

Comparison of Effectiveness between Hot Air versus Hot Water Bag Application in Reduction of Musculoskeletal Pain among Patients Admitted in Tertiary Care Hospital

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ABSTRACT

Background/Objective: Musculoskeletal pain of various types is one of the commonest forms of pain. According to WHO from 1990-2016, 20-33% of people over the world lead their life with a painful musculoskeletal condition. It is proved that musculoskeletal pain is considered to be the most widespread disease next to common cold. The Researchers main objective was to compare the effectiveness of hot water bag vs. hot air bag in reduction of musculoskeletal pain.

Methods: A comparative study was undertaken in a tertiary hospital situated at Puducherry with 90 samples randomly divided into 3 groups (2 experimental and 1 control). Using numerical pain rating scale and modified WOMAC scale the pretest on the samples were obtained. The intervention with hot water bag and hot air bag were applied for 15 – 20min, following posttest was obtained from all three groups.

Results: This study finding revealed that both hot water bag and hot air bag is effective in reduction of musculoskeletal pain. $P < 0.001$ highly significant.

Conclusion: this study proves that the hot air bag was found to be equally effective as the hot water bag. Thus in the absence of hot water in modern day ward setup hot air bag can be used as a replacement for hot water bag.

Key Words: hot water bag, musculoskeletal pain, hot air application, thermotherapy.

INTRODUCTION

At some point of time all human beings have experienced one or more brief episodes of musculoskeletal pain associated with injury or overuse. Each one uses different mechanisms to overcome the different types of pain. The effectiveness of these mechanism depend upon each individuals pain threshold, but most of the people seeking health care interventions want it to be free from pain especially musculoskeletal pain which is usually unbearable.

According to the international classification of diseases, more than 150 diagnoses broadly are put into musculoskeletal conditions on a whole. It is often assumed that the prevalence of musculoskeletal disorders increases with age, it is to be kept in mind that most of the younger generations are also affected, often during their peak earning years. Study on global ageing and adult health (SAGE) highlights the huge prevalence of arthritis in developing countries especially those in a lower socioeconomic group. ^[1]

The International Association for the Study of Pain (IASP) defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.” [2]

To emphasize the importance of pain management and to increase the awareness among our health professionals the American pain society coined the phrase “pain” the fifth vital sign. As nurses being the primary health care giver, they play a very important role in caring for the vital signs of the patient importantly the fifth vital sign “pain”. Pain is highly subjective in nature. According to McCaffery & Beebe, (1989), pain need to be documented in the exact words of the patient, as different people have different pain threshold. [5]

From the ancient period dating back to 500 B.C the use of heat for relieving various conditions has been in practice. Arthritis Foundation has found that using natural heat and cold therapies for pain relief to be the two simplest, yet most effective treatments for arthritis and swelling. People of all ages, shapes and sizes are able to benefit from heat treatments in any forms. [3]

According to Lewis and Brunner, Heat therapy can be said to be the application of either one of the two types of heat application such as moist or dry heat to the skin. Heat therapy can be any one of the type that is either superficial or deep. Superficial heat can be applied using an electric heating pad (dry or moist), a hot pack, hot moist compresses, warm wax (paraffin), or a hot water bottle. [4]

Various studies have been conducted in support of heat application only in the form of water for pain reduction. Thus the researcher’s interest was to find the other alternatives of heat application like use of warm air in reduction of musculoskeletal pain.

STATEMENT OF THE PROBLEM:

“Comparison of effectiveness between hot air versus hot water bag application in

reduction of musculoskeletal pain among patients admitted in tertiary care hospital.”

OBJECTIVES:-

- ✚ To assess the level of musculoskeletal pain among patients admitted in tertiary care hospital.
- ✚ To evaluate the effectiveness of hot air versus hot water bag on level of musculoskeletal pain among patients admitted in tertiary care hospital.
- ✚ To associate the level of musculoskeletal pain with selected demographic variables.

HYPOTHESES

- ❖ H_1 - Level of pain differs before and after hot air bag application.
- ❖ H_2 - Level of pain differs before and after hot water bag application.
- ❖ H_3 - Association exists between levels of musculoskeletal pain among patients with selected demographic variables.

MATERIALS AND METHODS

The research design adopted for the study was true experimental research design carried out in a tertiary care hospital, Puducherry. The study was conducted among 90 samples with musculoskeletal pain the age group of 40 – 60 years. The samples were randomly assigned into three groups of 30 each by lottery method. The samples were selected based on the inclusion and exclusion criteria. The sample size was calculated based on power analysis at the power of 90%.

The Institutional Human ethical clearance was obtained. The informed consent from the samples was obtained. A structured interview was used to collect the demographic variables and standardized numeric pain rating scale and modified WOMAC scale was used to assess the intensity of pain reduction among patients with musculoskeletal pain. The reliability of the tool was $r=0.96$ for numeric pain scale. The data collection was done for a period of 6 weeks.

After self- introduction a pretest was done to assess the level of musculoskeletal pain in both the two experimental and control group using Pain numeric rating scale and Modified WOMAC scale. Heat application using hot water bag for Group I and heat application using hot air bag for Group II and nil intervention was given to group III members. Posttest was done using Pain numeric rating scale and Modified WOMAC scale.

STATISTICAL ANALYSIS:

The data analysis was done using SPSS software. The investigator used descriptive statistics such as frequency, percentage, mean and standard deviation, were used to present the descriptive characteristics of the patient with musculoskeletal pain in group I, group II

and group III. Inferential statistics like Mann whitney test used to compare the effectiveness between the group I, group II and group III. ANOVA was used to find out the effectiveness of pretest and posttest within the group and chi square test to find out the association between the level of musculoskeletal pain and demographic variables for all analyses, P<0.05 was accepted as the level of significance.

RESULT

The following results were obtained when the data were collected from the patients.

Socio demographic Variables:

Among 90 samples Majority belonged to 18.5 -24.9 of BMI in all three groups, Majority of samples belonged to moderate workers in all three groups.

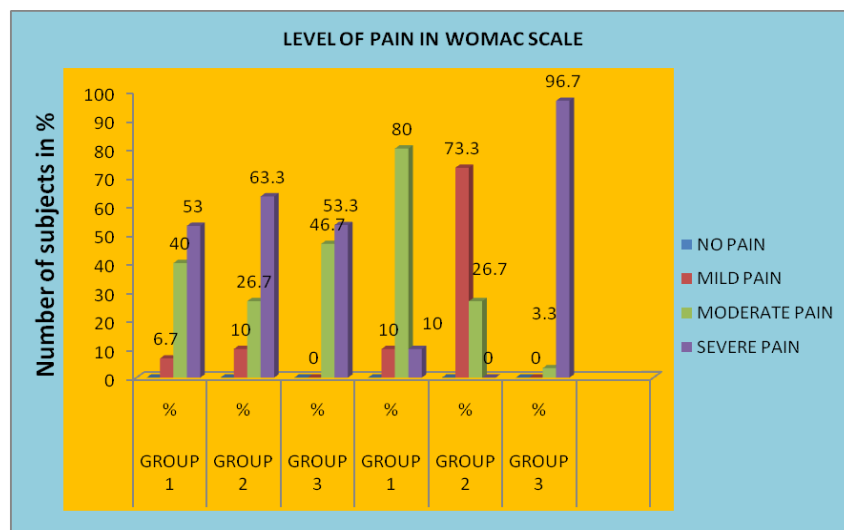


Figure 1: Distribution of Level of musculoskeletal Pain assessed using modified WOMAC scale in Group I, Group II and Group III during Pre-test and Post Test

Present study finding reveals that 16(53%) in Group I and 19(63.3%) in Group II and 16(53.3%) in Group III had severe pain prior to the intervention. Whereas after the intervention the severity of pain reduced from severe to moderate 24(80.0%) in

Group I. In Group II 22(73.3%) pain had considerably reduced from severe to mild. Whereas the severity of pain had remained the same in Group III, 29(96.7%) of samples were in severe pain.

Table 1: Comparison of Pre and Posttest of Mean musculoskeletal Pain Level between Group I, Group II and Group III among patients with musculoskeletal pain.

Observation	Group	Mean	Median	Standard Deviation	KW- ANOVA	P-Value
pre-test	Group 1	59.67	63	16	0.265	0.876
	Group 2	57.7	62	12.54		
	Group 3	59.13	62	10.92		
post-test	Group 1	54.73	57	9.82	76.036	0
	Group 2	22.77	20.5	6.65		
	Group 3	70.17	69.5	4.26		

The table depicts that pre-test mean musculoskeletal pain level in Group I, Group II and Group III was 59.67, 57.7, and 59.13 respectively. The post-test mean neuropathic pain level in Group I, Group II and Group III was 54.73, 22.77 and 70.17. P -value was <0.05 in post-test which is significant at $p < 0.05$, which implies that hot air bag application was effective than hot water bag application.

Table 2: The association between level of musculoskeletal pain and demographic variables.

S.NO	DEMOGRAPHIC VARIABLES	GROUP				chi –square	p-value
		NO	MEAN	MEDIAN	SD		
1.	Yoga	12	49.92	50	12.35	9.5333	0.0085
	Regular Exercise	11	65.82	65	6.01		
	None	67	59.28	62	13.46		
2.	Diabetes Mellitus	29	56.28	56	12.64	8.6445	0.0344
	Hypertension	22	58.59	63.5	13.91		
	Cardiac Diseases	12	54.25	59.5	15.12		
	None	27	63.81	64	11.32		

The table 2 depicts that the demographic variable specific health practices had shown statistically significant association with level of musculoskeletal pain $p < 0.05$, and systemic illness had also shown statistically significant association with level of musculoskeletal pain $p < 0.05$. The other demographic variables had not shown statistically significant association with level of musculoskeletal pain.

DISCUSSION

The first objective of the Present study finding reveals that 16(53%) in Group I and 19(63.3%) in Group II and 16(53.3%) in Group III had severe pain prior to the intervention. Whereas after the intervention the severity of pain reduced from severe to moderate 24(80.0%) in Group I. In Group II 22(73.3%) pain had considerably reduced from severe to mild. Whereas the severity of pain had remained the same in Group III, 29(96.7%) of samples were in severe pain.

This shows that the heat application through hot water bag application and hot air bag application in three groups were effective on pain reduction. The pain intensity of patients with musculoskeletal Disorders differs before and after administration of hot water bag and hot air bag in all three groups. Hence the stated Hypothesis (H₁) and (H₂) were accepted.

Finding is consistent with similar study done by Parminder Kauret,al.(2007) on the effect of ‘moist heat application’(hot

water bag application) on the intensity of knee joint pain among geriatric population” The results show that the use of moist heat application (hot water bag) is recommended for home base management of knee joint pain. [6]

The second objective of the present study finding reveals pre-test mean musculoskeletal pain level in Group I, Group II and Group III was 59.67, 57.7, and 59.13 respectively. The post-test mean neuropathic pain level in Group I, Group II and Group III was 54.73, 22.77 and 70.17. P -value was <0.05 in post-test which is significant at $p < 0.05$, which implies that hot air bag application was effective than hot water bag application.

The third objective of the present study finding reveals that the demographic variable specific health practices had shown statistically significant association with level of musculoskeletal pain $p < 0.05$, and systemic illness had also shown statistically significant association with level of musculoskeletal pain $p < 0.05$. The other demographic variables had not shown statistically significant association with level of musculoskeletal pain.

CONCLUSION

Based on in depth review and analysis done on musculoskeletal pain it can be concluded that musculoskeletal pain originating from musculoskeletal disorders from various origins are an urgent national

health problem. The study implicates that hot air bag application will be very useful for patients with musculoskeletal pain. Hot air bag application is a new cost effective approach to provide better pain relief.

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