Effectiveness of Castor Oil Pack on Knee to Reduce the Knee Joint Pain among Women Residing at Selected Urban Communities of Maharashtra

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Abstract: _Aim of the study:_ *The study aims to find the level of pain among women with knee joint pain by using numerical pain rating scale in order to reduce the level of pain. Problem statement: Does Application of Castor Oil Pack on Knee is Effective to Reduce the Knee Joint Pain among Women Residing at selected Urban Communities of Maharashtra?* _Primary objective:_ *Primary objective of study was to find out the effect of castor oil pack on knee joint pain among women residing at urban communities of Maharashtra. Secondary objective: 1) To assess the level of knee joint pain among women before application of castor oil pack. 2) To find out the effect of castor oil pack among women after intervention. 3) To find out the association between knees joint pain and demographic variables of women after application of castor oil pack._ _Method:_ *A pre-experimental one group pretest posttest design and quantitative approach was carried out on 30 women selected by purposive sampling technique to test effectiveness of castor oil pack to reduce knee joint pain. The data was collected by using 11 point's numerical pain rating scale._ _Results:_ *The presents study evaluates and found that the pre-intervention demographic variables of women were more or less similar revealing common characteristics. Before intervention it was observed that 25% of women have suffered with mild knee joint pain whereas 50.5% of them have suffered with moderate knee joint pain Further, it was reduced from 25% to 20% whereas the percentage of moderate knee joint pain was reduced from 50.5% and 25% of women had no pain after a castor oil pack application.* _Interpretation and conclusion:_ *The data were analyzed by applying descriptive and inferential statistics. The result of the study indicated that after intervention there was an improvement in the level of pain. Analysis of data shows that highly significance difference found between the pre-test and post-test knowledge scores at the level of (P<0.05). The hypothesis is proved and accepted*

Keywords: OA (osteoarthritis), KP (knee pain), BMI, COP (Castor oil pack), Numerical pain rating scale

1. Introduction

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. It disables and distresses more people than any single disease. Pain.1 Joint pain is a chronic, progressive process in which new tissue is produced in response to joint insults and cartilage deterioration.1 the knee is one of the most commonly affected joints. OA is usually a slowly progressive degenerative disease in which the joint cartilage gradually wears away.

As you age, you are more prone to suffer from various health complications, one common problem that people experience is joint pain. however, most people tends to ignore this pain until it become severe, and when this happens, popping pills or using ointments are the only option left well this time try massaging your aching joints with castor oil to get relief naturally. As a castor oil is rich in anti-inflammatory compounds, it is commonly used to treat arthritis. The oil also stimulates the immune system.

Castor oil is known for treating arthritis; its anti-inflammatory properties make it ideal massage oil for relieving joint pain, nerve inflammation and sore muscles. Massaging the joint with castor oil and placing a hot water bag helps in pain relief. Massaging the joint with castor oil and placing a hot water bag helps in pain relief

2. Need for the Study

Joint pain is a chronic, progressive process in which new tissue is produced in response to joint insults and cartilage deterioration. The knee is one of the most commonly affected joints. Knee pain on the whole is a very common condition and frequent problem presenting to general practitioners. The overall prevalence of knee pain in the population is approximately 19%. The incidence increases steadily with age. Furthermore, the severity of the pain increases with age and a greater percentage have pain associated with disability.[13]

It is estimated that the overall prevalence of knee pain for men of all ages is between 15 and 20%. A study in the US showed that approximately 18% of men aged 60 years and older reported knee pain and the incidence increases steadily with age. Similar proportions of Australian men are expected to be affected. The highest prevalence of knee pain was reported in men 85 to 90 years old at nearly 24%.

The incidence of knee pain has been found to be slightly more common in females compared to men. The overall prevalence of knee pain in women is approximately 20%.

In India Osteoarthritis is the second most common rheumatologic problem and it is the most frequent joint disease with a prevalence of 22% to 39%. OA is more common in women than men, but the prevalence increases dramatically with age. Nearly, 45% of women over the age of 65 years have symptoms while radiological evidence is found in 70% of those over 65 years. OA of the knee is a

major cause of mobility impairment, particularly among females. OA was estimated to be the 10th leading cause of nonfatal burden.[17]

3. Review of Literature

Review of literature was carried out on recent and ongoing research relevant to the present study.

After thorough review, investigator has classified the literature based on variables which support aims and objectives of study. The literature as fallows -

1) Review related to Anatomy and physiology of Knee.
2) Review related to Knee Joint Pain and associated pathological conditions of knee.
3) Review related to osteoarthritis
4) Review related to Factors related to Knee Joint Pain
5) Review related to Castor Oil pack and Effects on Human Body
6) Studies related to Effect of Castor Oil Application

Assumptions:
1) Application of castor oil pack may reduce the knee joint pain to certain extent among women residing in urban communities
2) Demographic variables of women may have some influence on knee joint pain

Delimitations:
The study was limited to-
- Knee joint pain with mild or moderate cases
- 30 women
- Urban community

Hypothesis:
H1: There is a significant difference between the levels of pain before and after application of castor oil pack among women with knee joint pain
H2: There is a significant association between the levels of pain and demographic variables of women after application of castor oil pack

4. Methodology

Research approach: An experimental research approach was used for the study

Research design: Quantitative, pre-experimental one group pretest posttest design

Variables under study:
- Independent variable: Application of castor oil pack
- Dependent variable: level of knee joint pain

Accessible population-women with knee joint pain residing in selected urban community

Sample and sampling technique

Sample: women residing in selected urban community were the samples for present research study.

Sample size: Sample's size was 30 Calculated based on sample size determination formula

Sampling technique: purposive sampling technique was used to select the women residing in selected urban community of Maharashtra state.

Inclusion criteria:
- Urban women who gave consent to participate in the study
- Urban women who were available at the time of data collection
- Urban women with 40 years or above
- Urban women with mild or moderate knee joint pain

Exclusion criteria:
- Urban women who were under medication for treatment of joint pain
- Urban women with severe knee joint pain (7 & above score in the rating scale
- Urban women with knee joint injury

Tool Preparation

Development of tool:
Tools were developed on the basis of research question, hypothesis and conceptual frame work. Investigator has undergone extensive review of literature to develop the tools. However, following efforts were made by the investigator prior to construction of tools.
- Reviews from sources like text books, journals, periodicals, magazines, published thesis, newsletters etc.
- Consultation and discussion with peer group, nursing experts, subject experts, and the others concerned.
- Personal and professional experience of investigator with the women.

After such deliberations, the investigator has constructed a final draft of numerical pain rating scale and castor oil pack.

Description of Tools:

1) Numerical pain rating scale
It was a modified numerical pain rating scale to assess the level of knee joint pain among women residing in selected urban community of Maharashtra State before and after castor oil application. Standardized 11 point numerical pain rating scale was constructed with minor modification. It consists of two parts; Part A and Part B.

Part-A seeks information regarding demographic variables of urban women such as; age in years, education, occupation, monthly family income, diet type, and body mass index.

Part-B was related to modified numerical pain rating scale that contains 11 points (0-10 scale of pain severity) to assess the level of knee joint pain among women residing in selected urban community. The 11 point includes 11 descriptions of pain experiences indicating severity of pain in the form of numbers. The scale was divided as; no pain [0

score], mild pain [1-3 score], moderate pain [4-6 score] and severe pain [7-10 score].

2) Castor oil pack

Castor oil pack was a piece of cotton cloth that soaked in castor oil to apply it on the knee joints of women suffering from knee joints pain.

Scoring:

Table 3.1.2

Level of pain	Pain experiences	Points	Score
No Pain	No Pain	0	4
Mild pain	Minimal	1	3
	Mild	2	
	Uncomfortable	3	
Moderate Pain	Moderate	4	2
	Distracting	5	
	Distressing	6	
Severe Pain	Unmanageable	7	1
	Intense	8	
	Severe	9	
	Unable to move	10	

Tool Validity

The content validity of rating scale and castor oil pack with was established in consultation with 10 experts from the field of community health nursing (*n*=5), physician (*n*=1), community medicine (*n* =1), Ayurveda expert (*n*=1), biostatistician (*n* =1), and language expert (*n*=1).

Tool Reliability

Data was collected from 06 women who were residing in urban area (other than the main study setting) to test the reliability of numerical pain rating scale. An Inter rater reliability method was used to assess the data quality. The tool was rated by 2 rater and the score were calculated using inter-rater reliability test. The calculated value was r = 0.83, hence the tool was considered as reliable.

Pilot Study

Pilot study was conducted among three women suffering from knee joint pain at selected urban area to find out the effect of castor oil pack application to reduce knee joint pain. A prior permission was obtained from the authorities concerned for pilot study and informed consent was also obtained from the selected women Data was collected during January 2021.

Plan for Data Analysis

The data collected was planned to analyze using both descriptive and inferential statistics. The descriptive statistics includes; mean, mean percentage and standard deviation. The inferential statistics includes; t test and ANOVA using SPSS software.

5. Results

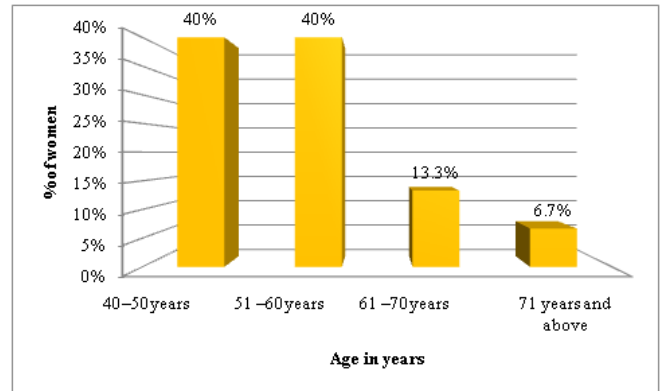**Section-I: Distribution of women according to their demographic variables**

Figure 4.1.1: Distribution of women according to their age in years

Distribution of women according to their age reveals that the highest percentage (40%) were belonged to the age group of 40-50 years & 51-60 years respectively whereas the women with 61 years & above were < 13% (figure-4.1.1).
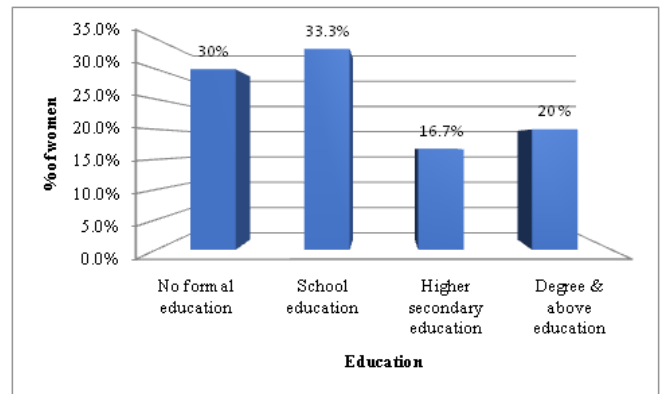

Figure 4.1.2: Distribution of women according to their education

Distribution according to education shows that higher percentage (33.3%) of women had school education whereas 30% of them had no formal education. However, the women with higher education were around 20% (figure-4.1.2).
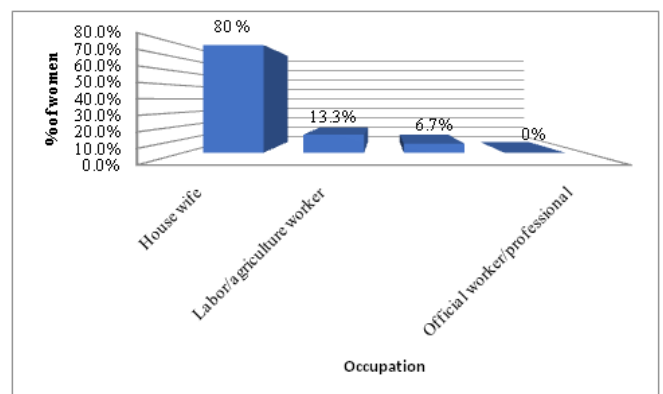

Figure 4.1.3: Distribution of women according to their occupation

Distribution according to occupation shows that majority (80%) of women were house wives whereas the women with other occupation were <14% (figure-4.1.3).
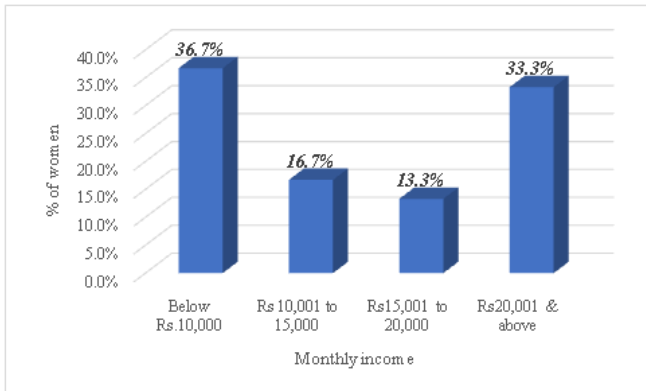
Figure 4.1.4: Distribution of women according to their monthly income of the family

Distribution according to income reveals that the highest percentage (36.7&33.3) of women belonged to the income group Rs. Below 10000/-& above 20, 000 respectively, whereas others are < 17 %. (Figure-4.1.4).
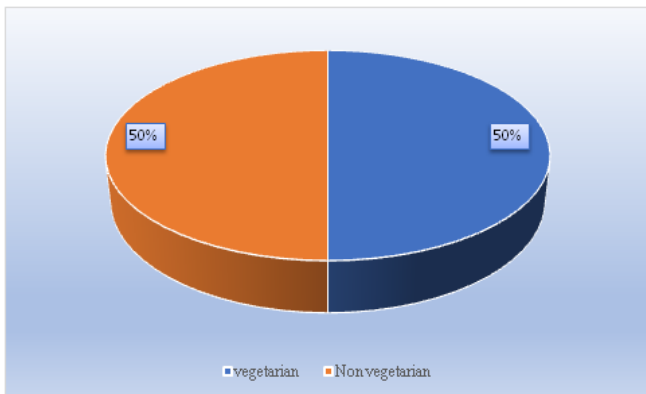

Figure 4.1.5: Distribution of women according to their type of diet

Distribution according to type of diet reveals equal percentages (50%) of women were vegetarian & non-vegetarian diet (figure-4.1.5).
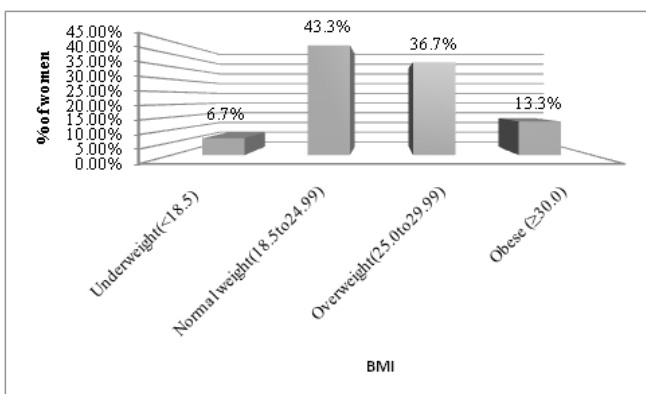

Figure 4.1.6: Distribution of women according to their body mass index

Percentage wise distribution according to BMI depicts that around 43.3% women were had normal BMI whereas the women with underweight and obese were <14%. However, the women with overweight were around 36.7% (figure-4.1.6).

Section-II: Assessment of knee joint pain among women before castor oil pack application

Table 4.2.2: Mean and mean % of level of knee joint among women before castor oil pack application

Level of knee joint pain	Number of Women	Mean	SD
Mild pain	10	2.5	0.5
Moderate pain	20	5.05	0.8
Total	30	4.2	1.4

Table 4.3.1: Percentage distribution of level of knee joint pain after castor oil pack application

Level of knee joint pain	Before intervention		After intervention	
	No of women	percentage	No of women	Percentage
No pain	-	-	10	25%
Mild Pain	10	25%	19	20%
Moderate Pain	20	50.5%	1	40.0%
Severe Pain	-	-	-	-
Total	30	42%	30	14%

Section III: Comparison of knee joint pain among women after castor oil pack application

Table 4.3.2: Mean and mean % of level of knee joint pain among women after intervention

Level of knee joint pain	Before intervention		After Intervention	
	Number of Women	Mean & SD	Number of Women	Mean & SD
No pain	0	0+0	10	2.5+0.5
Mild Pain	10	2.5+0.5	19	2+0.6
Moderate Pain	20	5.05+0.8	1	4+0
Severe Pain	0	0+0	0	0
Total	30	4.2+1.4	30	1.4+1.7

Section IV: Assess the effect of castor oil pack among women to reduce knee joint pain

Testing of hypothesis
H1: There is a significant difference between the levels of pain before and after application of castor oil pack among women with knee joint pain

Table 4.4.1: Effect of castor oil pack among women to reduce knee joint pain, *n=30*

Test	Mean ±SD	Mean difference	df	't' Value	P value
Pre-test	4.2+1.4	2.8+0.3	1, 29	25.1308	0.0001*** p<0.05
Post-test	1.4+1.7				

df:-1, 29 P value<0.0001 ***highly significant P value<0.0001, P value<0.001 **moderately significant, P value<0.05 * significant

Paired 't' test was computed to find out the significant difference between pre-test and posttest pain score on knee joint pain among women. Highly significant difference (p<0.0001) was found with 't' value of 25.13 between a pre-test & posttest pain score (table-4.4.1).

Section V: Association between knee joint pain scores and selected demographic and clinical variables

H2: There is a significant association between the levels of pain and demographic variables of women after application of castor oil pack

Table 4.5.1: Association between knee joint pain score and age in years, *n=30*

Age (yrs.)	No. of women	Mean	SD	F-value	p-value
40-50years	12	0.8	1.1		
51 -60years	12	1.4	1.1	3.2028	0.0397 S, p<0.05
61 -70years	4	2.5	0.5		
71 years & above	2	2.5	0.7		

df; 3.26, table value-0.0397 * significant NS-Not significant

Table-4.5.2: Association between knee joint pain score and Education, *n=30*

Education	No. of women	Mean	SD	F-value	p-value
No formal education	9	1.5	1.1		
School education	10	1.4	1.0		0.156 NS, p>0.05
Higher secondary education	5	0.4	0.8	1.8	
Degree & above education	6	2	1.4		

df; 3.26, table value-0.156 * significant NS-Not significant

Table 4.5.3: Association between knee joint pain score and Occupation, *n=30*

Occupation	No. of women	Mean	SD	F - value	p-value
House wife	24	1.5417	1.1788		
Labor/agriculture worker	4	1	1.4142	0.9624	0.3947 NS, p>0.05
Technical /clerical work supporter	2	0.5	0.7071		
Official worker/ professional	0	-	-		

df; 2.27, table value-0.3947 *significant NS-Not significant

Table 4.5.4: Association between knee joint pain score and Monthly Income of the family, *n=30*

Monthly Income of the family	No. of women	Mean	SD	F - value	p - value
Below Rs.10, 000	11	1.0	1.0		
Rs 10, 001 to 15, 000	5	1.2	1.0	2.3	0.1008 NS, p>0.05
Rs15, 001 to 20, 000	4	2.7	0.9		
Rs20, 001 & above	10	1.3	1.2		

df; 3.26, table value-0.1008 *significant NS-Not significant

Table 4.5.5: Association between knee joint pain score and Type of diet, n=30

Type of diet	No. of women	Mean	SD	F-value	p-value
Vegetarian	15	1.7	1.1	2.4644	0.1277 NS, p>0.05
Non-vegetarian	15	1.0	1.1		

df; 1.28, table value-0.1277 *significant NS-Not significant

Table 4.5.6: Association between knee joint pain score and Body Mass Index, n=30

Body Mass Index	No. of women	Mean	SD	F-value	p-value
Underweight (<18.5)	2	1.5	2.1		
Normal weight (18.5to24.99)	13	1	1	2.5635	0.0764 NS, p>0.05
Overweight (25.0to29.99)	11	1.3	1.0		
Obese (≥30.0)	4	2.7	1.2		

df; 3.26, table value-0.0764 *significant NS-Not significant
n=30

Presence of Diabetic mellitus	No. of women	Mean	SD	F-value	p-value
Yes	3	2	1	0.8401	0.3672 NS, p>0.05
No	27	1.3	1.2		

df; 1.28, table value-0.3672 *significant NS-Not significant

Summary

The study was undertaken to assess the effectiveness of castor oil pack on knee joint among women with knee joint pain. An experimental approach with one group pre-test post-test design was used to collect data among 30 women drawn purposively using inclusion and exclusion criteria.

6. Conclusion

From the findings of present study, it was concluded that the pre-intervention demographic variables of women and Percentage of pain and the mean scores were more or less similar revealing common characteristics. Further, it was observed that 25% of women have suffered with mild knee joint pain whereas 50.5% of them have suffered with moderate knee joint pain before intervention. However, the overall percentage was 42%.

However, after an intervention, the percentage of mild knee joint pain among women was reduced from 25% to 20% whereas the percentage of moderate knee joint pain was reduced from 50.5% to 40%. Further, 25% of women had no pain after a castor oil pack application. Hence castor oil application on knee joint pain was effective among women in selected urban communities of Maharashtra state.

7. Recommendations

- Similar study with large sample can be undertaken to bring out more generalization of findings.
- A comparative study can be conducted to assess the effect of castor oil pack vs. other interventions in the reduction of knee Joint pain.
- Similar study can be done to assess the effect of castor oil pack application among men having arthritis.
- Similar study can be conducted in rural area among men and women with knee joint pain
- The same study can be conducted by using quasi experimental approach.

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