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Research Article

A Study to Evaluate the Effectiveness of Epsom Salt with Hot Water Application on Knee Joint Pain Among Elderly Women Aged 65–70 Years in Selected Villages of Dindigul District

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Abstract:

Introduction: Knee joint pain is a common musculoskeletal problem among older adults and can interfere with mobility, physical functioning, and activities of daily living. **Objective:** To evaluate the effectiveness of Epsom salt with hot water application on knee joint pain among elderly women aged 65–70 years residing in selected villages of Dindigul District. **Methods:** A quantitative research approach with a quasi-experimental pre-test and post-test control-group design was adopted. Sixty elderly women aged 65–70 years with knee joint pain were selected using purposive sampling. Thirty participants from Kannivadi village constituted the experimental group and 30 participants from Puthupatty village constituted the control group. Knee joint pain was assessed using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). The experimental group received Epsom salt with hot water application for 20 minutes, twice daily for 12 days, while the control group received no intervention. Data were analysed using frequency, percentage, paired t test, unpaired t test, and chi-square test. **Results:** A statistically significant reduction in knee joint pain was observed in the experimental group ($t = 12.8$, $p < 0.001$), while the control group showed no statistically significant difference ($t = 1.2$, $p = 0.240$). The post-test comparison between the experimental and control groups also showed a statistically significant difference ($t = 23.08$, $p < 0.001$), confirming the effectiveness of Epsom salt with hot water application. **Conclusion:** Epsom salt with hot water application was effective in reducing knee joint pain among elderly women. The intervention may be considered a simple, low-cost supportive measure within appropriate community-based nursing care.

Keywords: Epsom salt, hot water application, knee joint pain, elderly women.

INTRODUCTION

Physiological changes are sure to take place progressively with senescence, which may impact musculoskeletal performance. Knee joint pain can be common in older adults and can be related to stiffness, decreased mobility, functional limitation and problems with activities of daily living. The dissertation made it clear that knee pain is an important issue in the life of older adults and showed that musculoskeletal pain is more common in elderly women.

An OA condition, such as knee OA, can significantly impact physical function. The dissertation review quoted evidence that women are more affected by osteoarthritis, and that problems are more prevalent as people get older. Local heat is a non-pharmacological treatment that can help to increase blood flow, relax the muscles, and decrease pain and stiffness.

As a supportive intervention hot-water treatment has been used for musculoskeletal pain. Epsom salt, which is magnesium sulfate, is added to the hot water and which is traditionally used locally. Previous studies included in the dissertation reported beneficial effects of Epsom salt with hot water application on knee joint pain among elderly populations. For instance, Roy and Sharma in a quasi-experimental study, found that the hot application of Epsom salt reduced the pain of the knee, and other studies conducted on applying the hot fomentation or Epsom salt showed a significant reduction in the pain.

Knee joint pain is a major problem among elderly women, causing stiffness, reduced mobility, and limitations in daily activities. As simple and low-cost non-pharmacological measures are needed for community-based pain management, Epsom salt with hot water application may provide a supportive approach for pain relief. Therefore, the present study was undertaken to evaluate its effectiveness in reducing knee joint pain among elderly women aged 65–70 years in selected villages of Dindigul District.

METHODOLOGY

A quantitative quasi-experimental pre-test-post-test control-group design was adopted among 60 elderly women aged 65–70 years with knee joint pain in Kannivadi and Puthupatty villages, Dindigul District. Using purposive sampling, 30 participants were selected for the experimental group and 30 for the control group. The WOMAC scale was used to assess knee joint pain, with scores ranging from 0–96 and categorized as none, mild, moderate, severe, and extreme pain. Following the pre-test, the experimental group received Epsom salt with hot water application using 30 g of Epsom salt in 1 L of hot water for 20 minutes, twice daily for 12 days, while the control group received no intervention. Post-test assessment was conducted using the same WOMAC scale. Data were analysed using frequency, percentage, mean, paired t test, unpaired t test, and chi-square test. Informed consent, confidentiality, and ethical principles were maintained throughout the study.

RESULTS

The demographic profile showed that the experimental group had a larger proportion of married women, Hindu women, daily-wage workers, and participants with co-morbidity. In both groups, most participants followed a non-vegetarian diet and reported no regular physical activity. The detailed demographic distribution is presented in the dissertation data analysis.

Before the intervention, 50% of participants in the experimental group had extreme pain and 30% had severe pain. Following the intervention, 60% had mild pain and 33.3% had moderate pain, while only 6.7% remained in the severe category. In contrast, the control group showed minimal change, with 43.3% remaining in the extreme-pain category at post-test.

The experimental group demonstrated a statistically significant reduction in WOMAC score from 67.2 ± 20.3 to 25.9 ± 9.0 ($t = 12.8$, $p < 0.001$). In the control group, the change from 67.3 ± 22.5 to 66.3 ± 20.7 was not statistically significant ($t = 1.2$, $p = 0.240$).

The post-test mean WOMAC score was substantially lower in the experimental group than in the control group. The between-group mean difference was 40.4 and the unpaired t value was 23.08 ($p < 0.001$), demonstrating a statistically significant intervention effect.

In the experimental group, pre-test knee joint pain was significantly associated with co-morbidity. No significant association was found with marital status, religion, education, occupation, dietary habits, family income, BMI, duration of pain, physical activity, or previous treatment. In the control group, none of the selected demographic variables demonstrated a statistically significant association with pre-test pain level.

DISCUSSION

The present study demonstrated a marked reduction in knee joint pain following Epsom salt with hot water application. In the experimental group, the mean WOMAC score decreased from 67.2 ± 20.3 before the intervention to 25.9 ± 9.0 after the intervention, producing a mean reduction of 41.3 points. The corresponding paired t value of 12.8 was highly significant ($p < 0.001$).

The categorical findings further support the effectiveness of the intervention. At baseline, half of the experimental participants had extreme pain, whereas after the intervention 60% had only mild pain and none remained in the extreme-pain category. The control group showed comparatively little change.

The findings are consistent with previous studies cited in the dissertation. Roy and Sharma reported that Epsom salt hot-water application administered for 20 minutes twice daily reduced knee joint pain among elderly participants. Sankar also reported a significant reduction in WOMAC pain scores following Epsom salt with hot water application among elderly individuals in a rural setting.

Similarly, Padmapriya et al. reported a significant reduction in knee pain following hot fomentation with Epsom salt among elderly individuals with osteoarthritis. Their intervention was administered for 20 minutes twice daily, and the reduction in pain was statistically significant. These findings are comparable with the present study, in which the same general intervention strategy produced a substantial reduction in WOMAC scores.

CONCLUSION

The study demonstrated that Epsom salt with hot water application was effective in reducing knee joint pain among elderly women aged 65–70 years. The experimental group showed a highly significant reduction in WOMAC scores compared with both its own pre-test scores and the post-test scores of the control group. The intervention was inexpensive, simple to administer, and suitable for consideration as a supportive community-based nursing intervention for elderly women with knee joint pain.

RECOMMENDATIONS

Further studies may be conducted with a larger sample size and randomized sampling to improve the generalizability of findings. Similar studies may be undertaken in different community settings and among different populations, including elderly men and women. Comparative studies may also be conducted to evaluate Epsom salt with hot water application against other non-pharmacological interventions for knee joint pain.

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Table 1: Distribution of elderly women according to selected demographic variables . (N= 60)

Demographic variable	Experimental group n (%)	Control group n (%)
Marital status		
Married	15 (50.0)	12 (40.0)
Unmarried	2 (6.7)	1 (3.3)
Widow	12 (40.0)	12 (40.0)
Divorced	1 (3.3)	5 (16.7)
Religion		
Hindu	22 (73.3)	18 (60.0)
Christian	3 (10.0)	10 (33.3)
Muslim	5 (16.7)	2 (6.7)
Education		
Illiterate	12 (40.0)	14 (46.7)
Primary school	9 (30.0)	7 (23.3)
Middle school	6 (20.0)	5 (16.7)
High school	2 (6.7)	3 (10.0)
Graduate	1 (3.3)	1 (3.3)
Occupation		
Unemployed	8 (26.7)	10 (33.3)
Private employee	2 (6.7)	4 (13.3)
Daily wages	11 (36.7)	9 (30.0)
Farmer	9 (30.0)	7 (23.3)
Dietary pattern		
Vegetarian	4 (13.3)	2 (6.7)
Non-vegetarian	26 (86.7)	28 (93.3)
Co-morbidity present	25 (83.3)	11 (36.7)
No physical activity	28 (93.3)	25 (83.3)
No previous treatment	10 (33.3)	19 (63)

Table 2. Pre-test and post-test distribution of knee joint pain. N=60

Level of knee joint pain	Experimental Pre-test n (%)	Experimental Post-test n (%)	Control Pre-test n (%)	Control Post-test n (%)
None	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Mild	0 (0.0)	18 (60.0)	0 (0.0)	0 (0.0)
Moderate	6 (20.0)	10 (33.3)	8 (26.7)	8 (26.7)
Severe	9 (30.0)	2 (6.7)	8 (26.7)	9 (30.0)
Extreme	15 (50.0)	0 (0.0)	14 (46.7)	13 (43.3)
Total	30 (100)	30 (100)	30 (100)	30 (100)

Table 3. Comparison of pre-test and post-test WOMAC scores. N=60

Group	Assessment	Mean $\pm$ SD	Mean difference	<i>t</i> value	<i>p</i> value
Experimental	Pre-test	67.2 $\pm$ 20.3	41.3	12.8	<0.001
Experimental	Post-test	25.9 $\pm$ 9.0			
Control	Pre-test	67.3 $\pm$ 22.5	1.03	1.2	0.240
Control	Post-test	66.3 $\pm$ 20.7			

Table 4. Post-test comparison between experimental and control groups. N=60

Group	Post-test Mean $\pm$ SD	Mean difference	<i>t</i> value	<i>p</i> value
Experimental	25.9 $\pm$ 9.0	40.4	23.08	<0.001
Control	66.3 $\pm$ 20.7			

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