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A Study to Assess the Effectiveness of Castor Oil Massage and Hot Water Application on Knee Joint Pain among Elderly Patients who are Attending the Orthopedic Department at HSK Hospital Bagalkot

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Abstract **Original Research Article**

Background of the Study: Joint Pain is a chronic, progressive process in which new tissue is produced in response to joint insults and cartilage deterioration. The most prevalent articular disease in adults can seen before 65 years of age and older. Osteoarthritis occurs more commonly in women than in men. It accounts for substantial disability as a result of its effect on the large weight bearing joints and the spine. There are various treatment and intervention are available to reduce joint pain such as hot application and castor oil application, active and passive etc. ***Aim*:** The aim of study was to assess the effectiveness of castor oil massage and hot water application on knee joint pain among elderly patients. ***Methodology*:** The present study is true experimental pre-test post-test control group design. The sampling technique adopted for this study is non-probability convenient sampling technique. Data divided into 2 groups of 60 elderly knee joint patients through simple random lottery method from HSK Hospital Bagalkot. The samples selected through non-probability convenient sampling technique and divided into two groups, 30 Elderly patients to experimental group and 30 elderly patients to control group. Data analysis done by using descriptive and inferential statistics in terms of frequency, percentage, mean, standard deviation, paired't' test and chi square test. ***Results*:** Findings related to significance of difference between the experimental and control group mean pre-test and pain scores and standard deviation was [7.2±1.7100] and control group having [4.4±1.248] before giving the intervention and experimental group [3.666±0.922], control group [4.06667±1.201] after giving the intervention. The effectiveness was statistically tested by using paired't' test which revealed that t value =15.37 and the result was found to be significant at $p<0.001$. ***Conclusion*:** The study proved that administration of Castor oil massage and Hot water application intervention on reduction of knee joint pain among elderly patients with knee joint pain was effective, scientific, logical, and cost-effective strategy.

Keywords: Assess, Effectiveness, Castor Oil, Massage, Elderly Patients, Knee Joint Pain, Hot Water Application.

INTRODUCTION

Ageing is a natural process where everyone must undergo this phase of life at their own time and pace. In the broader sense, ageing reflects all the changes taking place over the course of life. These changes start from birth to one grows, develops and attains maturity. Even the healthiest, aesthetically fit individual cannot escape from these all changes. Slow and steady physical impairment and functional disability are noticed because of the increased dependency in the period of old age [1].

Joint pain is a chronic, progressive process in which new tissue is produced in response to joint insults and cartilage deterioration. The most prevalent articular disease in adults 65 years of age and older. Osteoarthritis occurs more commonly in women than in men. It accounts for substantial disability as a result of its effect on the large weight bearing joints and the spine [2].

Massage, as one of the most widely used Complementary and Alternative Medicine therapies, is defined a method of touching or manipulating body soft tissues by hand to provide comfort. Compared to

pharmacological therapy and surgery, massage has unique advantages because of its characteristics of high safety, low-cost, and easy access. Previous studies have also demonstrated that massage can relieve the related symptoms of knee osteoarthritis by promoting the blood circulation around the joint, improving the tension of the muscle as well as increasing the flexibility of the joint [3].

Prevalence of knee pain is higher in females than males. Years of life lived with knee osteoarthritis increased from 10.5 million in 1990 to 17.1 million in 2010. Arthritis refers to the inflammation of the joints in the body. A person with arthritis used to experience unpleasant symptoms such as severe pain in the joint areas along with swelling and stiffness [4].

Heat can be applied in several ways, including electric pads, hot water bottles, hot gel packs or via a warm bath. Heat dilates blood vessels and increases blood flow, delivering oxygen and nutrients to cells, which helps with the removal of cell waste and promotes healing [5].

Castor oil comes from the seed, Ricinus Communis and is native to India. Due to its unusual composition, castor oil has a number of health benefits and healing properties. Castor oil is a triglyceride, comprised of fatty acids, 90 percent of which is ricinoleic acid. Castor oil is considered effective and safe as compared to some other natural remedies [6].

MATERIAL AND METHODS

Quantitative evaluation research approach was adopted for this study. The research design selected for the present study is a True experimental pre test post test control group design. A sample of 60 elderly patients with knee joint pain were selected from HSK Hospital Bagalkot. Written consent was taken from participants for the study. Socio demographic variables, and standardized Numerical Pain Scale was used as tool for data collection. The data was analyzed by using descriptive and inferential statistical in terms of mean, standard deviation, paired t test, & chi square.

Study Design:

The study design adopted for this study was True experimental pre–test post –test control groups design. Here experimental group and control group of elderly patients with knee joint pain were selected from randomization.

Setting of the Study:

The present study was conducted at HSK Hospital Bagalkot. The study setting was selected according to the availability of Elderly patients at HSK Hospital Bagalkot.

Participants:

In the present study participants were the Elderly patients with knee osteoarthritis. The sample consisted of 60 elderly patients with knee joint pain who met inclusion criteria, segregated 30 in each experimental and control group respectively.

Instruments:

The study was conducted using a Self Structured Questionnaires with items related to socio demographic and personal characteristics of elderly patients and Numerical pain scale for the assessments of severity of knee pain.

Description of Data Collection Instruments

PART I: SOCIO-DEMOGRAPHIC DATA

The first part of the tool consists of 11 items for obtaining information of the selected background factors such as Age, Gender, Educational, Religion, Family monthly income, BMI, Co-Morbidities, Previous history of joint pain, Diet, how often do you do exercise, any other treatment has taken for joint pain?

PART II: NUMERICAL PAIN SCALE

Numerical pain scale requires patients to rate their pain on defined scale. The numerical pain scale contains 0-10 scores, where 0 is no pain and 10 is the worst pain.

Data Collection Procedures:

The data collection was carried out from 06-06-2024 to 30-06-2024, among elderly patients with knee joint pain at the BVVS HSK Hospital and Research center, Bagalkot. Permission was obtained from the medical superintendent of BVVS HSK Hospital before data collection. Written consent was obtained from 60 samples. Knee osteoarthritis patients were selected on the basis of non-probability convenient Sampling Technique used, for randomization probability simple random through lottery method. Then the investigator conducted pre-test on assessment of level of knee pain among elderly patients by using Numerical Pain scale. Then the castor oil massage and hot water application Technique was administered For the Experimental group applying the Castor oil (10 ml) and gentle massage in a clockwise for 5 mins and keep hot water bag (between 30degree Celsius to 50 degrees Celsius) for 10mins on the knee for 4 weeks. Then the post-test level of knee pain was assessed after intervention for all the four weeks.

Variables under Study:

Independent Variable: Castor oil and hot water application on knee joint pain.

Dependent Variable: Dependent variable is the knee joint pain among elderly patients

Socio-Demographic Variables: Age, Gender, Education, Religion, Income, BMI, Co-morbidities,

Previous history of joint pain, How often do you exercise, any other treatment taken for joint pain.

Statistical Analysis:

The obtained data were statistically examined in terms of the objectives of the study using descriptive and inferential statistics. A master sheet was prepared with responses given by the study participants. Frequencies Percentage was used for the analysis of demographic data, and 't' test to determine significance of difference between pre-test and post test score of knee joint pain among elderly patients, and The Chi square (X^2) test to find out the association between socio demographic variables and pre-test level of knee joint pain among elderly patients.

Ethical Approval:

A certificate of ethical permission was obtained from ethical committee of the institution and written consent was taken from each participant.

RESULTS

Part I: Socio Demographic Variables

In this study, in the experimental group majority 83% (25) of the subjects were in the age group of 55 -60 and Where as in the control group majority of the subjects 80% were in the age group of 55 -60, majority of 60% (18) of subject in the experimental group is in the male and where as in the control group 50%(15) in both male and female followed by majority of 23% (7) experimental subjects are in illiterate and Primary education, where as in the control group majority of subjects were in 30% (9) in illiteracy. 37% (11) majority of experimental subjects are in Hindu, where as in control group majority of subjects 33% (10) in Hindu. It is also followed by 37% (11) subjects in experimental group belongs to the category of 20,000-30,000, where as in the control group majority of subjects 33% (10) are in the 20,001-30,000. Followed by in the experimental group the majority of subjects 47% (14) in the category of Normal BMI, and where as in the control group majority of subjects 43% (13) in normal BMI. 63% (19) of majority of subjects in experimental group belongs to the hypertension, Where as in the control group majority of subjects 43% (13) belongs to diabetes mellitus and hypertension.56% (17) majority of subjects of experimental group is in no category, if yes specify, where as in the control group 63% (19) in no category . In the experimental group the majority of subjects 37%(11) are in Non-vegetarian, where as in the control group majority of subjects 43%(13) are in non-vegetarian, followed by 63% (21) of experimental subjects are in thrice in a week, where as in the control group majority of subjects 70% (21) are in thrice a week, and also followed by 63% (19) of subjects in experimental group are in category Yes and, where as in the control group majority of the subjects 73% (22) in category yes.

Part II: Assessment of mean score and standard deviation of pre-test and post-test of experimental and control group.

Table 1: Mean score& standard deviation of pre- test and post- test of experimental and control group.

Sl. No	Groups		Mean	Standard deviation
1.	EXPRIMENTAL GROUP	Pre-Test	7.2	1.7100
		Post-Test	3.666667	0.9222
2.	CONTROL GROUP	Pre-Test	4.4	1.248
		Post-Test	4.06667	1.201

Table 1 depicts that the mean score of Knee joint pain in experimental and control group the pre-test is 7.2 and 4.4 respectively. In the post test the experimental group was 3.6 and in control group was 4. This shows that there is a significant reduction in the knee joint pain in experimental group when compared to control group.

Part III: The pre-test and post-test scores according to the numerical pain scale of knee joint pain among elderly patients who are attending the orthopedic department in both the groups.

Objective No. 1:a) To assess the level of knee joint pain among elderly patients who are attending the Orthopaedic department in experimental group.

Table 2: Pre-test and Post-test scores according to the numerical pain scale of knee joint pain among elderly patients in experimental group.

Sl. No	Scores	Pre test	Post test
1.	0-No pain	0	0
2.	1-4-Mild pain	3	6
3.	5-6-Moderate pain	6	11
4.	7-10-Severe pain	21	13

Table.2 depicts the level of knee joint pain among elderly patients who are attending the orthopaedic department in experimental group pre-test and post test scores according to the numerical pain scale. In the pre

test the majority of the patients 21 were having severe pain (7-10), patients with Moderate pain (5-6) were 6, patients with Mild pain (1-4) were 3 and patients with no pain were 0.In the post test the majority of the patients 13 were having severe pain (7-10), patients with Moderate pain (5-6) were 11,patients with Mild pain (1-4) were 6 and patients with no pain were 0.

b) To assess the level of knee joint pain among elderly patients who are attending the Orthopaedic department in control group.

Table 2.1: Pre-test and Post-test scores according to the numerical pain scale of knee joint pain among elderly patients in control group

Sl. No	Description	Scores	Pre test	Post test
1.	No pain	0	0	0
2.	Mild pain	1-4	0	1
3.	Moderate pain	5-6	15	15
4.	Severe pain	7-10	15	14

Table. No 2.1 depicts the level of knee joint pain among elderly patients who are attending the orthopedic department in control group pre-test and post test scores according to the numerical pain scale. In the pre test the majority of the patients 15 were having severe pain (7-10), patients with Moderate pain (5-6) were 15, patients with Mild pain (1-4) were 0 and patients with no pain were 0. In the post test the majority of the patients 14 were having severe pain (7-10), patients with Moderate pain (5-6) were 15,patients with Mild pain (1-4) were 1 and patients with no pain were 0.

Part IV: To assess the effectiveness of Castor oil massage and Hot water application in experimental group and routine care in the control group.

Objective No.2:

To assess the effectiveness of the castor oil massage and hot water application and routine care on knee joint pain among elderly patients in experimental group.

H1: The mean post-test scores of knee joint pain is significantly lower than the mean pre-test scores of knee joint pain among elderly patient in experimental group.

Table 3: Showing the significance level of mean post-test scores than the mean pre-test score in experimental group.

Experimental	Total sample	Mean	Standard Deviation	T value	T table value	Significance
Pre-test	30	7.2	1.7100	**15.37**	**2.05**	**Significant**
Post-test		3.666667	0.9222			

Table 3 despites the comparison of pre-test and post-test scores in the experimental group were calculated with 'paired t test'. The calculated t value is 15.37 and the table value is 2.05 with the significance level of 0.05. The calculated value is more than the table value. Hence it is significant and effective and accepted the **H1**. The mean post-test scores of knee joint pain is significantly lower than the mean pre-test scores of knee joint pain among elderly patient in experimental group.

Part V: To find out the association between the pre-test score of knee pain and socio demographic variables in both the groups.

Table 4: Association among the socio demographic variables in experimental group

SI. No	Socio demographic variables	Degree of freedom	X^2	Table value	Significance
1	Age	1	1	3.84	Not significant
2	Gender	1	1	3.84	Not significant
3	Education	1	0.5367	3.84	Not significant
4	Religion	1	1	3.84	Not significant
5	Family Income	1	0.6015	3.84	Not significant
6	BMI	1	0.5478	3.84	Not significant
7	Co-Morbidities	1	1	3.84	Not significant
8	Previous history of joint pain	1	0.6129	3.84	Not significant
9	Diet	1	0.622	3.84	Not significant
10	How oftenly do you do exercise?	1	1	3.84	Not significant
11	Any other treatment has taken for joint pain?	1	1	3.84	Not significant

Table No.4 shows that in the experimental group the demographic variables (Age, Gender, Education, Religion, Family Income, BMI, Co-Morbidities, Previous History of joint pain, Diet, How often do you do exercise, Any other treatment has taken for joint pain?) did not show statistically significant association with pre test level of knee joint pain among elderly patients at $p<0.05$.

Hence, the **H2** is rejected for the demographic variables were not significantly associated with pre test level of knee joint pain among elderly patients with $p<0.05$ in experimental group.

Table 4.1: Association among the socio demographic variables in Control group

Sl. No	Socio demographic variables	Degree of freedom	X^2	Table value	Significance
1	Age	1	0.2	3.84	Not significant
2	Gender	1	1	3.84	Not significant
3	Education	1	1	3.84	Not significant
4	Religion	1	1	3.84	Not significant
5	Family Income	1	1	3.84	Not significant
6	BMI	1	1	3.84	Not significant
7	Co-Morbidities	1	1	3.84	Not significant
8	Previous history of joint pain	1	1	3.84	Not significant
9	Diet	1	1	3.84	Not significant
10	How often do you exercise?	1	1	3.84	Not significant
11	Any other treatment has taken for joint pain?	1	1	3.84	Not significant

Table No.4.1 shows that in the control group the demographic variables (Age, Gender, Education, Religion, Family Income, BMI, Co-Morbidities, Previous History of joint pain, Diet, How often do you do exercise, Any other treatment has taken for joint pain?) Did not show statistically significant association with pre test level of knee joint pain among elderly patients at $p<0.05$.

Hence, the **H2** is rejected for the demographic variables were not significantly associated with pre test level of knee joint pain among elderly patients with $p<0.05$ in control group.

DISCUSSION

The findings of the present study are discussed in light of previous scientific studies in this chapter and discussion regarding findings of the study is presented in accordance with the objectives of the study and hypothesis. The current study find out the effectiveness of Castor oil massage and hot water application on knee joint pain among elderly patients with osteoarthritis at BVVS HSK Hospital and Research Centre, Bagalkot. The study found that the there is effectiveness of Castor oil massage and hot water application on reduction of knee joint pain among elderly patients with knee joint pain. The present study revealed that difference between the experimental and control group mean pre-test and pain scores and standard deviation was [7.2±1.7100] and control group having [4.4±1.248] before giving the intervention and experimental group [3.666±0.922], control group [4.06667±1.201] after giving the intervention. The effectiveness was statistically tested by using paired 't'test which revealed that t value =15.37 and the result was found to be significant at $p<0.001$ level of significance. Study concluded that Castor oil massage and hot water application is effective, scientific, logical and cost effective strategy in reducing the knee joint pain among elderly patients.

Limitations

The study limited to the sample of 60 Elderly patients with knee joint pain who are attending the orthopaedic department in BVVS HSK Hospital Bagalkot.

CONCLUSION

Effectiveness of Castor oil massage and hot water application on knee joint pain among elderly patients was shown by comparison of mean score of Knee joint pain in experimental and control group the pre-test mean score is 7.2 and 4.4 respectively. In the post test the experimental group mean score is 3.6 and mean score in control group 4. This shows that there is a significant reduction in the knee joint pain in experimental group when compared to control group and it is found to be statistically significant.

DECLARATION BY AUTHORS

Ethical Approval: Institutional ethical clearance approved.

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Conflicts of Interest: The author declare there are no conflicts of interest.

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