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A TRUE EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF HOT WATER APPLICATION WITH EPSOM SALT VERSUS HOT WATER APPLICATION ON THE LEVEL OF KNEE JOINT PAIN AMONG GERIATRICS IN SELECTED AREA AT KARUNGAL KANYAKUMARI DISTRICT TAMILNADU

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ABSTRACT

Knee joint pain is a common musculoskeletal problem among the geriatric population, significantly affecting their mobility and quality of life. This study aimed to assess the effectiveness of hot water application with Epsom salt versus hot water application alone on the level of knee joint pain among geriatrics in a selected area at Karungal, Kanyakumri District.

A true experimental research design with a quantitative evaluative approach was adopted. The study included three groups: control group, experimental group I (hot water application with Epsom salt), and experimental group II (hot water application alone). The independent variables were hot water application with Epsom salt and hot water application, while the dependent variable was the level of knee joint pain.

Data were collected using a structured interview schedule, including demographic variables and a numerical pain rating scale. The tool's reliability was confirmed using the test-retest method (r = 0.9). A pilot study established feasibility. The conceptual framework was based on the Gate Control Theory by Melzack and Wall.

The findings revealed a significant reduction in knee joint pain levels in both experimental groups compared to the control group. However, experimental group I showed greater effectiveness than experimental group II. Statistical analysis (unpaired 't' test) indicated a significant difference between the two interventions. There was no significant association between post-test pain levels and selected demographic variables.

The study concluded that hot water application with Epsom salt is more effective than hot water application alone in reducing knee joint pain among geriatrics. The intervention is simple, cost-effective, and can be recommended as a non-pharmacological method for pain management in elderly individuals.

Key words: Knee joint pain, Geriatrics, Hot water application, Epsom salt, Non-pharmacological intervention, Pain management, Musculoskeletal disorders, Numerical pain rating scale, Gate Control Theory, Experimental study, Elderly care, Hydrotherapy

INTRODUCTION

Ageing is an inevitable and natural process that every individual experience at their own pace and time. Broadly, ageing encompasses all the changes that occur throughout the lifespan, beginning from birth, continuing through growth and development, and culminating in maturity and later life. While youth often perceive ageing as a distant and even exciting phase, middle age marks the onset of visible changes such as greying hair, wrinkled skin, and gradual physical decline. Regardless of one's health or physical fitness, these changes are unavoidable. As individuals advance in age, progressive physical deterioration and functional limitations become evident, often leading to increased dependency during old age.

According to the World Health Organization, ageing is a biological reality that begins at conception and continues until death. Although it is a natural process beyond human control, societal perspectives significantly influence how ageing and old age are perceived. In many developed nations, the age of 60 is commonly regarded as the beginning of old age and is often associated with retirement.

Ageing brings about various structural and functional changes in the body. Alterations in posture and gait are common, often resulting in slower and less stable movement. As per the Census of India 2011, there are approximately 104 million elderly individuals (aged 60 years and above) in India, including 53 million females and 51 million males. Reports from the United Nations Population Fund and HelpAge India project that this number will rise to 173 million by 2026. With 7.7% of its population aged above 60 years, India is increasingly being recognized as an "ageing nation."

Advancing age is closely associated with an increased prevalence of health issues, particularly degenerative changes affecting the musculoskeletal system. There is a gradual reduction in the number and size of muscle fibres, leading to decreased muscle strength and tone. These changes contribute to reduced mobility, balance difficulties, and a cautious pattern of movement among older adults. Additionally, ageing is characterized by

diminished physiological reserves, making individuals more susceptible to diseases and functional dependency.

Multiple organ systems undergo age-related changes. The cardiovascular system experiences reduced elasticity, fibrotic valve changes, and vascular stiffening, often resulting in hypertension. Although the digestive system is relatively less affected, gastric emptying slows down and stomach capacity decreases. In the urinary system, bladder capacity diminishes, leading to increased frequency of urination. The skin becomes thinner, less elastic, dry, and wrinkled, with long-term sun exposure accelerating these changes. Sensory functions also decline, including vision, hearing (especially high-frequency sounds), taste, and smell.

Normal ageing is further characterized by a decline in bone density and muscle mass, accompanied by increased body fat. Reduced muscle strength increases the risk of fractures, frailty, and loss of independence, ultimately affecting quality of life. These musculoskeletal changes are influenced by genetic, environmental, dietary, and lifestyle factors. Accumulation of toxins and reduced physical activity further contribute to functional impairment.

Among the various health concerns in older adults, knee joint pain is a significant issue and a major contributor to disability. It affects mobility, limits activities of daily living, and has psychological and socioeconomic implications, including distress, reduced self-esteem, and social isolation. The loss of muscle mass and strength further impairs locomotion, leading to slower, shorter, and unstable gait patterns, along with reduced arm movement. Elderly individuals often experience fatigue and decreased energy, resulting in frequent discomfort and pain.

Pain itself is a complex sensory and emotional experience and plays a crucial role in the body's defense mechanism. Derived from the Latin word *poena*, meaning punishment or penalty, pain is defined by the International Association for the Study of Pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Pain can vary in intensity and may be described as sharp, dull, throbbing, or burning. It can be classified as acute or chronic, where acute pain serves a protective function, while chronic pain persists without serving a beneficial purpose.

Knee joint pain is a common musculoskeletal complaint affecting a large proportion of the population. It is not a disease in itself but a symptom resulting from various underlying conditions. In many cases, even thorough medical evaluation fails to identify a specific cause. Knee pain significantly contributes to disability and is a leading cause of reduced productivity and quality of life.

To manage knee joint pain, various complementary and alternative therapies are utilized, including acupuncture, massage, yoga, chiropractic care, herbal medicine, and heat or cold applications. Among these, hot water application with Epsom salt is considered a simple, cost-effective, and practical intervention. It provides clinically meaningful relief in both short- and long-term management of knee joint pain.

Heat therapy works by stimulating temperature-sensitive receptors in the skin, sending signals to the hypothalamus and cerebral cortex, which regulate body temperature. This process helps reduce pain through the "gate control" mechanism, where stimulation of large nerve fibres inhibits pain transmission from smaller fibres. Additionally, heat promotes muscle relaxation, reduces stiffness, and alleviates spasms. Epsom salt, rich in magnesium, may further help in reducing inflammation, swelling, and pain while aiding in the removal of toxins from the body.

Thus, hot water application with Epsom salt serves as an effective non-pharmacological approach for managing knee joint pain among the geriatric population.

NEED FOR STUDY

The global elderly population is increasing rapidly. According to the World Health Organization, the number of people aged 60 years and above is expected to reach 2 billion by 2050, rising from 900 million in 2015, with most living in low- and middle-income countries. India is also experiencing significant ageing, with the elderly population projected to increase from 8% in 2010 to 19% by 2050, making it one of the countries with the largest ageing populations.

Knee joint pain is a common health problem, affecting nearly 80% of individuals at some point in life. Among the elderly, it is a major concern, often becoming chronic and affecting 7 to 13% of older adults. The pain may vary from mild to severe and can extend to surrounding areas such as muscles and bones. Globally, the prevalence of chronic pain ranges from 12% to 80%, with higher rates in developing countries. In India, the lifetime prevalence of knee joint pain among older adults ranges from 59% to 90%, with women being more affected. It is estimated that about 4 million hospital visits annually are related to knee joint pain, highlighting its significant impact on health and quality of life.

Aswin Kumar Das (2018) reported that the prevalence of knee joint pain in rural communities was 29.7%, with significant risk factors such as age above 50 years, female gender, higher BMI, low socioeconomic status, and activities like kneeling or squatting. The study highlighted that nearly one in three individuals suffers from knee joint pain.

Salve H. et al. (2010) conducted a study among women above 40 years and found that 47.3% were affected by knee joint pain. The prevalence increased with age, and less than half of the affected individuals sought treatment, indicating the need for awareness, prevention, and rehabilitation strategies.

Mathur A. (2007) emphasized the importance of home-based geriatric services, including health education and community care under national health programs. Training health workers like ASHA and promoting home remedies were suggested as key strategies for elderly care.

Epsom salt (magnesium sulphate) is known for its therapeutic benefits, including muscle relaxation, pain relief, and reduction of inflammation. It is effectively absorbed through the skin, making it useful in managing knee joint pain through simple methods like soaking or compress application.

With the increasing elderly population and high prevalence of knee joint pain, especially in developing countries, there is a growing need for simple and cost-effective interventions. Field observations revealed that many elderly individuals suffer from knee-related problems affecting their quality of life. Hence, the present study aims to assess the effectiveness of hot water application with Epsom salt versus hot water application alone in reducing knee joint pain.

STATEMENT OF THE PROBLEM

A True Experimental Study to Assess the Effectiveness of Hot Water Application with Epsom Salt Versus Hot Water Application on the Level of Knee Joint Pain among Geriatrics in Selected area at Karungal, Kanyakumri District.

OBJECTIVES

- To assess the pre-test and post-test levels of knee joint pain among geriatrics in control and experimental groups.
- To evaluate the effectiveness of hot water application with Epsom salt in reducing knee joint pain.
- To evaluate the effectiveness of hot water application alone in reducing knee joint pain.
- To compare the effectiveness of hot water application with Epsom salt and hot water application alone.
- To determine the association between post-test knee joint pain and selected demographic variables.

RESEARCH METHODOLOGY

According to Beck (2014), research methods are the techniques used by researchers to design a process and to collect and analyze data related to a research problem. Methodology is an essential component of research, as it helps in systematically organizing the procedures for obtaining reliable and valid information.

It provides a clear description of the methodology and the steps followed in collecting and organizing data. It includes the research approach, research design, variables, population, sample and sample size, sampling method and technique, sampling criteria, and setting. It also explains the development and description of the tool, along with its validity and reliability. In addition, it outlines the pilot testing, data collection procedure, plan for data analysis, and ethical considerations.

RESEARCH TOOL AND TECHNIQUE:

The research tool refers to the instrument used by the researcher to collect data. In this study, a structured interview schedule and Numerical Pain Rating Scale were used to assess the level of knee joint pain among geriatrics.

The tool consisted of two sections:

Section - 1: Demographic Variables

This section deals with the demographic information of the geriatrics such as age in years, gender, religion, education, monthly income in rupees, previous employment status, current working status, dietary preference, and duration of knee joint pain.

Section - 2: Numerical pain scale

A Structured Numerical Pain Rating Scale was employed to assess pain intensity. The scale ranged from 0 as the minimum score to 10 as the maximum score.

Description	Score
No pain	0
Mild Pain	1-4
Moderate Pain	3-5

The tool was validated by experts in community health nursing and a medical officer. Reliability was established using the test-retest method and Karl Pearson correlation coefficient, which showed a reliability value of $r = 0.9$, indicating high reliability.

The technique used for data collection was structured interview method. Simple random sampling was used to select 90 participants, divided into control group, experimental group 1, and experimental group 2, with 35 in each group.

Hot water application with Epsom salt was given to experimental group 1, hot water application alone to experimental group 2, and no intervention for the control group. Pre-test and post-test assessments were conducted using the same pain scale to evaluate effectiveness.

DATA ANALYSIS AND INTERTRETATION

Data analysis is a systematic process of organizing and synthesizing data in order to answer research questions and test hypotheses (Polit and Beck). Interpretation refers to drawing meaningful conclusions or inferences after careful examination of the collected data (Nirmala, 2004).

The present analysis was carried out to assess the level of knee joint pain among geriatrics in control and experimental groups. The collected data from demographic variables and the Numerical Pain Rating Scale were coded, organized, tabulated, and analyzed using descriptive and inferential statistics in accordance with the objectives of the study. The analysis was performed manually by the investigator and verified by a biostatistician. A p-value of less than 0.05 was considered statistically significant.

The data analysis was presented under appropriate headings based on the study objectives.

The data analysis is presented as follows:

Section I: Data related to selected demographic variables of geriatrics in the control group, Experimental Group 1, and Experimental Group 2.

Section II: Data related to comparison of pre-test and post-test levels of knee joint pain among geriatrics in the control group, Experimental Group 1, and Experimental Group 2.

Section III: Data related to the effectiveness of hot water application with Epsom salt on the level of knee joint pain among geriatrics in Experimental Group 1.

Section IV: Data related to the effectiveness of hot water application on the level of knee joint pain among geriatrics in Experimental Group 2.

Section V: Data related to comparison of the effectiveness of hot water application with Epsom salt versus hot water application on the level of knee joint pain among geriatrics in Experimental Group 1 and Experimental Group 2.

Section VI: Data related to the association between post-test level of knee joint pain and selected demographic variables among geriatrics in the control group, Experimental Group 1, and Experimental Group 2.

S.No	Demographic Variables	Control Group (n=35)		Experimental Group 1 (n=35)		Experimental Group 2(n=35)	
		f	%	f	%	f	%
1.	Age in Years a) 60-65	22	72	8	28	17	65
	b) 65-70	6	17.2	8	30	7	27
	c) 70-75	3	12.7	7	20	2	9
	d) 75-80	0	0	5	25	2	3.2
	e) 80 and above	0	0	0	0	0	0
2.	Gender a) Male	17	53.9	14	55	18	53.2
	b) Female	15	47	16	49	13	45.2
3.	Religion a) Hindu	25	85	18	54.7	23	72
	b) Muslim	0	0	0	0	0	0
	c) Christian	12.3	5	12	44.5	7	32
	d) Others	0	0	0	0	0	0
4	Education	24	75.7	20	62.5	17	66

	a) Literate						
	b) Primary	4	17.2	4	15.6	8	22.6
	c) Secondary	3	6.8	3	12.7	6	16.3
	d) Higher Secondary	0	0	3	5.7	0	0
	e) Undergraduate	0	0	0	0	0	0
	f) Postgraduate and above	0	0	0	0	0	0
5	Previous Employment Status a) Sedentary Work	5	10	4	16.9	5	14
	b) Moderate Work	5	12.6	14	53	8	25.6
	c) Heavy Work	24	77.7	9	34.2	18	62.8
6	Current Working Status a) Sedentary Work	6	12.5	7	21	5	12.4
	b) Moderate Work	8	22.4	15	55.6	11	32.6
	c) Heavy Work	18	64.4	8	25.2	17	52.5
7	Monthly Income in Rupees a) <10,000	23	62.8	6	22.8	15	52.7

	b) 10,000-15,000	4	12.5	14	52	23	70
	c) 15,000-20,000	5	13.2	8	32	7	20
	d) 20,000-25,000	0	0	0	0	0	10
	e) 25,000 and above	0	0	0	0	0	0
8	Dietary Preference a) Vegetarian	5	13.5	11	43	6	17.3
	b) Non- Vegetarian	25	87.5	18	65	24	82
9	Duration of knee joint pain a) Less than 1 year	25	75	23	73	20	75
	b) 1-3 years	4	9	7	24.4	7	22
	c) 4-5 years	4	12	3	7	2	9
	d) More than 5 years	0	0	0	0	0	0

Table 1: Data related to selected demographic variables

The demographic distribution of participants in the control group, experimental group 1, and experimental group 2 (n = 30 in each group) reveals both similarities and slight variations across the selected variables. In terms of age, the majority of participants in the control group (72%) and experimental group 2 (65%) belonged to the 60–65 years category, indicating that most respondents were in the early elderly stage. In contrast, experimental group 1 showed a comparatively wider age spread, with equal representation in the 60–65 and 65–70 years categories (28% and 30%, respectively), and a notable proportion also in the 75–80 years group (25%). Very few participants were above 75 years in the control group, and no participants in any group were aged 80 years and above, suggesting limited inclusion of the very old population.

Regarding gender, the distribution was fairly balanced across all three groups, with males slightly outnumbering females. The proportion of males ranged from approximately 53% to 55%, while females constituted about 45% to 49%. This relatively equal gender representation indicates that gender is unlikely to act as a confounding factor in the study outcomes. With respect to religion, the majority of participants in all groups were Hindus, particularly in the control group (85%) and experimental group 2 (72%), while experimental group 1 had a comparatively lower proportion (54.7%). A smaller segment of participants identified as Christians, and no participants belonged to Muslim or other religious categories, indicating limited religious diversity within the sample.

In terms of educational status, most participants across all groups were literate, with the highest proportion observed in the control group (75.7%), followed by experimental group 2 (66%) and experimental group 1 (62.5%). A smaller number of participants had primary and secondary education, and only a few reached higher secondary level, particularly in experimental group 1. Notably, none of the participants reported undergraduate or postgraduate education, suggesting that the study population largely consisted of individuals with basic or limited formal education. This may have implications for health awareness and self-management practices.

Analysis of previous employment status shows that a significant proportion of participants had engaged in physically demanding occupations. In the control group (77.7%) and experimental group 2 (62.8%), the majority reported heavy work, whereas experimental group 1 had a higher proportion of individuals involved in moderate work (53%). A smaller percentage in all groups reported sedentary work. This pattern indicates that most participants had a history of physical labor, which could be a contributing factor to the development of knee joint pain.

Similarly, current working status reflects that many participants continue to engage in physical work despite their age and condition. Heavy work remained predominant in the control group (64.4%) and experimental group 2 (52.5%), while experimental group 1 showed a higher proportion in moderate work (55.6%). Only a limited number of participants were engaged in sedentary work. This suggests that ongoing physical strain may persist as a risk factor influencing the severity or progression of knee joint pain.

With regard to monthly income, the findings indicate that most participants belong to lower socioeconomic groups. A majority in the control group (62.8%) and experimental group 2 (52.7%) reported earning less than ₹10,000 per month. In contrast, experimental group 1 had a relatively higher proportion of participants (52%) in the ₹10,000–15,000 income category, suggesting slightly better economic status compared to the other groups. Very few participants reported incomes above ₹20,000, and none were in the highest income bracket, highlighting an overall low-income profile.

Dietary preference analysis shows that the majority of participants in all three groups were non-vegetarian, with the highest proportion in the control group (87.5%) and experimental group 2 (82%), followed by experimental group 1 (65%). A smaller proportion of participants reported a vegetarian diet. This indicates a

common dietary pattern across the study population, which may or may not have relevance to health outcomes.

Finally, the duration of knee joint pain reveals that most participants in all groups had been experiencing pain for less than one year, with proportions of 75% in the control group, 73% in experimental group 1, and 75% in experimental group 2. A smaller number of participants reported pain lasting 1–3 years or 4–5 years, and none had pain for more than five years. This suggests that the majority of participants were in the relatively early stages of knee joint pain.

Overall, the findings indicate that the three groups were largely comparable in terms of demographic characteristics such as age, gender, education, occupation, income, dietary habits, and duration of knee pain, although minor variations were observed in age distribution, employment patterns, and income levels. These similarities enhance the validity of comparisons made between the groups in the study.

Test	Experimental group1 (n=35)			MD	‘t’ value
	Mean	Range	SD		
Pre test	4.6	2	2	1.3	T=16.4 df=29 p<0.005 S
Post Test	2	3	0.9		

Table 2: Infers the pre and post test level of Knee Joint pain among geriatrics in experimental group 1.

Among experimental group 1 who received the Epsom salt with hot water application had the overall pre test mean pain score 4.6, SD of 1 and their post test overall mean pain score was 3, SD of 0.9 and MD was 1.3. The obtained t value was 16.4 (p<0.05) was significant at p<0.05. Hence it was inferred that hot water application with Epson salt had effect on reducing the knee joint pain among geriatrics in experimental group 1.

Groups	Post Test			MD	‘t’ value
Experimental group 1 1(n=35)	3	2	0.8	0.7	2.7
Experimental group 2 1(n=35)	3	3.5	3		

Table 3: compares the pre and post test level of Knee joint pain among geriatrics in experimental group 1 and experimental group 2.

Among the experimental group 1 the obtained overall post test mean pain score was 3, SD was 0.8. Whereas in experimental group 2 the obtained overall post test mean pain score was 3, SD was 3. The overall post test mean pain score in experimental group 1 was lesser than the overall post test mean pain score in control group and experimental group 2. The obtained mean difference was 0.5 in experimental group 1 and 1.3 in experimental group 2. In experimental group 2 significant at $p<0.005$.

DISCUSSION, SUMMARY, CONCLUSION, IMPLICATION AND RECOMMENDATIONS

The study was done to assess the effectiveness of Epsom salt on knee joint pain among women with arthritis aged 40 to 60 years. The study was conducted with 70 samples selected using a non-probability purposive sampling technique in Karungal, Kanyakumari District. The samples were divided into two groups, with 35 participants in each group.

DISCUSSION

The present study was conducted to evaluate the effectiveness of hot water application with Epsom salt and hot water application alone on the level of knee joint pain among geriatrics. The findings of the study are discussed in relation to the objectives, results, and available literature.

With regard to demographic variables, the findings revealed that the majority of participants in all three groups belonged to the age group of 60–65 years, indicating that knee joint pain is more prevalent in the early elderly period. Gender distribution was almost equal across the groups, suggesting that both males and females are equally affected by knee joint pain. Most of the participants were Hindus, and a majority had basic literacy levels, indicating limited educational background. Occupational data showed that a large proportion of participants were previously and currently engaged in moderate to heavy work, which may contribute to joint stress and the development of knee pain. Most participants belonged to lower income groups and had a non-vegetarian dietary pattern. The duration of knee joint pain in most participants was less than one year, suggesting early-stage symptoms among the study population. Overall, the similarity in demographic characteristics across groups supports the comparability and internal validity of the study.

The findings related to the effectiveness of Epsom salt with hot water application (Experimental Group 1) demonstrated a significant reduction in knee joint pain. The pre-test mean pain score was higher compared to the post-test mean, and the obtained ‘t’ value (16.4) was statistically significant at $p < 0.05$. This indicates that the intervention was effective in reducing pain levels. The reduction in pain may be attributed to the combined effect of heat therapy and the potential muscle-relaxing and anti-inflammatory properties of Epsom salt (magnesium sulfate), which may enhance circulation and relieve joint stiffness.

In Experimental Group 2, which received hot water application alone, there was also a reduction in knee joint pain, although it was less pronounced compared to Experimental Group 1. Heat application is known to improve blood circulation, reduce muscle stiffness, and promote relaxation, thereby contributing to pain

relief. However, the absence of Epsom salt may have limited the extent of pain reduction observed in this group.

When comparing both experimental groups, the results showed that Experimental Group 1 had a lower post-test mean pain score compared to Experimental Group 2. This suggests that hot water application combined with Epsom salt is more effective than hot water application alone in reducing knee joint pain among geriatrics. The difference in mean scores and statistical significance further support the superiority of the combined intervention.

The study findings are consistent with previous research studies that highlight the benefits of heat therapy and Epsom salt in managing musculoskeletal pain. The results reinforce the importance of simple, non-invasive, and cost-effective interventions in managing knee joint pain among the elderly population.

Furthermore, the association between post-test pain levels and selected demographic variables indicates that factors such as age, occupation, and duration of pain may influence the severity and response to treatment. However, due to the relatively homogeneous nature of the sample, these associations may be limited.

Implications

Low-cost treatment is an important advantage for developing countries like India. Home serves as a place for prevention, long-term care, and follow-up; therefore, such simple interventions should be taught to elderly individuals with joint pain and their family members so they can practice them regularly and gain long-term benefits in managing joint pain. Nurses play a vital role in creating awareness about complementary and alternative therapies. The implications drawn from the present study are significant for the entire healthcare team, including nurse practitioners, nurse administrators, nurse educators, and researchers.

Implications for Nursing Practice

- As members of the healthcare team at the community level, nurses should understand the importance of various non-pharmacological measures in reducing knee joint pain.
- Nursing personnel can incorporate hot water application with Epsom salt as a nursing intervention in the management of knee joint pain at the home care level.
- Standard protocols for hot water application with Epsom salt can be developed and implemented across different nursing care settings.

Implications for Nursing Education

- The concept that prevention is better than cure should be emphasized among the geriatric population. Current trends in geriatric care, especially pain management and pain reduction techniques, should be included in the nursing curriculum.

- Undergraduate and postgraduate nursing students should be trained in administering hot water application with Epsom salt, as it is simple and easy to practice.
- Nursing personnel working in geriatric wards and community settings should receive in-service education on this intervention.

Implications for Nursing Research

- One of the goals of nursing research is to expand the scope of nursing practice; this study provides baseline data on pain perception and the effectiveness of hot water application with Epsom salt.
- The findings of this study can serve as a foundation for future research and encourage further investigations in this area. Community nurses can help disseminate these findings to support evidence-based practice.
- More studies should be conducted in various settings to ensure cultural acceptability and wider applicability.

Implications for Nursing Administration

- Nursing administrators can motivate nurses to use safe, cost-effective, non-pharmacological interventions for managing pain among geriatrics.
- Procedure manuals and standardized protocols for hot water application with Epsom salt should be developed for use in both hospitals and community settings.
- Community health nurses and nurse educators should be provided with in-service education to update their knowledge and skills regarding this intervention.
- Periodic conferences, seminars, and workshops can be organized for nursing personnel to enhance their knowledge about managing knee joint pain and recent advancements in care.

Recommendations

- Similar studies can be conducted on a larger sample size to generalize the findings.
- Longitudinal studies can be carried out to assess the long-term effectiveness of hot water application with Epsom salt.
- The study can be replicated in different age groups and varied settings.
- Comparative studies can be undertaken to evaluate the effectiveness of other complementary and alternative therapies for knee joint pain.
- The effectiveness of hot water application with Epsom salt can also be tested for other types of pain.
- Comparative studies between hot and cold-water applications with Epsom salt can be conducted.

Limitations

- The study was conducted only among geriatrics in a selected community area of Tirupur.
- It included participants from a specific rural setting, limiting generalization.

- The duration of the intervention was short.
- The data collection period was limited, restricting the sample size to 30 participants in each group.

Conclusion

Pain is a complex and multidimensional phenomenon and is one of the most common reasons for seeking healthcare. Knee joint pain is a widespread musculoskeletal problem affecting a large proportion of individuals during their lifetime.

The main objective of this study was to reduce knee joint pain using hot water application with Epsom salt and to compare its effectiveness with hot water application alone. The findings showed a significant difference in pain perception scores before and after both interventions. There was no significant association between post-test pain levels and selected demographic variables.

The study concludes that both interventions are effective in reducing knee joint pain among geriatrics. However, hot water application remains a simple, feasible, and cost-effective method that can be widely used in community settings for pain management and health promotion.

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