

# Effectiveness Of Hot Water Application With Epsom Salt To Reduce Knee Joint Pain In Osteoarthritis Among Women Residing In Selected Urban Community Of Maharashtra State.

Ms. Pallavi Nimkar

*(Community Health Nursing)*

*Clinical Instructor*

*Datta Meghe College Of Nursing, Wanadongari, Nagpur*

*Maharashtra University of Health Sciences, Nashik, Maharashtra, India*

Mr. SudnyanGawaie

*Associate Professor Cum Vice-Principal*

*Dr. Panjabrao Deshmukh Nursing Institute, Amravati*

*Maharashtra University of Health Sciences, Nashik, Maharashtra, India*

Dr. Veda Vivek

Principal

Dr. Panjabrao Deshmukh

*Clinical Instructor*

*Nursing Institute, Amravati*

*Maharashtra University of Health Sciences, Nashik, Maharashtra, India*

Dr. Vasant Gawande

*Associate Professor Dept. of Orthopedics*

*Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences,  
Sawangi (Meghe), Wardha*

## **Abstract :**

**Background:** Osteoarthritis of the knee is a common cause of pain and disability, especially in the elderly.1 Osteoarthritis is a condition characterized by the progressive loss of articular cartilage and remodeling of the underlying bone. OA affects almost all joints, but the most commonly affected joints are the knee and hip joints. **Objectives:** Primary objective : To assess the effect of hot water application with Epsom salt to reduce knee joint pain among women. Secondary objectives:1. To assess the level of knee joint pain of urban women before hot water application with Epsom salt. 2. To assess the effect of hot water application with Epsom salt to reduce knee joint pain in osteoarthritis among urban women.3. To find out the association of knee joint pain among women with selected demographic and clinical variables. **Methods:** An Experimental method .**Sample size:** 100 Urban Women. **Material:** Eleven Point Numerical Pain Rating Scale and Hot Water Application with Epsom Salt.**Results:** The hot water application with Epsom salt has shown Highly significant difference (  $t=39.41$  at  $p<0.0001$ ) between pretest and posttest with a mean  $\pm$ SD of  $2.68 \pm 0.67$ . Hence it is concluded that the hot water application with Epsom salt is effective among the urban women those who suffers from mild and moderate knee joint pain.

**Keywords:** *Hot Water Application, Epsom Salt, Knee Joint Pain, Osteoarthritis, Urban Women*

### **INTRODUCTION:**

Osteoarthritis of the knee is a common cause of pain and disability, especially in the elderly.<sup>1</sup> Osteoarthritis is a condition characterized by the progressive loss of articular cartilage and remodeling of the underlying bone<sup>2</sup>. OA affects almost all joints, but the most commonly affected joints are the knee and hip joints. It is estimated that 10%–15% of all adults aged over 60 have some degree of OA, with prevalence higher among women than men, obese person, and those having sedentary work.<sup>3,4</sup> Osteoarthritis is the second most common rheumatologic problem and it is the most frequent joint disease.<sup>5</sup> Exact cause of OA is not known. However it is strongly believed that it occurs due to aging or wear and tear or degenerative changes in the joints. The disease limits everyday activities.<sup>6,7,8</sup> Several methods have been proposed to treat knee OA.<sup>9</sup> It is a leading cause of disability and can negatively impact people's physical and mental well-being.<sup>10</sup> The particular alternative treatment options that are available for a patient, An Epsom salt bath is an effective alternative remedy Epsom salts contain a high level of sulphate and magnesium, possesses powerful anti-inflammatory properties and warm water creates a powerful system for naturally relieving pain and inflammation associated with knee arthritis.<sup>5</sup> Epsom salt is an ingredient used in a soak to treat minor aches and pains. Its soothe tired muscles and reduce swelling. If you're soaking in an Epsom salt bath for aches and pains, make sure not to use water that's too hot. Epsom salt hot water bath very effective in the treatment of joint pain. Epsom salt can act topically and immediately reduce the pain in joint. Pain measurements help determine the severity, type, and duration of the pain, and are used to make an accurate diagnosis, determine a treatment plan, and evaluate the effectiveness of treatment.<sup>6,11</sup>

### **Material & Method:**

Setting of the study: The study was conducted in two selected urban areas under two different blocks of Maharashtra State.

Research Design: Pre-experimental one group pre-test post-test research design

Population: Urban women

Sample: Urban women with knee joint pain

Sample size: 100

Sampling technique: Purposive sampling technique

Inclusion Criteria: Urban women who gave consent to participate in the study

Urban women who were available at the time of data collection

Exclusion criteria: Urban women who were under joint pain relief medication

Urban women with severe knee joint pain (7 & above score)

Urban women with knee joint injury.

### **Material :**

Tools used for data collection

1. Eleven Point Numerical Pain Rating Scale

2. Hot Water Application with Epsom Salt

Description of tools

1. Eleven Point Numerical Pain Rating Scale: standardized 11 point numerical pain rating scale was modified to assess the effect of hot water application with Epsom among women with knee joint pain residing in selected urban area of Maharashtra State. Part-B: is related to scale on assessment of knee joint pain. It is Modified Numerical Pain Rating Scale contains 11 points (0-10 scale of pain severity) to assess the severity of knee joint pain among women suffering from osteoarthritis. The 11 points of scale includes 11 descriptions of pain experiences indicating severity of pain in the form of numbers. The scale of pain is divided as No pain [0 score], mild pain [1-3 score], moderate pain [4-6 score] and severe pain [7-10 score].

Hot Water Application with Epsom Salt: is a sequential procedure in a written form that explains the application of hot water and Epsom Salt on knee joint/s of urban women for a period of 20 minutes.

The pilot study was conducted on 10 urban women. The findings of pilot study have shown the feasibility of major study in terms of time, money, samples and data collection procedure.

**Method of data collection:** The investigator has obtained formal permission from chairperson BORS, Institutional ethical committee and from concerned authorities of selected urban area of Maharashtra state to conduct research study. The informed consent was obtained from each woman for their willingness to participate in the study. They were assured anonymity of participation in the study. Further, the investigator has explained the purpose and how the study is beneficial to them. After obtaining permission from concerned authorities, the investigator has fixed the date and time for data collection in consultation with urban women. According to pre-planned date and time, the investigator has visited to home and collected data. **Pre-test:** Was conducted by using Numerical Pain Rating Scale and demographic data sheet to assess the level of knee joint pain among urban women. Further the same protest data was used to assess the effect of hot water application with Epsom salt with the post-test data on level of knee joint pain. **Intervention:** Application of hot water with Epsom salt was applied over the knee joint among the participants for 15 days on alternate days from the date of pre test. 30 grams of Epsom salt was added to one litre of hot water (The temperature of the boiling water was as tolerated by the women) and a hot compress for 20 minutes over the knee joint was applied by dipping a clean cotton washcloth, wringing it out.

**Post-test:** The post test was conducted using same tool used for pre-test after 15 days of intervention.

**Data Analysis :** The data collected was planned to analyze by using both descriptive and inferential statistics based on objectives and hypothesis of the study. The descriptive statistics includes; mean median, mode, mean percentage and standard deviation. The inferential statistics includes; t test and ANOVA.

**Results :** More or less similar disruption was observed in age group of 41-50 years, 51-60 years and 60 years above was the large population of 80%.Majority (53%) were educated up to SSC and (62%) were housewives. Most (71%) of the women had monthly income of Rs. 20,000/- & below whereas only 29 % of them had monthly income of Rs.20,000/- and above. Around 67% of women were either overweight or obese

Table 1: Percentage wise distribution of women according to their demographic characteristics.

n=100

<b>Demographic Variables</b>	<b>No. of women</b>	<b>Percentage(%)</b>
<b>Age(yrs)</b>		
31-40 yrs	20	20
41-50 yrs	26	26
51-60 yrs	29	29
>60 yrs	25	25
<b>Education</b>		
SSC and below	53	53
HSC	25	25
Graduate	16	16
PG and above	6	6
<b>Occupation</b>		
Govt. Job	8	8
Private Job	9	9
Self Employed	21	21
Housewife	62	62
<b>Monthly family income of the family</b>		
5001-10000 Rs	27	27
10001-15000 Rs	24	24
15001-20000 Rs	20	20
>20000 Rs	29	29
<b>Body Mass Index</b>		

Underweight	6	6
Normal Weight	27	27
Overweight	36	36
Obese	31	31

Before intervention, around 41.6% of women was suffering from knee joint pain with mean+SD of  $4.16 \pm 1.44$ .

Table 4.1: % distribution of level of knee joint pain of urban women before intervention

Level of knee joint pain	Number of urban women (Frequency)	Percentage
No Pain	-	-
Mild Pain	32	32%
Moderate Pain	68	68%
Severe Pain	-	-
Overall		41%

Table 4.2: Mean, SD and mean % of level of knee joint pain of urban women before intervention

*n=100*

Sr No.	level of knee joint pain	Frequency	Mean $\pm$ SD
1	No Pain	-	-
2	Mild Pain	32	$2.37 \pm 0.55$
3	Moderate Pain	68	$5 \pm 0.84$
4	Severe Pain	-	-
Overall			$4.16 \pm 1.44$

After intervention, the, around 14.8% of women was suffering from knee joint pain with mean+SD of  $1.48 \pm 1.26$ .

**Table 4.3: % distribution of level of knee joint pain of urban women after intervention**

*n=100*

Sr No.	level of knee joint pain	Pre test	post test	Difference in % of level of knee joint pain
1	No Pain	0	33%	33%
2	Mild Pain	32%	62%	30%
3	Moderate Pain	68%	5%	-63%
4	Severe Pain	0	0	0

Table 4.4 Mean, SD, Mean % of level of knee joint pain among women after intervention

*n=100*

Sr No.	Level of knee joint pain	Pre test (x)	Post test (y)	Difference in %
		Mean±SD	Mean±SD	Mean±SD
1	No Pain	0±0	0±0	0±0
2	Mild Pain	2.37±0.55	2.06±0.74	-0.31±0.19
3	Moderate Pain	5±0.84	4±0	-1±0.84
4	Severe Pain	0±0	0±0	0

The hot water application with Epsom salt has shown significant difference ( $t=39.41$  at  $p<0.0001$ ) between pre-test and post-test with a mean difference  $2.68 \pm 0.67$ .

Table 4.5: Overall effectiveness of hot water application with Epsom salt to reduce knee joint pain in osteoarthritis among urban women

Overall	Mean	SD	Mean Difference	t-value	p-value
Pre Test	4.16	1.44	$2.68 \pm 0.67$	39.41	0.0001* **

Post Test	1.48	1.26		
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df-1,98 p-value-<0.05 \*\*\* Highly significant

No significance difference (F-2.09, p>0.05) was observed between level of knee joint pain of urban women and their age in years. There was no significance difference (F-2.09, p>0.05) was observed between level of knee joint pain of urban women and their educational level. No significance difference (F-0.39, p>0.05) was observed between level of knee joint pain of urban women and their occupation. There was a significance difference (F-5.17, p<0.05) was observed between level of knee joint pain of urban women and their monthly family income. There was a significance difference (F-6.81, p<0.05) was observed between level of knee joint pain of urban women and their body mass index. Hence it is concluded that the hot water application with Epsom salt is effective among the urban women those who suffers from mild and moderate knee joint pain.

Table 4.6: Association of post test knee joint pain score in relation to age.

n=100

Age (yrs)	No. of women	Mean posttest pain score	F-value	p-value
31-40 yrs	20	0.95±1.05	2.09	0.10 NS, p>0.05
41-50 yrs	26	1.34±1.19		
51-60 yrs	29	1.75±1.43		
>60 yrs	25	1.72±1.20		

df-3,96 p-value->0.05 NS-Notsignificant

Table 4.7: Association of post test knee joint pain score in relation to educational level

n=100

Education	No. of women	Mean posttest pain score	F-value	p-value
SSC and below	5 3	1.52±1.24	0.56	0.34 NS, p>0.05
HSC	2 5	1.48±1.12		
Graduate	1 6	1.56±1.54		
PG and above	6	0.83±1.32		

Df-3,96 p-value->0.05 NS-Notsignificant

Table 4.8: Association of post test knee joint pain score in relation to occupation

*n=100*

Occupation	No. of women	Mean posttest pain score	F-value	p-value
Govt. Job	8	1.87±1.55	0.39	0.76 NS, p>0.05
Private Job	9	1.33±1.65		
Self Employed	21	1.33±1.31		
Housewife	62	1.50±1.16		

Df-3,96 p-value->0.05 NS-Notsignificant

**Table 4.9: Association of post test knee joint pain score in relation to monthly family income(Rs)**

*n=100*

Monthly family income(Rs)	No. of women	Mean posttest pain score	F-value	p-value
5001-10000 Rs	27	1.96±1.12	5.17	0.002* **
10001-15000 Rs	24	1.75±1.18		
15001-20000 Rs	20	0.65±0.93		
>20000 Rs	29	1.37±1.39		

df-3,96 p-value-<0.05 \*\*\* Highly significant

**Table 4.10: Association of post test knee joint pain score in relation to Body mass index**

*n=100*

Body mass index	No. of women	Mean posttest pain score	F-value	p-value
Underweight	6	1.33±1.50	6.81	0.0001* **
Normal Weight	27	0.88±1.21		
Overweight	36	1.30±1.11		

Obese	31	2.22±1.11		
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df-3,96 p-value-<0.05 \*\*\* Highly significant

### Discussion :

The study was undertaken to assess the effectiveness of hot water application with Epsom salt to reduce knee joint pain among urban women osteoarthritis.

The major findings of the study include More or less similar distribution was observed in age group of 41-50 years, 51-60 years and 60 years above was the large population of 80%.Majority(53%) were educated up to SSC.Majority (62%) were housewives.Most (71%) of the women had monthly income of Rs. 20,000/- & below whereas only 29 % of them had monthly income of Rs.20,000/- and above.Around 67% of women were either overweight or obese Before intervention, around 41.6% of women was suffering from knee joint pain with mean+SD of  $4.16 \pm 1.44$  After intervention, the, around 14.8% of women was suffering from knee joint pain with mean+SD of  $1.48 \pm 1.26$  The hot water application with Epsom salt has shown significant difference (  $t=39.41$  at  $p<0.0001$ ) between pretest and posttest with a mean difference of  $2.68 \pm 0.67$  No significance difference (F-2.09,  $p>0.05$ ) was observed between level of knee joint pain of urban women and their age in years. There was no significance difference (F-2.09,  $p>0.05$ ) was observed between level of knee joint pain of urban women and their educational level No significance difference (F-0.39,  $p>0.05$ ) was observed between level of knee joint pain of urban women and their occupation. There was a significance difference (F-5.17,  $p<0.05$ ) was observed between level of knee joint pain of urban women and their monthly family income. There was a significance difference (F-6.81,  $p<0.05$ ) was observed between level of knee joint pain of urban women and their Body Mass Index. The percentage wise distribution of urban women with regards to their age revealed that, around 26%, 29%, 25% of urban women belongs to the age group of 41-50 years, 51-60 years and 60 years above respectively forming the large homogeneous group in the study population. With similar findings of study conducted by Shilpa Parag Satralkar (2018).

In the present study most (53%) of the women were educated up to SSC, which is almost equally supported by the findings (52%) of a study conducted by Jaya Deshmukh and Dr. Suresh Ray (2019).

Majority (62%) of women with knee joint pain were housewives whereas in other study conducted by Ruth Benita. F (2016) it is contradictory (33%).

Higher Percentage (71%) of the women had monthly income of Rs. 20,000/- & below whereas only 29 % of them had monthly income of Rs. 20,000/- and above. However, the results of present study are supported by the findings (73%,24%) of a study conducted by Shilpa Parag Satralkar (2017). Percentage distribution of level of knee joint pain among women before intervention revealed that overall percentage of level of knee joint pain among women was around 41.6%. However, majority of them had Moderate pain (68%) with a frequency of 68 women with knee joint pain whereas 32% of them had mild pain. (with a frequency of 32)

Before intervention, the mean level of knee joint pain among urban women with Moderate Pain was found to be  $5+0.84$  whereas the mean level of knee joint pain was only  $2.37+ 0.55$  among urban women with mild pain

Before intervention, the level of knee joint pain score was 41.6% with an overall mean of  $4.16 \pm 1.44$  which is supported with the findings of a similar study conducted by Jaya Deshmukh and Dr. Suresh Ray (2019).

In the present study, it is observed that the level of knee joint pain among women reduced by 26.8% ( $1.48 \pm 1.26$ ) after intervention. However, it is contradictory to the findings (11%) of a study conducted by Jaya D (2019) Around 67% of women were either overweight or obese which

almost equally supported by the findings (61%) of a study conducted by Ms. J. Rose Jenila (2007). Articles related to knee joint were reported<sup>12-15</sup>. Wairagade et. al. reported about efficacy of ayurvedic formulations along with swedana therapy in the management of rheumatoid arthritis<sup>16-19</sup>.

**LIMITATION:** • The study was limited only to mild and moderate pain. The study was limited to literate women only. The study was limited to urban area only. Data collection period was limited for 4 weeks. The study was limited to women only. The Sample size was limited to 100 women as there was dropout of 13. The study was limited to women with knee joint pain who were willing to participate in the study.

**Implication:**

#### **Nursing Services**

- The hot water application with Epsom salt can be used by the staff nurses now and then in regular health care services.
- The hot water application with Epsom salt can significantly be used among the client in osteoarthritis.
- Nurses working in the community field as well as in the hospitals can benefit from such researches, as it will provide more insight regarding the hot water application with Epsom salt to reduce knee joint pain in OA.

#### **Nursing Education**

- Education curriculum must include all traditional treatment of knee joint pain.
- The nursing teachers can use the result of the study as an informative illustration for the students.
- Educate the students about Epsom salt used in clinical practice.

#### **Nursing administration**

- As an administrator, the nurse should motivate her staff to participate in learning new trends in nursing field. Learning to communicate, develop new traditional methods and their practice the new trends in the nursing field.
- Nurse administrator should convey the traditional way of use of Epsom salt.

#### **Nursing research**

- The finding can be used for publication to disseminate effectiveness of hot water application with Epsom salt to reduce knee joint pain.
- The study will serve as a valuable reference material for the future investigators of a nurse consumer.
- These all researches are showing that how we can discover the new traditional method and use it as an effective way to upgrade our professional knowledge.

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