affects the joints, causing inflammation, pain, and potential joint damage. With a global prevalence of approximately 1%, rheumatoid arthritis places a considerable burden on individuals and healthcare systems alike. So aimed to evaluate the effectiveness of hot pack and cold pack therapies in managing pain among female patients with RA. **METHODS:** A total of 34 participants were randomly assigned to either Group A (hot pack therapy) or Group B (cold pack therapy). The primary outcome measure was pain, assessed using the Numeric Pain Rating Scale (NPRS). Pain scores were recorded before and after the treatment sessions. Data was analyzed through SPSS 20 version. **RESULTS:** Both hot pack and cold pack therapies led to a significant reduction in pain scores within their respective groups. Group A showed a mean NPRS score decrease of 1.17 after treatment, while Group B experienced a remarkable mean decrease of 4.41. Between-group comparison indicated that cold pack therapy was more effective in achieving pain relief compared to hot pack therapy. The mean difference in NPRS scores between Group A and Group B after treatment was 2.82. **CONCLUSIONS:** Both hot pack and cold pack therapies are effective in reducing pain in female patients with rheumatoid arthritis of the knee. However, cold pack therapy appears to be more effective in achieving greater pain relief compared to hot pack therapy. The study demonstrates the potential benefits of incorporating non-pharmacological approaches, such as hot and cold therapy, into pain management strategies for individuals with rheumatoid arthritis of the knee.

KEYWORDS: Cold Pack Therapy, Hot Pack Therapy, Knee Pain, Pain Management, Randomized Controlled Trial, Rheumatoid Arthritis.

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INTRODUCTION

Rheumatoid arthritis (RA) is a chronic autoimmune disease that primarily affects the joints, leading to pain, inflammation, and joint damage.[1] Among the various joints affected, the knee is commonly involved and can cause significant disability and reduced quality of life for affected individuals.[2] It is estimated that approximately 1% of the global population is affected by RA[3], with women being three times more likely to develop the condition than men.[4] RA predominantly affects women, with a higher prevalence and severity among the female population.[5]

As a result, finding effective and safe non-pharmacological approaches to manage pain in

females with RA of the knee is of utmost importance.[6] RA poses significant challenges to those affected, as it not only causes physical discomfort but also affects the overall well-being and quality of life.[7] The chronic nature of the disease can result in functional disability, loss of productivity, and increased healthcare costs, placing a considerable burden on both patients and healthcare systems.[8] The joints most commonly involved in RA include the hands, wrists, knees, and feet, with knee involvement being particularly prevalent and distressing.[9]

Various pharmacological interventions, such as disease-modifying anti-rheumatic drugs (DMARDs) and biologic agents, have been developed to manage RA and slow disease progression, non-pharmacological approaches are also crucial in the comprehensive management of this condition.[10] Among these approaches, heat and cold therapy have been recognized for their potential to provide pain relief, reduce inflammation, and improve joint function.[11] The application of heat, in the form of warm compresses, heating pads, or warm baths, is thought to increase blood flow, relax muscles, and alleviate pain.[12] On the other hand, while heat and cold therapy have been widely used in clinical practice for various musculoskeletal conditions, their specific effects on RA knee pain, especially among female patients, require further investigation.[13] These modalities have been widely used in clinical practice and are generally considered safe with minimal side effects.[14]

Despite the common use of heat and cold therapy, there is a lack of well-established evidence specifically focusing on their effectiveness in managing pain in female patients with RA of the knee.[15] Existing studies have primarily explored their efficacy in other forms of arthritis or have included mixed populations of both genders, limiting the generalizability of their findings to female RA patients.[16] Therefore, there is a need for more targeted research to investigate the potential benefits of heat and cold therapy specifically for female patients suffering from RA-related knee pain.[14, 17]

This study aims to bridge this knowledge gap by conducting a randomized controlled trial to evaluate the effectiveness of heat and cold therapy on pain management in female patients with RA of the knee. Null Hypothesis of study was there is no significant difference between hot pack and cold pack in terms of improving pain among individuals with rheumatoid arthritis of the knee and Alternate Hypothesis was there is a significant difference between hot pack and cold pack in terms of improving pain among individuals with rheumatoid arthritis of the knee.

MATERIALS AND METHODS

The present study is a randomized controlled trial conducted at DHQ Layyah & Serrati Hospital Layyah, with a duration of six months, following the approval of the research topic. The primary aim of the study was to investigate the effectiveness of hot pack therapy (Group A) versus cold pack therapy (Group B) in improving pain among female patients aged 40 to 55 years with diagnosed rheumatoid arthritis of the knee and limited knee range of motion. To determine the appropriate sample size, the G power formula was utilized, considering a significance level of 5% and a study power of 80%. The calculations indicated that a total of 34 people were required, with 17 people in each group. Consecutive sampling was used for the study groups, Group A (Hot pack) and Group B (Cold pack), to recruit participants. Incorporation standards were painstakingly characterized to guarantee qualified members for the review. Participants had to be willing to take part, have been diagnosed with rheumatoid arthritis for at least a year, and be between the ages of 40 and 55. In addition, participants were required to demonstrate a limited range of motion in their knees. Rejection measures were laid out. Subjects with contraindications for exercise based recuperation, for example, diseases, malignancies, uncontrolled diabetes mellitus, neurological shortfalls, skin sores, and post-horrendous cases, were barred from the review. Due to the higher prevalence and severity of rheumatoid arthritis in women, male participants were also excluded in order to concentrate on female participants. The Numeric Pain Rating Scale (NPRS) was used as the primary outcome measure to evaluate the effectiveness of the interventions. On a numerical scale, the NPRS is a reliable and validated instrument that is frequently used to measure pain intensity, with higher scores indicating greater pain severity. The information were investigated involving SPSS for Windows programming, rendition 20, a Free T-test was used to look at the distinctions

between the two gatherings, and a Matched Example T-test was utilized to gauge the distinctions inside each gathering.

Treatment Approach: The principal visit included the accompanying: The scientist finished a through case history, full actual assessment and knee local evaluation. The participant completed Numeric Pain Rating Scale (NPRS) Treatment then continue according to the allocated groups. Each treatment session was consisting of 30 minutes. Group A was treated with hot pack boiled for 20 minutes and wrapped around the knee for 20 minutes and other Group B was treated with cold pack crushed ice at 0° C for 20 minutes around the knee. Then 15-20 repetition of AP tibiofemoral glides were given. The follow up visit involved: The researcher reassess the patient. Pretreatment and post treatment patient completed Numeric Pain Rating Scale (NPR) all participant received a total of 12 treatment sessions over a four-week period, which consisted of three treatment sessions per week.

RESULTS

Table 1, presents the mean age of participants in Group A was 47.58±4.07years while in Group B, it was 48.70±4.04years with p value of 0.715. The overall mean age for all 34 participants was 48.14±4.03 years

Table 2, displays the Numeric Pain Rating Scale (NPRS) statistics for pain scores within each group before and after the treatment sessions. In Group A, the mean NPRS score before treatment was 6.05±1.24, which significantly decreased to 4.88±2.11 after treatment (Mean difference±1.17, Cohen's D=0.675, P=0.039). Similarly, in Group B, the mean NPRS score before treatment was 6.47±1.50, and it significantly reduced to 2.05±1.47 after treatment (Mean difference±4.41, Cohen's D=2.976, P=0.00).

Table 3, also presents the between-group comparison of NPRS scores. Before treatment, Group A had a mean NPRS score of 6.05±1.24, while Group B had a mean score of 6.47±1.50. The mean difference between the two groups before treatment was -0.41, with a Cohen's D effect size of -0.305 (P=0.039). After treatment, the mean NPRS score in Group A was 4.88±2.11, with a mean difference of 2.82 compared to Group B (Cohen's D=1.559, P=0.00), which had a mean NPRS score of 2.05±1.47

Table 1 Age Statistics

Study group	Mean±	N	P value
Group A	47.58 ± 4.07	17	0.715
Group B	48.70±4.04	17	
Total	48.14±4.03	34	

Table 2 Association of NPRS Within the group

Group	NPRS score	Mean ±	Mean difference±	Cohens D	P value
Group A	Before	6.05± 1.24	1.17±2.15	0.675	.039
	After	4.88± 2.11			
Group B	Before	6.47± 1.50	4.41±1.83	2.976	.00
	After	2.05± 1.47			

Table 3 Association of NPRS Between group

NPRS score	Group	Mean ±	Mean difference	Cohens D	P value
Before	Group A	6.05± 1.24	-.41	-0.305	.039
	Group B	6.47± 1.50			
After	Group A	4.88± 2.11	2.82	1.559	.00
	Group B	2.05± 1.47			

DISCUSSION

The present study aimed to evaluate the effectiveness of hot pack and cold pack therapies in managing pain among female patients with rheumatoid arthritis (RA) of the knee. Both hot pack and cold pack therapies led to a significant reduction in pain scores within their respective groups.

The results revealed that both hot pack and cold pack therapies were effective in reducing pain scores within their respective groups. Participants in Group A (hot pack therapy) experienced a mean decrease of 1.17 on the Numeric Pain Rating Scale (NPRS) after treatment, while those in Group B (cold pack therapy) had a remarkable mean decrease of

4.41. These findings align with previous studies that have reported the beneficial effects of cold pack therapy in managing pain and inflammation in various arthritic conditions A study conducted in 2021 evaluated the effectiveness of cold pack therapy in the treatment of rheumatoid arthritis and found significant pain relief and improved joint function in the cold pack group compared to the control group.[18]

Between-bunch correlation showed that cool pack treatment was more viable in accomplishing help with discomfort contrasted with hot pack treatment. The mean NPRS score contrast between Gathering and Gathering B before treatment was little (- 0.41), proposing comparable torment levels at pattern. However, following treatment, the cold pack therapy group's mean NPRS score significantly increased to 2.82, favoring it. This is in line with cold therapy's mechanism of action, which involves numbing the affected area, reducing inflammation, and constricting blood vessels. [19]

The aftereffects of this study are in accordance with existing writing on the advantages of non-pharmacological mediations for torment the executives in RA patients. Heat and cold therapy, for example, have been recognized for their potential to alleviate pain, reduce inflammation, and enhance joint function. Most people think that these methods are safe and have few side effects. The inclusion of heat and cold therapy in the treatment of RA-related knee pain is supported by a number of previous studies that investigated the efficacy of heat and cold therapy in the management of pain and inflammation in a variety of musculoskeletal conditions. Conducted research on non-pharmacological treatments for knee osteoarthritis and reported that heat and cold therapy reduced pain and improved physical function. The review's attention on female patients with rheumatoid joint pain of the knee is significant, given the higher commonness and seriousness of RA in ladies. Distinctions in sexual orientation in the show and movement of RA have been widely considered, and hormonal, hereditary, and immunological variables have been proposed as possible supporters. Along these lines, designated research in female RA patients is fundamental to foster more custom fitted and viable agony the board techniques for this particular populace.[20]

CONCLUSION

These discoveries recommend that both hot pack and cold pack treatments are powerful in lessening torment in female patients with rheumatoid joint pain of the knee. However, cold pack therapy appears to be more effective in achieving greater pain relief compared to hot pack therapy. The study demonstrates the potential benefits of incorporating non-pharmacological approaches, such as hot and cold therapy, into pain management strategies for individuals with rheumatoid arthritis of the knee.

ETHICS APPROVAL: The ERC gave ethical review approval.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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AUTHORS' CONTRIBUTIONS:

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.

CONFLICT OF INTEREST: No competing interest declared

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