

A Study to Assess the Effectiveness of Hot Water Therapy Among Elderly People with Joint Pain Living in Selected Areas of Mehsana District

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KEYWORDS

ABSTRACT

Joint pain, elderly, hot water therapy, pain management, non-pharmacological treatment, nursing care.

Background: Articular pain is a common problem in the elderly, profoundly influencing their quality of life. Many treatment options are available, but non-drug methods like hot water therapy have come under scrutiny for their effectiveness in alleviating pain and functional gain.

Methods: Quantitative research design was utilized, where 30 older people with joint pain were recruited. The data collection entailed demographic information and assessment of pain using a standard scale prior to and after the application of hot water. Descriptive statistics and inferential statistics were employed for data analysis, where frequency distribution, percentage analysis, mean, standard deviation, and chi-square test of association were applied.

Results: The pre-test results indicated that 40% of the participants had mild pain, 26.66% moderate pain, and 16.66% severe pain. The post-test indicated a considerable decrease in pain with 66.66% having no pain, 16.66% having mild pain, and none with severe or worst pain. A statistically significant difference between pre-test and post-test pain scores was noted ($p < 0.005$), indicating the effectiveness of hot water therapy.

Conclusion: Hot water treatment is an effective, safe, and readily available intervention to lower joint pain in joints in the elderly, enhancing their functional ability in performing activities of daily living. This research emphasizes the necessity of incorporating such non-pharmacological methods into regular nursing practice.

I. INTRODUCTION

Pain is a universal human phenomenon that differs in intensity and is conditioned by a host of factors like injury, disease, and emotional status. It is a protective mechanism of immense value that alerts the body to possible injury and causes associated physiological and behavioral reactions. Among the plethora of pain, joint pain is one of the most prevalent, particularly in the elderly. Joint pain can significantly impair mobility, independence, and quality of life and necessitates proper management techniques [1].

Older individuals are most susceptible to joint pain because of degenerative musculoskeletal alterations of aging, e.g., osteoarthritis, rheumatoid arthritis, and other inflammatory arthropathies. In India, joint pain is a disabling disease and is often associated with chronic disease states that compromise daily function. With a growing population of elderly individuals, the burden of joint pain will automatically rise, necessitating effective, low-cost, and safe interventions [2-3].

Traditional drug therapy, such as NSAIDs and analgesics, has been the mainstream treatment for joint pain. However, prolonged administration of such drugs is necessarily linked with side effects, particularly in older individuals with concomitant comorbid conditions like liver, renal, or cardiovascular disease. Hence, a growing interest now is in non-pharmacological therapy that can provide maximum relief of pain without the concomitant risk of side effects [4-5].

One of such interventions is hot water therapy, in which heat is used to apply to the involved joints to alleviate pain and discomfort. Heat therapy has been noted to induce vasodilation, enhance blood flow, relax muscles, and enhance flexibility. Heat therapy has been widely used in the management of musculoskeletal disorders like arthritis and arthralgia due to its efficacy in muscle relaxation and joint mobility improvement. Research has shown that thermotherapy, including hot water, can reduce the severity of pain, decrease inflammation, and enhance functional outcomes in arthralgia patients [6-7].

In view of the increasing prevalence of joint pain in the elderly and the potential of hot water therapy, the present study will assess its effectiveness in pain relief among elderly individuals who live in chosen areas of the Mehsana district. By comparing the pre- and post-intervention pain scores, the present study aims to validate the efficacies of hot water therapy as a simple, cost-effective, and non-surgical treatment for arthralgia management in older individuals. The findings of the present study can guide the development of non-pharmacological interventions for pain management, enhancing the mobility and quality of life of older individuals with arthralgia [8].

II. METHODS

Research Approach

Experimental research approach was used in this study to assess the efficacy of hot water therapy in reducing joint pain among the elderly. Research methodology is a scientific guide that directs the researcher in collecting, analyzing, and interpreting data in a scientific way. It assists in ensuring the study follows scientific rigor to enable valid and reliable findings. The used approach was aimed at measuring change in levels of joint pain objectively after the intervention to ensure empirical evidence informs the conclusion of the study.

Research Design

Pre-test and post-test experimental research design was used in this study. Participants were randomly assigned to the experimental group where the impact of hot water therapy on joint pain was established before and after the intervention. Pre-test was used to establish the level of pain in the baseline form using a numerical pain scale before the provision of hot water therapy as the intervention. After the provision of the therapy for a given period of time, post-test was utilized to measure change in pain levels, thus establishing the effectiveness of the intervention.

Variables

The study involved independent, dependent, and extraneous variables. Independent variable was hot water therapy since it was the intervention given to establish its impact. Dependent variable was joint pain, and it was measured before and after the intervention to establish any significant reduction in discomfort. Extraneous variables like age, occupation, number of births, and other ongoing interventions were also taken into consideration since they may have a potential effect on the findings of the study.

Study Setting and Population

The study was conducted in Mehsana district, Gujarat, and was targeted to elderly individuals with joint pain. The research setting was important in establishing the feasibility and effectiveness of the intervention. The population of interest was elderly individuals with joint pain, and the accessible population was individuals residing in the areas that were selected in Mehsana district and meeting the inclusion criteria.

Sample and Sampling Technique

60 elderly individuals with non-specific knee joint pain were selected as the sample for the study. The selection process utilized a simple random sampling method to ensure unbiased selection and maximize the generalizability of the findings.

Inclusion and Exclusion Criteria

The study included elderly individuals aged 60 years and older who were willing to be enrolled and had joint pain. Participants should be available at the time of data collection to be enrolled in the study. Exclusion was used on individuals who were unwilling to be enrolled or were not available at the time of data collection.

Data Collection and Tools

Data collection was conducted by gathering demographic data and assessing pain severity using a structured tool. The assessment tool consisted of two sections. The first section gathered demographic data, including age, gender, religion, duration of illness, and comorbidities. The second section used a numerical scale of 0 to 10 to assess the severity of joint pain. Zero equated to no pain, and 10 equated to the worst possible pain.

Validity and Reliability

To ensure validity and relevance, the data collection instrument was tested for validity and reliability. The numerical pain scale was employed as a standardized tool to measure pain levels objectively. Inter-rater was used to test reliability, which provided a reliability coefficient of $\pi = 0.07$. A pilot study was also undertaken to test the feasibility and efficacy of the approach.

Pilot Study

A pilot study was carried out on a small sample of elderly subjects with joint pain to test the feasibility, cost, and likely effectiveness of the intervention. The pilot study confirmed that hot water therapy was a feasible and effective method, reiterating the importance of conducting the full-scale study.

Data Collection Procedure

Formal consent was taken from the concerned authorities, including the principal and research committee of Nootan College of Nursing and the village sarpanch in Mehsana

district. The participants were chosen according to the inclusion criteria, and informed consent was taken from each participant. The baseline pain level was measured prior to initiating the intervention. Hot water therapy was given once a day for 10 to 15 minutes for 15 days. After the completion of the therapy sessions, a post-test was done on the sixteenth day through the numerical pain scale to check for any difference in pain levels. During the process, participants showed cooperation and maintained effective communication.

Data Analysis

Data gathered were statistically analyzed using descriptive and inferential statistical analysis. Descriptive statistics in the frequency distribution, percentage, mean, and standard deviation were used in presenting the results. Inferential statistics in the form of the chi-square test and paired t-test were used to determine differences in the intensity of pain before and after the intervention. Analysis findings indicated the efficacy of hot water therapy in the relief of joint pain among the elderly group.

III. RESULTS

This section reports the findings and interpretation of the data collected, which centers on the efficacy of hot water therapy in alleviating joint pain in the elderly. Descriptive and inferential statistics are used to analyze the findings to derive significant conclusions.

Demographic Characteristics of Participants

The sample comprised 60 older adults suffering from non-specific knee joint pain. Out of these, 41.66% were in the age range of 60–65 years, 33.33% were in the age range of 65–70 years, and 25% were above 70 years. The gender split was such that 58.33% were male, and 41.66% were female. The population split evenly between Hindu and Muslim subjects (50% each). Most of the participants had experienced joint pain for 0–5 months (75%), and 16.66% and 8.33% for 5–10 years and more than 10 years, respectively. Hypertension was the most prevalent comorbidity (58.33%), followed by diabetes mellitus (16.66%), cardiac conditions (8.33%), and other diseases (16.66%).

Table 1: Demographic Characteristics of Participants

Demographic Variables	Frequency (n)	Percentage (%)
Age Group		
60–65 years	25	41.66%
65–70 years	20	33.33%
Above 70 years	15	25%
Gender		
Male	35	58.33%

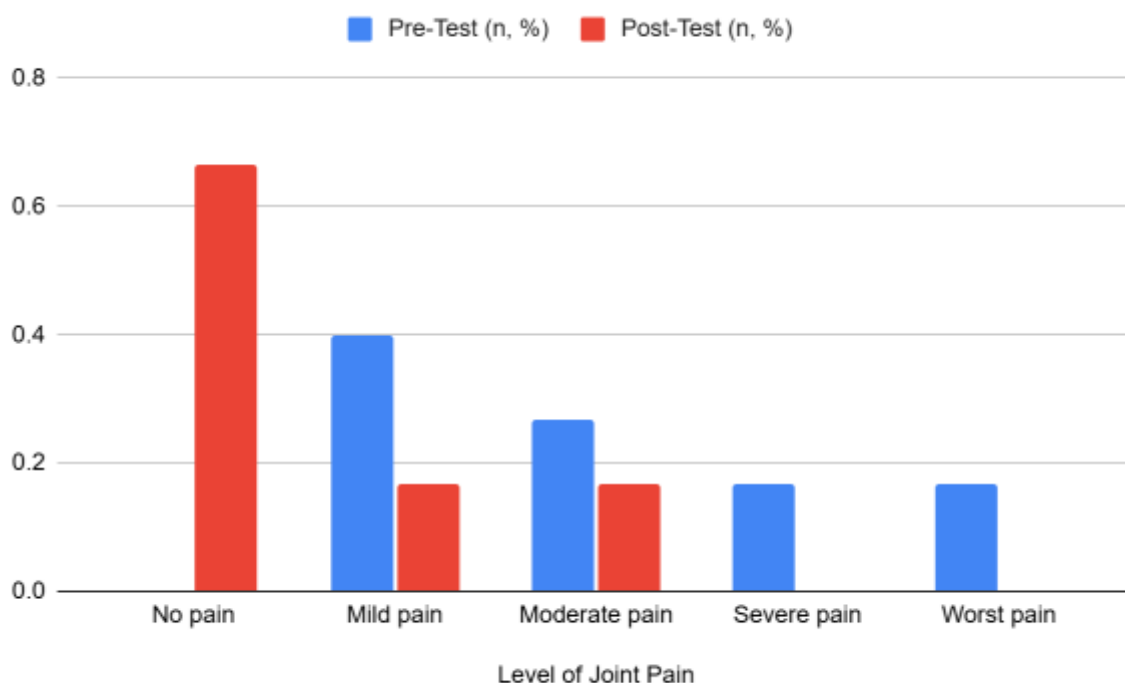
Female	25	41.66%
<i>Duration of Illness</i>		
0–5 months	45	75%
5–10 years	10	16.66%
Above 10 years	5	8.33%
<i>Comorbid Conditions</i>		
Diabetes mellitus	10	16.66%
Hypertension	35	58.33%
Cardiac disorders	5	8.33%
Other disorders	10	16.66%

Effect of Hot Water Therapy on Joint Pain

A pre-test and post-test comparison of pain levels showed a marked decrease in joint pain among participants who underwent hot water therapy. Before the intervention, 40% of participants had mild pain, 26.66% had moderate pain, 16.66% had severe pain, and 16.66% had the worst pain. After the intervention, 66.66% of participants had no pain, 16.66% had mild pain, and another 16.66% had moderate pain. No participant reported worst or severe pain following the therapy.

Table 2: Comparison of Joint Pain Levels Before and After Hot Water Therapy

Level of Joint Pain	Pre-Test (n, %)	Post-Test (n, %)
No pain	0 (0%)	20 (66.66%)
Mild pain	12 (40%)	5 (16.66%)
Moderate pain	8 (26.66%)	5 (16.66%)
Severe pain	5 (16.66%)	0 (0%)
Worst pain	5 (16.66%)	0 (0%)



Graph 1: Distribution of Joint Pain Levels Before and After Therapy

Mean and Standard Deviation of Pain Scores

Statistical comparison revealed a significant decrease in mean pain scores after the use of hot water therapy. Pre-test mean pain score was 5.633 (SD = 2.96), which decreased considerably to 2.85 (SD = 1.77) in the post-test. Statistical significance of the decrease was established using the paired t-test ($t = 6.261$, $p < 0.005$), proving the effectiveness of intervention.

Table 3: Mean and Standard Deviation of Pain Scores Before and After Therapy

Test	Mean Pain Score	Standard Deviation (SD)	T-Test Value	p-Value
Pre-Test	5.633	2.96	6.261	<0.005
Post-Test	2.85	1.77		



Graph 2: Mean and Standard Deviation of Pain Scores

Association Between Demographic Variables and Pain Reduction

The relationship between demographic factors and post-test pain intensity was examined using the chi-square test. The results indicated that age and illness duration had a significant impact on the outcome of pain reduction ($p < 0.05$). Gender, religion, and co-morbid conditions were not significantly related to post-test pain intensity.

Table 4: Association Between Demographic Variables and Post-Test Pain Levels

Demographic Variables	Chi-Square Value	Significance
Age	5.121	Significant ($p < 0.05$)
Religion	2.38	Not Significant
Gender	0.736	Not Significant
Duration of Illness	5.726	Significant ($p < 0.05$)
Comorbid Conditions	0.344	Not Significant

The research proved that hot water therapy significantly alleviates joint pain in the elderly. Pre-test measurement indicated a high incidence of moderate to severe pain, which reduced substantially after the intervention. The mean pain score decreased significantly, proving the effectiveness of the intervention. Age and duration of illness were also found to have a

significant effect on the outcome of pain reduction. The results conclude that hot water therapy is an easy, non-surgical, and effective approach to pain management in older people with joint pain.

IV. DISCUSSION

The results of this research underscore the efficacy of hot water therapy in alleviating joint pain in older adults, supporting the role of non-pharmacological interventions in pain relief. The pre-test evaluation indicated that a high percentage of participants had moderate to severe pain, which significantly reduced after the intervention, with 66.66% of them reporting no pain at all. This result concurs with previous literature highlighting the effectiveness of thermal therapy in alleviating musculoskeletal pain. Emmanuel et al. (2009) [9] have explained how thermotherapy improves joint mobility and also decreases stiffness in patients with osteoarthritis, corroborating the diminution of pain reported in the current study.

Arthralgia in elderly subjects is usually multifactorial in nature, with age-related degenerative changes, comorbidities, and chronicity of disease assuming significant roles. In the current study, the most common comorbidity (58.33%) was hypertension, followed by diabetes mellitus (16.66%) and cardiac disorders (8.33%). While post-test pain levels were not affected by comorbidities, earlier studies have indicated that there is a high association between chronic diseases and vulnerability to joint pain (Hutton, 1996) [11]. The results also illustrate a strong correlation between pain relief and the length of illness, which is consistent with the research conducted by Shanthi (2005) [10], showing that longer musculoskeletal conditions tend to result in more chronic pain, requiring early intervention measures.

The statistical computation revealed a dramatic decrease in the mean pain score from 5.633 to 2.85 following hot water therapy with a t-value of 6.261 and a p-value of <0.005, reflecting a significant therapeutic effect. The results concur with Mathew et al. (2009) [14], who found enhanced quality of life in South Indian patients with rheumatoid arthritis following non-pharmacological treatments. In addition, Kramer (2018) [15] highlighted that natural treatments like the application of heat enhance blood flow, increase joint mobility, and alleviate inflammation, further attesting to the efficacy of the intervention applied in this research.

Notwithstanding the benefits that were observed, demographic factors like gender and religion did not significantly affect pain reduction outcomes, indicating that hot water therapy is effective across all cases regardless of these factors. This is in line with the research conducted by Kelly et al. (2009) [12], which emphasized the need for uniform pain management strategies in multicultural patient populations. Furthermore, Machado et al.'s (1998) [13] study underscored the importance of educational intervention to encourage self-care practices among healthcare professionals, highlighting the application of simple, low-cost techniques like hot water therapy in elderly care.

In summary, the current study confirms the effectiveness of hot water therapy as a safe and efficient treatment for relief from joint pain in older adults. The results are consistent with existing literature pointing to the therapeutic value of thermal therapy in the management of pain. Based on the notable decline in pain intensity noted, the inclusion of hot water therapy in standard elderly care protocols may provide a useful, non-surgical means of enhancing

musculoskeletal well-being. Nonetheless, larger-scale research is justified in order to evaluate its long-term consequences and its possible incorporation in other forms of therapy.

V. CONCLUSION

In conclusion, this study validates the use of hot water therapy as a safe, non-invasive, and effective treatment for pain relief in older people. The considerable reduction in the level of pain after the intervention indicates the usefulness of this uncomplicated method in enhancing functional activity and mobility. The research underscores the necessity of integrating complementary therapies into daily nursing practice and highlighting the utility of non-pharmacological interventions in pain management. With its efficacy, hot water therapy can be incorporated into hospital, clinic, and community nursing care protocols to deliver holistic pain management. Additionally, nursing education must incorporate evidence-based complementary therapies for a broad range of pain management strategies. Nursing administrators may make training programs available and establish policies encouraging alternative therapies in patient care. Also, the research highlights the necessity of more research on the long-term advantage of hot water therapy and its extension to other musculoskeletal diseases. Broadening research in this field would help create standardized protocols for non-drug pain management, eventually enhancing the quality of life in older adults with joint pain.

VI. REFERENCES

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