A COMPARATIVE STUDY TO ASSESS THE EFFECTIVENESS OF EPSOM SALT WITH HOT WATER AND HOT WATER ONLY FOR JOINT PAIN AMONG OLD AGE PEOPLE IN A SELECTED RURAL AREA OF HARYANA

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Abstract

BACKGROUND: Knee pain in older adults is common the globe over. It is the second commonest reason for chronic pain and chronic pain is the most common reason for long-term disability. Various kinds of treatment are accessible for knee joint pain like pharmacological therapy, non-pharmacological therapy, and surgery. But the risk and side effects of non-pharmacological treatment are less as compared to other therapies and available at low cost also. Epsom salt with warm water is a treatment that reduces joint pain, inflammation and swelling and can be done easily at home.

OBJECTIVES: Objectives of the study were to: (1) To assess and compare the effectiveness of Epsom salt with hot water & hot water only on the joint pain among old age people who are exposed to Epsom salt with hot water (experimental group I) and who are exposed to hot water only (experimental group II). (2) To determine the association of joint pain among old age people who are exposed to Epsom salt with hot water (experimental group I) and to hot water only (experimental group II) with selected variables i.e. age, gender, education qualification, occupation, co-morbidity, duration of pain, exercise.

METHODS: Quantitative experimental research approach was used for the study. The research design adopted was a pre-experimental two-group pre-test and post-test design. The research setting selected for the study was village Assan, Rohtak, Haryana. The population was old age people above 50 years of age with knee joint pain. 60 samples, 30 in each group i.e., experimental group I (Epsom salt with hot water) and experimental group II (hot water only) were selected by purposive sampling technique. Tools used for data collection was structured interview schedule for sample characteristics and pain level was assessed by a global pain rating scale (standard tool). In the experimental group I intervention of Epsom salt with hot water application for 10 consecutive days twice a day for 20 minutes was given. In experimental group II hot water only, application was given for the same period and frequency as in experimental group I.

RESULTS: The major findings of the study were: The mean post-test joint pain scores 26.38 is lower than the mean pre-test joint pain scores 43.25 of experimental group I i.e., Epsom salt with hot water. (t=16.95, p<0.01 level of significance). The mean post-test joint pain scores 33.4 is lower than the mean pre-test joint pain scores 43.03 of experimental group II (hot water only). (t=28.57, p<0.01 level of significance). The mean post-test joint pain scores of experimental group I (Epsom salt with hot water) 26.38 is lower than the mean post-test joint pain scores of experimental group II (hot water only) 33.4. (t=4.54, p<0.01 level of significance). Chi-square test in both experimental group I (Epsom salt with hot water) & experimental group II (hot water only) indicates that there is no significant association between the post-test joint pain scores of old age people with their selected variables i.e., age, gender, education qualification, occupation, co-morbidity, duration of pain, exercise.

CONCLUSION: The study concludes that Epsom salt with hot water application is more effective as compared to hot water application only in reducing the joint pain among old age people.

Keyword: Epsom salt with hot water, hot water, joint pain, old age people.

INTRODUCTION

Knee joint pain is the most common joint pain in old age people which affects the daily life of an individual and hampers the job work also. It is not a particular disease but a symptom that may occur due to other disease conditions.

Treatment of knee joint pain includes pharmacological and non-pharmacological interventions. Pharmacological interventions include medicines or drugs. Non-pharmacological interventions include different types of therapies used to reduce the pain. And these interventions are inexpensive, safe, without or fewer side effects and some of the interventions can be done easily at home like hot and cold application therapy.

Nurses play a very important role in decreasing their suffering with knee joint pain. Nurses can spread awareness and educate non-pharmacological interventions in public so that at a low cost every suffered people can take benefit and adopt these home methods.

BACKGROUND

Knee pain affects approximately 25% of adults. The prevalence of knee pain has increased almost 65% over the past 20 years, accounting for nearly 4 million primary care visits annually.[1,2] The most common arthritis seen in India is age-related arthritis. In Indian females, the common age for the onset of knee problems is 50 years, in Indian males, it's 60 years. Over 15 crore Indians suffer from knee problems, out of which four crore need a total knee replacement (TKR), imposing a large health burden on the society and country. Even worse, the incidence of knee arthritis among Indians is believed to be up to 15 times higher than that found in Western nations.[3]

Non-pharmacological treatment strategies for acute musculoskeletal injury revolve around pain reduction and promotion of healing to facilitate a return to normal function and activity. In non-pharmacological methods warmth therapy helps in pain relief and increases in blood flow.[4] Most patients find that 20 to 30 minutes of warmth application on the knee provides maximum relief, additionally, starting the day with a hot bath or shower may be a quick and simple way to decrease morning stiffness.[5]

A scarcity of magnesium can contribute to dozens of health issues, including cardiovascular disease, high BP, high cholesterol, anxiety, fatigue, muscle cramping, and inflammation.[6] Epsom salt which is also known as magnesium sulphate helps in decrease inflammation, aid muscle and nerve function, and easily absorbed in skin.[7]

OBJECTIVES

The objectives of the study were to-
1. To assess and compare the effectiveness of Epsom salt with hot water & hot water only on the joint pain among old age people who are exposed to Epsom salt with hot water (experimental group I) and who are exposed to hot water only (experimental group II).
2. To determine the association of joint pain among old age people who are exposed to Epsom salt with hot water (experimental group I) and hot water only (experimental group II) with selected variables i.e. age, gender, education qualification, occupation, co-morbidity, duration of pain, exercise.

MATERIALS AND METHODS

Study design and population:
A quantitative experimental research approach with pre-experimental "two-group pre-test and post-test research design"

selected for this study. The research setting selected for the study was rural areas of Rohtak, Haryana (village Assan). Inclusion criteria of the samples were old age people who are having knee joint pain and above age of 50 years living in selected rural areas of Rohtak, Haryana. Exclusion criteria of samples were people who are taking regularly medications for pain and having severe neuropathies, burns, skin lesions on knee. The non-probability purposive sampling technique was used to select the subjects for the study. The sample comprises 60 old age persons. Thirty in experimental group I and thirty in experimental group II.

Data collection tool and technique:
The data collection tools used for the present study consists of two sections that are:

Section A: It consists of a structured interview schedule to know the sample characteristics i.e. age, gender, educational, occupation, co-morbidity, duration of pain, exercise.

Section B: It consists of a global pain rating scale (standardized tool) for assessing joint pain.
- The global pain scale has four specific categories, including a numeric rating scale, patient's emotional well-being, clinical outcomes, and patient's activity.
- Scoring of the tool: Each category worth 25 points. The maximum total score is 100.

Scoring was grade as:
- Mild pain- 0-33
- Moderate pain- 34-66
- Severe pain- 67-100

Method of data collection procedure:
Samples were selected using the non-probability purposive sampling technique. A total of 60 samples were taken 30 in each experimental group I and experimental group II. And samples were collected from different Mohalla i.e., experimental group II samples were collected from Gondra and Sauram and the experimental group I samples were collected from Chetram and Surtiya Mohalla. Consent was taken from the participants who are willing to participate in the study.
- First, by interview schedule collect the data about the demography of samples and also assess the level of pain, feeling clinical outcome, and activity by a global pain rating scale from experimental group II. The average time taken for the assessment of pain was 10-15 minutes.
- Then for experimental group II hot water only compression (The temperature of the boiling water is as tolerated by the client in between 45-50 *C) applied by creating a hot compress by dipping a sponge cloth in the boiling water, wringing it out, and applying, cover with plastic sheet and apply another layer of dry sponge cloth for 20 minutes over the knee joint, twice a day for consecutive 10 days. And the sponge cloth was changed every 3 minutes with two folded layers of cloth. Average time for the intervention of each individual was 25-30 minutes.
- And day 12th post-test assessment of joint pain was done by a global pain rating scale in experimental group II.
- Then for the experimental group I i.e., Epsom salt with hot water demographic data and level of joint pain was assessed by global pain rating scale on day 1.
- Experimental group I Epsom salt with hot water compression prepared by adding 2 tablespoons (approx. 30 grams) of Epsom salts to one litter of boiling water (The temperature of the boiling water is as tolerated by

the client in between 45-50 *C) and applied with the same method as in experimental group I for the same duration of time.

- Then day 12th post-test assessment of joint pain was done by global pain rating scale in the experimental group I.
- In both the groups 30 samples were divided into three small groups 10 in each group. Then intervention given one by one to each small group at different time.

RESULTS

The results of the findings were presented according to the objectives of the study and are organized under the following sections:

SECTION-1 FINDINGS RELATED TO THE SAMPLE CHARACTERISTICS

Data given in table 1 shows majority 14 (46.6 %) were in the age group of 60-69 years in both experimental groups I & II. In both groups majority of people were female which is 76.6 % and 60 % respectively. Most of the people were having illiterate 18 (60%) in experimental group I and 19 (63.3%) in experimental group II. The majority of the people who have participated in study mainly housewives 23 (76.6%) in experimental group I and 18 (60%) in experimental group II. In both experimental group I and experimental group II most of the people were having no co-morbidity which is 80 % and 83.3 % respectively. Considering the duration of pain, the majority of the people in the experimental group I 10 (33.3%) having less than 6 months and 14 (46.6%) in experimental group II. In both experimental group I and experimental group II most of the people do not exercise which is 80 % and 76.6 % respectively.

Table 1: Frequency and Percentage Distribution of Demographic Data of Sample Characteristics   N=60

S. No.	Sample characteristics	Experimental group I n=30		Experimental group II n=30		Total no. of participants N=60	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
1	**Age in year**						
	50-59	7	23.3 %	11	36.6 %	18	30 %
	60-69	14	46.6 %	14	46.6 %	28	46.6 %
	70-79	5	16.6 %	3	10 %	8	13.3 %
	80 & above	4	13.3 %	2	6.6 %	6	10 %
2	**Gender**						
	Male	7	23.3 %	12	40 %	19	31.6 %
	Female	23	76.6 %	18	60 %	41	68.3 %
3	**Education**						
	Illiterate	18	60 %	19	63.3 %	37	61.6 %
	Primary	10	33.3 %	6	20 %	16	26.6 %
	Secondary	2	6.6 %	5	16.6 %	7	11.6 %
4	**Occupation**						
	Housewife	23	76.6 %	18	60 %	41	68.3 %
	Private job	2	6.6 %	4	13.3 %	6	10 %
	Govt job	0	0 %	2	6.6 %	2	3.3 %
	Self –employed	3	10 %	4	13.3 %	7	11.6 %
	Unemployed	0	0 %	2	6.6 %	2	3.3 %
	Retired	2	6.6 %	0	0 %	2	3.3 %
5	**Co morbidity**						
	No	24	80 %	25	83.3 %	49	81.6 %
	Yes	6	20 %	5	16.6 %	11	18.3 %
	If yes, specify: HTN	3	50%	3	60%	6	54.5%
	DM	2	33.3%	0	0%	2	18.1%
	Asthma	1	16.6%	1	20%	2	18.1%
	Hypo-thyroidism	0	0%	1	20%	1	9.09%
6	**Duration of pain**						
	<6 months	10	33.3 %	14	46.6 %	24	40 %
	6 month-1 years	9	30 %	8	26.6 %	17	28.3 %
	1-2 year	8	26.6 %	3	10 %	11	18.3 %
	>2 year	3	10 %	5	16.6 %	8	13.3 %
7	**Exercise (Walking)**						
	No	24	80 %	23	76.6 %	47	78.3 %
	Yes	6	20 %	7	23.3 %	13	21.6 %

SECTION-2

Section 2(a): The subsection deals with the mean, median & standard deviation of pre-test and post-test joint pain score of old age people in the experimental group I and experimental group II. The data is depicted in table 2 and figure 1.

Table 2: Mean, Median, Standard Deviation of the Pre-Test and Post-Test Joint Pain Scores of Old age People in the Experimental Group I and Experimental Group II   N=60

GROUP	JOINT PAIN SCORE	MEAN	MEDIAN	STANDARD DEVIATION
Experimental group I (n=30)	Pre-test	43.25	44.25	6.61
	Post-test	26.38	28	5.62
Experimental group II (n=30)	Pre-test	43.03	42	6.47
	Post-test	33.4	32.25	5.07

Data are given in table 2 shows that both the experimental group I and experimental group II are homogenous as the mean pre-test joint pain scores of the experimental group I was 43.25 and the mean pre-test joint pain scores of the experimental group II is 43.03 which was almost same.

The data revealed that the mean post-test joint pain scores of the experimental group I 26.38 were lower than the pre-test joint pain scores of the experimental group I 43.25. The findings also revealed that the mean post-test joint pain scores of the experimental group I 26.38 were lower than the mean post-test joint pain scores of the experimental group II 33.4

The median of post-test joint pain score of experimental group I 28 was lower than the median of pre-test joint pain score of experimental group I 44.25. The finding also shows that the median of post-test joint pain score of experimental group I 28 was lower than the median of post-test joint pain score of experimental group II 32.25.

The SD of post-test joint pain scores of experimental group I was 5.62 less than the pre-test SD scores 6.61 of experimental group I.

Thus, it was found that the joint pain scores of both the experimental group I and II were similar in pre-test but in the post-test, joint pain scores of experimental group I had decreased more after the intervention of Epsom salt with hot water and experimental group II after intervention of hot water only.

SECTION 2 (b.1): This subsection deals with the areas of global pain rating scale in the experimental group I

Table 3 (A): Area Wise Joint Pain Score, Mean Percentage and Mean Percentage Reduced Pain Scores of Pre-Test and Post-Test Joint Pain Scores of Old age People in Experimental Group I   N=30

S. NO.	AREA	PRE-TEST		POST-TEST		REDUCTION IN SCORES		RANK ORDER
		Mean Score	Mean %	Mean Score	Mean %	Mean score	Mean %	
1.	Pain	14.63	58.52%	10.38	41.52 %	4.25	17 %	2
2.	Feelings	9.7	38.8 %	5.23	20.92 %	4.47	17.8%	1
3.	Clinical outcomes	8.63	34.52%	4.53	18.12 %	4.1	16.4 %	3
4.	Activities	10.28	41.12%	6.23	24.92 %	4.05	16.2 %	4

MAX. SCORE-25

The data presented in table 3 (a) and figure 1 indicates that in experimental group I, the lowest pre-test percentage mean score was in the area of clinical outcomes and the highest pre-test mean percentage was in the area of pain. There was a reduction of scores 17% in the area of pain: 17.88 % in the area of feelings; 16.4 % in the area of clinical outcomes; 16.2 % in the area of activities.
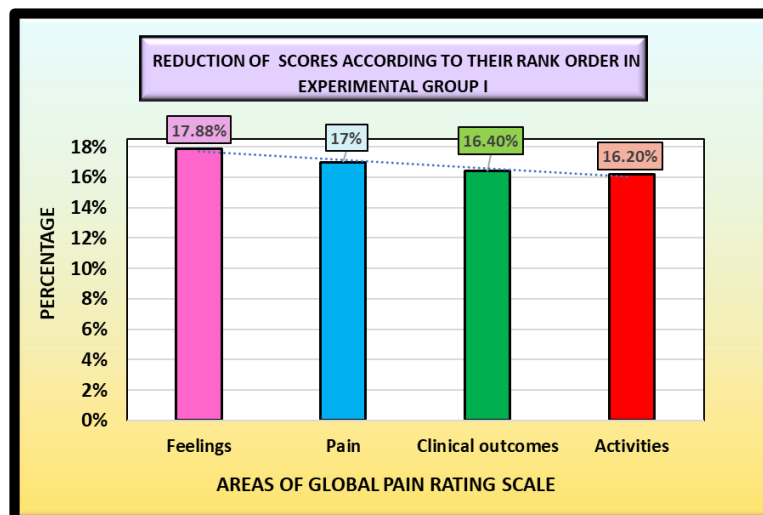

Figure 1: The column diagram showing area wise mean percentage reduction in joint pain scores according to their rank order in experimental group I

SECTION 2 (b.2): This subsection deals with the areas of global pain rating scale in the experimental group II

Table-3 (B): Area Wise Joint Pain Score, Mean Percentage and Mean Percentage Reduced Pain Scores of Pre-Test and Post-Test Joint Pain Scores of Old age People in Experimental Group II   N=30

S.NO	AREA	PRE-TEST		POST-TEST		REDUCTION IN SCORES		RANK ORDER
		Mean Score	Mean %	Mean Score	Mean %	Mean score	Mean %	
1.	**Pain**	14.65	58.6 %	11.66	46.64 %	2.99	**11.96 %**	**1**
2.	**Feelings**	9.6	38.4%	7.18	28.72 %	2.42	**9.68 %**	**2**
3.	**Clinical outcomes**	8.41	33.64%	6.33	25.32 %	2.08	**8.32 %**	**4**
4.	**Activities**	10.36	41.44%	8.21	32.84 %	2.15	**8.6 %**	**3**

MAXIMUM SCORE-25

The data presented in table 3 (b) and figure 2 indicates that in experimental group II, the lowest pre- test percentage mean score was in the area of clinical outcomes and the highest pre-test mean percentage was in the area of pain. There was a reduction of scores 11.96 % in the area of pain: 9.68 % in the area of feelings; 8.32 % in the area of clinical outcomes; 8.6 % in the area of activities.
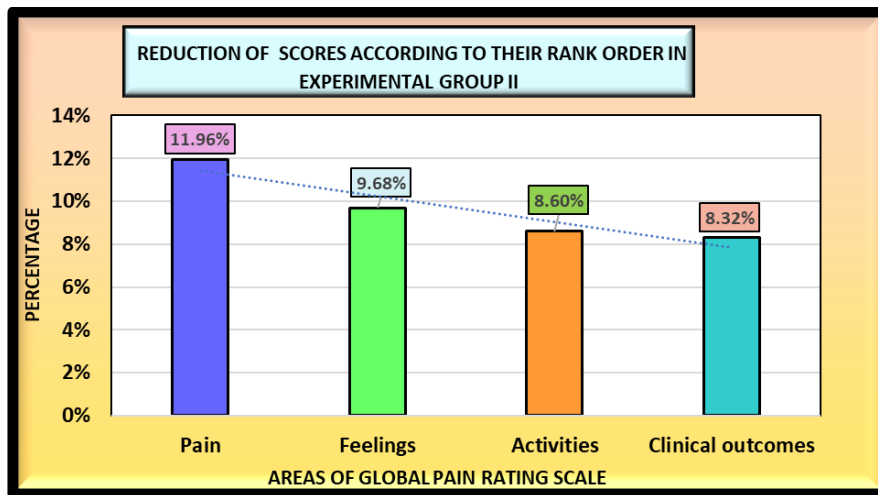

Figure 2: The column diagram showing area wise mean percentage reduction in joint pain scores according to their rank order in experimental group II

SECTION-2 (b.3): In the global pain rating scale, total score of scale is 100. The scores were divided into three levels that are mild pain, moderate pain, and severe pain which is depicted in table 4 (a) and figure 3 of experimental group I.

Table-4(A): Percentage of Pre-Test and Post-Test Joint Pain Scores of Experimental Group I According to Their Level of Pain   N=30

TEST	Mild pain		Moderate pain		Severe pain	
	No. of samples	% of samples	No. of samples	% of samples	No. of samples	% of samples
Pre-test joint pain scores of experimental group I (n=30)	02	6.66 %	28	93.33 %	0	0 %
Post-test joint pain scores of experimental group I (n=30)	27	90 %	03	10 %	0	0 %

The data presented in table 4(a) and figure 3 indicates that in the pre-test joint pain scores of experimental group I 6.66 % of old age people were having mild pain; 93.33% were having moderate pain and no one was having severe pain and the post-test joint pain scores indicates 90% people were having mild pain; 10% people were having moderate pain and no one was having severe pain. The data shows that there is a decrease in post-test joint pain scores as compared to pre-test joint pain scores of old age people in the experimental group I which is depicted in figure 3.
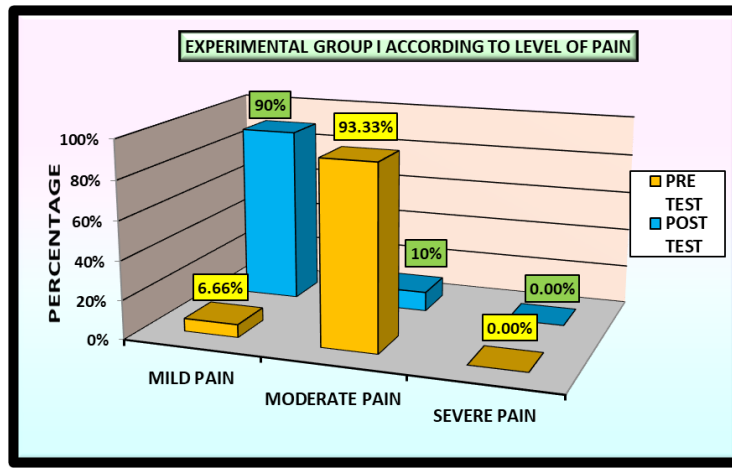
Figure 3: Bar diagram showing the percentage of pre-test and post-test joint pain scores of experimental group I according to their level of pain

SECTION-2 (b.4): In the global pain rating scale, total score of scale is 100. The scores were divided into three levels that are mild pain, moderate pain, and severe pain which is depicted in table 4 (b) and figure 4 of experimental group II.

Table-4 (B): Percentage of Pre-Test and Post-Test Joint Pain Scores of Experimental Group II According to Their Level of Pain
                                                                                          N=30

TEST	Mild pain		Moderate pain		Severe pain	
	No. of samples	% of samples	No. of samples	% of samples	No. of samples	% of samples
Pre-test joint pain scores of experimental group II (n=30)	03	10 %	27	90 %	0	0 %
Post-test joint pain scores of experimental group II (n=30)	17	56.66 %	13	43.33 %	0	0 %

The data presented in table 4 (b) and figure 4 indicates that in the pre-test joint pain scores of experimental group II 10 % of old age people were having mild pain; 90 % were having moderate pain and no one was having severe pain and the post-test joint pain scores indicates 56.66 % people were having mild pain; 43.33 % people were having moderate pain and no one was having severe pain. The data shows that there is a decrease in post-test joint pain scores as compared to pre-test joint pain scores of old age people in experimental group II which is depicted in figure 4.
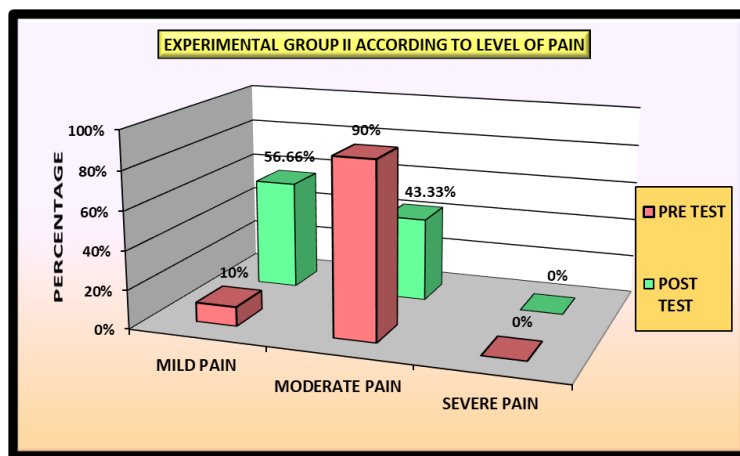

Figure 4: Bar diagram showing the percentage of pre-test and post-test joint pain scores of experimental group II according to their level of pain

SECTION 2 (c): This section describes 't' value of pre-test joint pain scores of experimental group i and experimental group ii of old age people on joint pain

Table 5: Mean, Mean Difference, (Sd$_d$), (Se$_{md}$) & 'T' Value of the Pre-Test Joint Pain Scores of Old Age People Between Experimental Group I & Experimental Group II.   **N=60**

Group	Joint pain scores	Mean	Mean difference	SD$_D$	SE$_{MD}$	't' value
Experimental Group I (n=30)	Pre-test	43.25	0.22	0.14	0.02	0.20*
Experimental group II (n=30)	Pre-test	43.03				

* t value for df (58) level=2.66, P<0.01= not significant at 0.01 level

The data presented in table 5 shows that the statistically calculated 't' value was (0.20) which less than the table value (2.66) for the degree of freedom 58 at 0.01 level of significance. Therefore, there is no difference in both the groups, and hence both the groups were homogenous.

SECTION 2 (d.1): This section describes 't' value of pre-test & post-test joint pain scores of experimental group i of old age people on joint pain

Table-6 (A): Mean, Mean Difference, (Sd$_d$), (Se$_{md}$) &'T' Value of the Pre-Test & Post-Test Joint Pain Score of Old Age People In The Experimental Group I.   **N=30**

Group	Joint pain score	Mean	Mean difference	SD$_D$	SE$_{MD}$	't' value
Experimental Group I (n=30)	Pre-test	43.25	16.87	0.99	0.18	16.95*
	Post-test	26.38				

* t value for df (29) level=2.75 P<0.01= significant at 0.01 level

The data presented in table 6 (a) shows that the statistically calculated "t" value (16.95) was greater than the table value (2.75) for the degree of freedom 29 at 0.01 level of significance. Thus, it was established that the difference obtained in the mean pre-test & post-test joint pain scores in experimental group I is a true difference & not by chance. This shows that Epsom salt with hot water was effective in reducing joint pain among old-age people.

SECTION 2 (d.2): This section describes 't' value of pre-test & post-test joint pain scores of experimental group ii of old age people on joint pain

Table-6 (B): Mean, Mean Difference, (Sd$_d$), (Se$_{md}$) &'T' Value of the Pre-Test & Post-Test Joint Pain Score of Old Age People in Experimental Group II.   **N=30**

Group	Joint pain score	Mean	Mean difference	SD$_D$	SE$_{MD}$	't' value
Experimental Group II (n=30)	Pre-test	43.03	9.63	1.4	0.26	28.57*
	Post-test	33.4				

* t value for df (29) level=2.75, P<0.01= significant at 0.01 level

The data presented in table 6 (b) shows that the statistically calculated "t" value (28.57) was greater than the table value (2.75) for the degree of freedom 29 at 0.05 level of significance. This shows that hot water only was effective in reducing joint pain among old age people.

SECTION 2 (e): This section describes 't' value of post-test joint pain scores of experimental group i and experimental group ii of old age people on joint pain

Table 7: Mean, Mean Difference, (Sd$_d$), (Se$_{md}$) & 'T' Value of the Post-Test Joint Pain Scores of Old age People Between Experimental Group I & Experimental Group II. N=60

Group	Joint pain scores	Mean	Mean difference	SD$_D$	SE$_{MD}$	't' value
Experimental Group I (n=30)	Post-test	26.38	7.02	0.55	0.1	4.84*
Experimental group II (n=30)	Post-test	33.4				

* t value for df (58) level=2.66, P<0.01= significant at 0.01 level

The data presented in table 7 shows that the statistically calculated 't' value of 4.84 was greater than the table value 2.66 for the degree of freedom 58 at 0.01 level of significance. This shows that Epsom salt with hot water was more effective in reducing joint pain as compared to the hot water only intervention of old age people.

SECTION-3 (a): This section deals findings related to association between post-test joint pain scores of old age people in experimental group i with selected factors

Table-8 (A): Chi-Square Value Showing the Association Between Post-Test Joint Pain Scores with Selected Factors of Old age People in the Experimental Group I   N=30

S. No.	Selected variables	Below-median	Above Median	Df	Obtained Chi-Square value (X^2)	Table value of Chi-square	Significance/not significance
1.	**Age (in Years)**			3	1.74	11.34	Not significance
	50-59	3	4				
	60-69	9	6				
	70-79	2	2				
	80 & above		3				
2.	**Gender**			1	0.05	6.6	Not significance
	Male	4	3				
	Female	12	11				
3.	**Education Qualification**			2	1.87	9.21	Not significance
	Illiterate	9	9				
	Primary	5	5				
	Secondary	2	0				
4.	**Occupation**			3	0.24	11.34	Not significance
	Housewife	12	11				
	Private job	1	1				
	Self-employed	2	1				
	Retired	1	1				
5.	**Co-morbidity**			1	1.20	6.63	Not significance
	No	14	10				
	Yes	2	4				
6.	**Duration of pain**			3	1.21	11.34	Not significance
	<6 months	6	4				
	6-1 year	4	5				
	1-2 year	5	3				
	>2 year	1	2				
7.	**Exercise (walking)**			1	2.71.	6.63	Not significance
	No	11	13				
	Yes	5	1				

The data given in the table 8 (a) shows that there is no significant association between the post-test joint pain scores of old age people in the experimental group I & selected factors at 0.01 level of significance. This indicates that pain did not depend on selected factors. The pain is independent on its own, & not influenced by the selected factors.

SECTION-3 (b): This section deals findings related to association between post-test joint pain scores of old age people in experimental group ii with selected factors

Table-8 (B): Chi-Square Value Showing the Association Between Post-Test Joint Pain Scores with Selected Factors of Old Age People in Experimental Group II   N=30

S. No.	Selected variables	Below-median	Above Median	Df	Obtained Chi-Square value (X^2)	Table value of Chi-square	Significance/not significance
1.	**Age (in Years)**			3	5.64	11.34	Not significance
	50-59	8	3				
	60-69	5	9				
	70-79	1	2				

	80 & above	0	3				
2.	**Gender**			1	0.20·	6.63	**Not significance**
	Male	5	7				
	Female	9	9				
3.	**Education Qualification**			2	0.25	9.21	**Not significance**
	Illiterate	10	9				
	Primary	3	3				
	Secondary	2	3				
4.	**Occupation**			4	1.87	13.28	**Not significance**
	Housewife	9	9				
	Private job	2	2				
	Govt. job	1	1				
	Self-employed	2	2				
	Unemployed	2	0				
5.	**Co-morbidity**			1	1.71	6.63	**Not significance**
	No	13	12				
	Yes	1	4				
6.	**Duration of pain**			3	3.61	11.34	**Not significance**
	< 6 months	7	7				
	6-1 year	3	1				
	1-2 year	2	5				
	>2 year	1	4				
7.	**Exercise(walking)**			1	3.91	6.63	**Not significance**
	No	9	14				
	Yes	7	0				

The data given in the table 8 (b) shows that there is no significant association between the post-test joint pain scores of old age people in the experimental group II & selected factors at 0.01 level of significance. This indicates that pain did not depend on selected factors. The pain is independent on its own, & not influenced by the selected factors.

DISCUSSIONS

- The findings of the study revealed that the Epsom salt with hot water and hot water only was effective to decrease the level of pain of old age people. In this section, the major findings of the present study have been discussed with the result obtained by the other researchers.

Effectiveness of Hot Water only Application to Reduce the Joint Pain

The findings of the present study indicates that hot water application twice a day for 20 minutes of duration consecutively 10 days is effective to reduce the joint pain.

The findings of the present study are in conformity with the findings of the study conducted[8] which showed that 20-minute heat application every other day decreased pain and disability of the patients with knee osteoarthritis. Also, heat application was found to improve the subdimensions of quality-of-life scores of physical function, pain, and general health perception of patients.

The findings of the present study are in conformity with the findings of the study conducted[9], which showed that out of the total geriatric population surveyed 48% had knee joint pain. And the intensity of knee joint pain and intake of painkiller was reduced significantly in the experimental group (Moist heat was applied at the knee joint twice a day for seven days) as compared to the control group (No treatment given). The use of moist heat application is recommended for home base management of knee joint pain.

Effectiveness of Epsom Salt with Hot Water Application to Reduce the Joint Pain

The findings of the present study indicates that Epsom salt with hot water application twice a day for 20 minutes of duration consecutively 10 days is effective to reduce the joint pain.

The findings of the present study are consistent with the findings of the study conducted [10], which revealed that the hot water application with Epsom salt has shown a highly significant difference (t=39.41 at p<0.0001) between pre-test and post-test with a mean +SD of 2.68± 0.67. Hence it is concluded that the hot water application with Epsom salt is effective among urban women who suffer from mild and moderate knee joint pain.

The findings of the present study are confirmatory with the findings of the study conducted[11], whose findings showed that the clients in the experimental group (Hot water compress with Epsom salt for 10 days continuously given) 58% of reduction in pain levels as compared to the clients in the control group (Routine intervention) who had 3% of pain reduction. And the study concluded that hot water compress with Epsom salt helps to relieve muscle pain, and it will be economical, culturally accepted, it can be practiced safely at home and it has fewer side effects as compared to pharmacological intervention.

Effectiveness of Epsom Salt with Hot Water as Compared to Hot Water only to Reduce the Joint Pain
The findings of the present study indicates that Epsom salt with hot water application is more effective as compared to hot water application to reduce the joint pain.

The findings of the present study are in conformity with the findings of the study conducted[12,] which showed that the mean score of post-test for plain hot water fomentation was 4.4 and the hot water with Epsom salt fomentation mean score of post-test is 2.46, mean difference of post-test is 1.94, with Standard deviation 1.13, standard deviation error 0.27 and calculated "t" value is 7.15 is more than tabulated p" value (2.00) at 0.05 level of significance. Findings revealed that hot water with Epsom salt fomentation is more effective than plain hot water fomentation in reducing knee joint pain among the elderly.

The findings of the present study are in conformity with the findings of the study conducted[13], which revealed that the mean of pain score in post-intervention of Epsom salt compress (1.900) was lower than their mean of pain score in post-intervention of Plain water compress (4.93). The obtained mean difference is found to be statically significant (p <0.001) as evident from obtained "t´´ value 9.02 for df 58. Thus, the difference obtained in the mean of pain score of Epsom salt compress was found effective in reducing the joint pain of patients.

CONCLUSION
Based on the findings, it is concluded that both the groups were homogenous and having almost similar sample characteristics and in both the groups significant difference in the reduction of the level of pain. But the reduction of the level of pain was more in Epsom salt with hot water intervention as compared to hot water only intervention which indicates that Epsom salt with hot water is more effective as compared to the hot water application in reducing the joint pain among old age people. There is no significant association between post-test joint pain scores of old age people with selected variables i.e. age, gender, education, occupation, co-morbidity, duration of joint pain, exercise in both groups which indicates that pain is independent on its own and did not depend on selected variables.

Conflicts of interest: The authors declare that there are no conflicts of interest.

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