e - ISSN – 2349-0691

AMERICAN JOURNAL OF ADVANCES IN NURSING RESEARCH

Journal homepage: www.mcmed.us/journal/ajanr

EFFECTIVENESS OF HYDROTHERAPY ON PAIN AMONG ARTHRITIS PATIENTS ATTENDING SELECTED COMMUNITY HEALTH CENTRE AT MADURAI

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Article Info

Received 25/12/2020
Revised 15/02/2021
Accepted 17/02/2021

Key word:
Hydrotherapy, arthritis, pain.

ABSTRACT

To assess the level of pain among arthritis patients in both intervention and control group attending selected community health centre pudhur Madurai. To evaluate the effectiveness of Hydrotherapy on pain among arthritis patients attending selected community health centre pudhur Madurai. To associate the level of pain among arthritis patients attending selected community health centre pudhur .with their selected socio demographic variables. Quantitative approach True Experimental – pre test post test only design was used. 60 subjects were selected by consecutive sampling. Pre test was conducted. The hydrotherapy hot foot bath was given to arthritis patients of experimental group about 15-20 minutes. Arthritis patients of control group were not received the intervention. The post test was conducted after 6 weeks intervention. The findings revealed that there was a significant reduction of pain after intervention, which was confirmed by paired 't' test ($t=10.33$; $p< 0.001$) and unpaired 't' test ($t=6.36$; $p< 0.001$) level.The study concluded that hydrotherapy was effective on pain among arthritis patients.

INTRODUCTION

A report by the world health organization(WHO) on the global burden of disease suggests Osteoarthritis of knee is like to become the fourth most important global cause of disability in women and the eighth most common in men. The impact of Osteoarthritis can be significant on individuals. People with Osteoarthritis have difficult in performing and taking longer perform activities of daily living.[1] Osteoarthritis of the knee account for more dependence in walking, stair climbing and lower limb extremity task than any other disease.[2] India is the second most populous country in the world with 1.2 billion residents counted in the 2011 census.

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It is the most common problem and is most frequent joint disease with prevalence of 22% to 39% in India. The reported prevalence of Osteoarthritis in rural India is 5.78%. There were 3328 knee Osteoarthritis patients out of a total surveyed sample of 41 884. The prevalence of knee Osteoarthritis thus becomes 8%. In the Bhigwan population in India, 6% of the respondents had chronic knee pain without clinical evidence of Osteoarthritis .So that about 11% of all women over the age of 60 years have symptoms due to knee Osteoarthritis.

India may become the osteoarthritis capital of the world with over 60 million cases by 2025, osteoarthritis is the most prevalent form of arthritis in India, affecting over 15 million adults every year. "In the last few decades, Indians in the age-group of 30 to 50 years are falling prey to osteoarthritis and it continues to have serious impact on the lives of elderly people," the South

Asian nations also have a high number of osteoarthritis cases, they are only the a fourth of the cases in India.

There are many reasons for the high prevalence of Osteoarthritis in India. Genetic is the strongest reason which makes more pre- disposed to it. several other factors like the popular squatting position in India, rising obesity, sedentary life style, and poor diet are responsible for its high incidence. .[3] The economic impact of Osteoarthritis on society and health care resources is also significant.

The main aim of hydrotherapy is to relieve pain, improve joint motion, promote feelings of comfort, and consequently improve function and quality of life. Hydrotherapy is advocated as a safe and efficient medium for achieving goals, and it is commonly used for patients with arthritic disease. Though many countries used water to produce different physiological/therapeutic effects on different part of the system for maintaining health, preventing, and treating the diseases. This treatment is easy to use, is low-cost, and can be used in the home, outpatient clinic and private office.[4]

A study to evaluate the effectiveness of hydrotherapy on pain among arthritis patients attending selected community health centre Pudhur Madurai.To assess the level of pain among arthritis patients in both intervention and control group attending selected community health centre pudhur Madurai.To evaluate the effectiveness of Hydro therapy on pain among arthritis patients attending selected community health centre pudhur Madurai.To associate the level of pain among arthritis patients attending selected community health centre pudhur with their selected socio demographic variables . [5]

Methodology:

Research design is the over all plan for obtaining an answer, to research question for testing the research hypothesis is referred to as the research design(polit and hungler,1999), The research design selected for the present study was true experimental - pretest post test design. The study intended to assess the effectiveness of Hydrotherapy on pain among arthritis patients attending selected community health centre Madurai. [6]

Research Variables

Dependent Variable:

Arthritis pain

Independent Variable:

Hydrotherapy.

Demographic variable:-

Socio-demographic variables like age, sex, education, marital status, occupation, income, religion diet habits, exercise, body mass index, duration of the knee pain,

Total population in Male 51%, in Female 49%,The age group of 41-60 years of the population were participated in this study. The sample size consists of 60 samples.30 subjects are assigned to experimental group and 30 subjects are assigned to control group respectively. Consecutive sampling technique was used in this study.

The following were the criteria for the selection of samples for the study.

Inclusion criteria:

- Patients with osteoarthritis pain
- The age group of 41-60 years, both male and female
- The patients those who are arthritis with pharmacotherapy drugs
- Willing to under go hydrotherapy[7]

Exclusion Criteria

- Patients with any systemic illness, secondary diseases, such as Diabetic, Blood Pressure etc
- Age group above 61 years
- Rheumatic arthritis
- Patients with restricted mobility
- Those who are not willing to participate in the study
- Any history of trauma injury to the joints or lower legs.
- Already having any foot ulcer, and fungal infection.

Method of sample selection;

The subjects were selected for random assigned by using the lottery method. The study tool consisted of two sections. Section A: Demographic variable. Section B: The Western Ontario Mac Master scale used to assess the arthritis pain. [8]

Scoring Procedure:-

Womac Pain Score Interpretation

Common Interpretation:-	
None	0
Mild	1 - 24
Moderate	25 - 48
severe	49 - 72
extreme	73 - 96

The research proposal has approved by the experts of the Dissertation committee of College of Nursing, Madurai Medical College, Madurai and Institutional Review Board, Independent Ethical Committee of Government Rajaji Hospital, Madurai for conducting the pilot study and main study. The formal permission has obtained from the City health officer.

The data collection was done for the period of 6 weeks.The data has been collected from the subjects

who were interested to participate in the study who met the inclusion criteria and 60 samples were selected through consecutive sampling technique and samples were assigned using lottery method. Pretest was conducted by using structure interview questionnaire. The hydrotherapy was given 15-20 minutes for alternative days per week for 6weeks for each subjects. After the intervention arthritis pain level were assessed with Western Onterio Mac Master Scale on the last day. The post test was conducted 6 weeks after the intervention.

The data was collected from 60 samples, assembled, analyzed and tested for their significance. The findings based on the statistical analysis are presented in this chapter. Descriptive statistics was used for analyzing data in the light of objective of the study.

RESULTS:

The study findings of the samples are presented in the following sections.

Section-I: Distribution of socio demographic variables of arthritis patients in experimental group and control group shown in table 1

Section-II: Description of pre test level of pain among arthritis patients in experimental group and control group shown in table 2,3,4,5 and 6

Section-III: Effectiveness of hydrotherapy on pain in experimental group among arthritis patients shown in table 7,8,9,10,11 and 12

Section-IV: Association between post test level of pain among arthritis patients in experimental group and control group with their selected demographic variables. shown in table13,14 and 15.

The above table reveals that, in the aspect of age, most of the subjects 17 (56.70%) were belongs to 41-50years; the least were 13 (43.3%) belongs to51-60 years and None of the subjects (0%) belongs to 61-70 years in experimental group and in the control group 15(50.0%) were belongs to 41-50 years,15 (50.0%) were in the age group of 51-60 years and None of the subjects were in 61-70 years of age group.

In regard to gender, 7(23.3%) were males and 23(76.7%) were females in experimental and in control group, 8(26.7 %) were males and 22(73.3%) were females.

Regarding education, most of the subjects, 11 (36.7%) we re Non formal education ,9 (30%) subjects were studied u p to primary education, the subjects,9(30%) were up to se condary education and the remaining 1 (3.3%) were degre e education in experimental group. In control group 7(23. 3%) subjects were Non formal education,14(46.7%) were primary education, the subjects,9 (30%)were secondary e ducation and the remaining were None of the degree educ ation.

About marital status of the subjects, most of their married in experimental group 29(96.7%) and the subjects 1 (3.3%)in unmarried. In control group, 30 (100.0%) were marrie d , and none of them unmarried.

Regarding occupation, most of the subjects 14 (46.7%) w ere moderate worker, next the subjects were 11(36.7%)se dentary worker and remaining 5(16.7%) were heavy work er in experimental group. Similarly in control group, most of the subjects 14(46.7%) were moderate worker, and the subjects were 13(43.3%)sedentary worker and remaining 3(10%) were heavy worker.

About family income of the subjects, most of their salary i n experimental group 24(80%) were in Rs.2000-5000,the subjects4(13.3%) were in Rs 5001-10,000, and none of th em earned Rs 10001-15000, 2(6.7%)were the above Rs.15 000.In control group, 22(73.3%) were in Rs.2000-5000,th e subjects 7 (23.3%) were in Rs 5001-10,000, and none of them earned Rs 10001-15000, and 1(3.3%)were above Rs. 15000 per month.

Related to the religion In experimental group most of the subjects 25(83.3%)were belongs to Hindu religion,2(6.7%) were belongs to muslims,3(10%) belongs to Christian. I n control group most of the subjects 19(63.3%)were belon gs to Hindu religion,8(26.7%) were belongs to muslims,3(10%) belongs to Christian.

About diet habits, maximum subjects 27(90%)were non-v egetarian,3(10%) were vegetarian in experimental group a nd29(96.7%) were non-vegetarian remainin1(3.3%) were vegetarian in control group.

Based on exercise, 8(26.7%) subjects were doing regular exercise,22(73.3%) were irregular exercise None of them (0%) were not doing exercise in experimental group. the s ubjects 11(36.7%)were regular exercise,19(63.3%) were i rregular exercise None of them (0%) were not doing exerc ise in control group.

Related to body mass index, In experimental group 2(6.7 %) subjects were below 18, 12(40%) between 18.5-25,the subjects belongs to 11(36.7%) between 25- 30,and the sub jects belongs to 5(16.7%) between more than30.In control group the subjects belongs to None of them(0%)were belo w 18.5, the subjects belongs to 15(50%) between 18.5-25 the subjects belongs to 12(40%) between 25-30, the subje cts belongs to 3(10%) between more than30.

In regard to duration of knee pain, most of them in experimental group10(33.3%) were got below one year of knee pain,14(46.7%)were 1-3 years of knee pain, and 6(20%)were 4-6 years of knee pain. In control group 7 (23.3%) were got below one year knee pain,16(53.3%)were got one year to three years of knee pain and 7(23.3%)were got 4-6 years knee pain.

The above table shows that most of the subjects 22(73.3%) were in Moderate pain ;6 (20%) were in Mild pain ; 2(6.7%) severe pain among control group. In

experimental group most of the subjects 23(76.7%) were in moderate pain, 4(13.3%) were severe pain ,3(10%) were got mild pain Hence none of the subjects were extreme level of pain in pre test score among experimental group and control group.

Above table shows that most of the subjects 16(53.3%) were in Moderate level of pain;14 (46.7%) were in severe pain level.. In experimental group the level of pain 11(36.7%) subjects had in mild level of pain, 19(63.3%) were in Moderate level of pain, None of the subjects were in extreme level of pain in both groups.

The above table shows that the level of stiffness, most of the subjects 16(53.3%)had in Mild;13 (43.3%) had in Moderate. one (3.3%) in severe among pre and post test of control group. In experimental group the level of stiffness, 4(13.3%) subjects were None,19(63.3%) were mild, and 7(23.3%) scored in moderate. None were scored severe in both group. slightly changes in pre and post test for both group.

The above table shows that the level of Physical function, most of the subjects 20(66.7%) were in Moderate level of physical function;9 (30%) were in Mild level of physical function.1 (3.3%) in severe level of physical function among pre and post test control group. In experimental group the level of Physical function,22 (73.3%) subjects were Mild,8(26.7%) were Moderate level of physical function, None were scored severe level of physical function. In both group none of the subjects were in extreme level of physical function.

Above tables shows that in pre and post test on p ain among experimental group, none of the subjects were having no pain, 10% and 70% subjects were having mild pain, 23(76.7%)and 9(30%) subjects were having moderat e pain, in pre test 4(13.3%) subjects were having only sev ere pain in post test no subjects were in severe pain. Amo ng control group, in pre and post test none of them were h aving no pain, 20%,and 10% of them were having mild pa in, 73.3% ,83.3% of them are having moderate pain and 6. 7% of them were having severe pain from Osteoarthritis a re deprived of access to quality treatment 5.78%, rural po pulation in India, in urban population 22.00% to 28.00% o f India.

Medical management is an important part of treat ment for many knee problems. The medication used will d epend largely on the specific condition or form of arthritis . Analgesics are among the most commonly used drugs fo r many forms of arthritis. Non-steroidal anti-inflammatory drugs are a first line of treatment and are commonly used in the symptomatic treatment of many arthritis diseases an d other associated medical conditions. Non-steroidal anti-i nflammatory drugs reduce swelling and pain in arthritis p atients Non-pharmacological treatment includes the patien t education regarding joint protection and avoidance of ex cessive joint loading is important for these patients. Physi cal measures like hot pack, paraffin bath, clove oil massag e, hydrotherapy, foot bath, hot and cold application are fe w examples of management.

Alternative medicine and complementary medici ne are generally used to describe the practice used indepe ndently and used in conjunction with or without to compl ement conventional medical treatments. many types used t he complementary and alternative medicine in medical an d nursing department. Hydrotherapy is the one of the com plementary alternative medicine therapy.

Hydrotherapy can be traced back to ancient Egypt, where royalty bathed in large, warm pools of water mixed with oils and flowers.Many believe that the Egyptians understood the inherent medicinal value of water as a healing agent. Other experts believe that Hydrotherapy got its start even earlier in Asia.The Romans borrowed from these practices and expanded upon them, becoming famous for the large communal bathhouses they built for the enjoyment and health of their citizens.

The father of modern Hydrotherapy is believed b y many to be Vincent Priessnitz, an Austrian farmer born in the 1700's who prescribed combinations of "water, foo d & air" in place of traditional medicine as cures for com mon ailments

They were cheap and easy to do at home, they be came very popular in Europe during his lifetime. Later, A Bavarian Priest named Sebastian Kneipp furthered Priessn itz's work and developed systematic and controlled applic ations of Hydrotherapy for support and in combination wi th medicinal treatments delivered by doctors. It was the fir st time in modern history where Hydrotherapy was used a s a medicinal treatment and administered by health profes sionals.

Most early forms of Hydrotherapy in Europe inv olved the use of cold water, but there were some hot treat ments that become popular at the time, as well. Borrowed from "Turkish Baths", hot Hydrotherapy treatment was in troduced by David Urquhart into England after he returne d from a trip to the East where he had enjoyed the benefic ial therapeutic effects of hot mineral baths. The first medi cinal Hydrotherapy clinic was thought to have opened in 1844 in New York City and later moved to Massachusetts . The use of Hydrotherapy and specifically hot and cold b aths became a vogue practice, particularly among the wea lthy elite.

World health organization(2013) , Reported the incidence and prevalence of the knee pain. According to report knee pain in the world Musculoskeletal conditions are a major burden on individuals, health systems, and social care systems. with indirect costs being predominant. Burden of 4 major musculoskeletal conditions are osteoarthritis, Rheumatoid arthritis, oseoporosis, and low back pain. Osteoarthritis, affects 9.6

% of men and 18% of women aged >60 years. Increases in life expectancy and ageing populations are expected to make osteoarthritis the fourth leading causes of disability by the year 2020.

The above table reveals before intervention pain level among 30 subjects the pre test mean was 38 with standard deviation of 9.16 in experimental group. after intervention mean was 21.8 with standard deviation of 6.26 the 't' value of 0.50 at p<0.05 level of significant calculated. In control group pre test pain level among 30 subjects mean was 34.6 with standard deviation of 9.29,.After intervention in mean was 34.5 with standard deviation of 8.97 the 't' value10.33 p< 0.01 highly significant calculated.

The table shows that the calculated 't' value in the experimental groupwere10.33 which was statistically highly significant at P<0.001 there level which clearly shows that there was a significant decrease the pain among arthritis patients after giving the hydrotherapy. Hence research hypothesis H1 is accepted.

The table shows that the over all calculated un paired 't' value of 1.43 was Non significant. The pre test control group mean 34.6and experimental group mean 38,and its mean difference was 3.4. It is clearly concluded that there was a non significant on pain among arthritis patients. Hence research hypothesis H1is rejected.

The table shows that the over all obtained 't' test value between the control and experimental group was6.3 6which was highly significant at p>0.001. The post test m ean of control group in case of reach 34.5, where as in exp erimental group was 21.8 and their mean difference was 1 2.7 which had a greater improvement than other para mete rs. It is concluded that hydrotherapy was highly effective i n arthritis patients. Hence research hypothesis H1 is accepted.

DISCUSSION:

In the present study in the aspect of age, most of the subjects 17 (56.70%) were belongs to 41-50years; the least were 13 (43.3%) belongs to51-60 years and None of the subjects (0%) belongs to 61-70 years in experimental group and in the control group 15(50.0%) were belongs to 41-50 years,15 (50.0%) were in the age group of 51-60 years and None of the subjects were in 61-70 years of age group In regard to gender, 7(23.3%) were males and 23(76.7%) were females in experimental and in control group, 8(26.7%) were males and 22(73.3%) were females. Regarding education, most of the subjects, 11 (36.7%) were Non formal education 9 (30%) were studied up to primary education, the subjects,9(30%) were studied up to secondary education and the remaining 1(3.3%) were degree education in experimental group. In control group 7(23.3%) were Non formal education,14(46.7%) were primary education,9 (30%)were secondary education and None of the subjects were in degree education. About marital status of the subjects, most of their married in experimental group 29(96.7%) and the subjects 1 (3.3%)in unmarried. In control group, 30 (100.0%) were married , and none of them unmarried.

Regarding occupation, most of the subjects 14 (46.7%) were moderate worker,11(36.7%) were sedentary worker and remaining 5(16.7%) were heavy worker in experimental group. Similarly in control group, most of the subjects 14(46.7%) were moderate worker, and 13(43.3%) were sedentary worker and remaining 3(10%) were heavy worker.

About family income of the subjects, most of their salary in experimental group 24(80%) were between the income of Rs.2000-5000,the subjects4(13.3%) were between Rs 5001-10,000, and none of the subjects were between Rs 10001- 15000, 2(6.7%) subjects were above Rs.15000.In control group 22(73.3%) were between Rs.2000-5000,the subjects 7 (23.3%) were between Rs 5001-10,000, and none of them earned between Rs 10001-15000, and 1(3.3%) subject were above Rs.15000 per month.

Related to the religion In experimental group most of the subjects 25(83.3%)were belongs to Hindu religion,2(6.7%) were belongs to muslims,3(10%) belongs to Christian. In control group most of the subjects 19(63.3%)were belongs to Hindu religion,8(26.7%) were belongs to muslims,3(10%) belongs to Christian. About diet habits, maximum subjects 27(90%)were non-vegetarian,3(10%) were vegetarian in experimental group and29(96.7%) were non-vegetarian remaining1(3.3%) were vegetarian in control group.

Based on exercise, 8(26.7%) were doing regular exercise,22(73.3%) were irregular exercise None of them (0%) were not doing any exercise in experimental group. 11(36.7%) subjects were regular exercise,19(63.3%) were irregular exercise None of the subjects (0%) were not doing any exercise in control group.

Related to body mass index, In experimental group 2(6.7%) subjects were below 18.5,the subjects belongs to 12(40%) between 18.5-25,the subjects belongs to 11(36.7%) between 25-30,and the subjects belongs to 5(16.7%) between more than30.In control group the subjects belongs to None of them(0%)were below 18.5, the subjects belongs to 15(50%) between 18.5-25 the subjects belongs to 12(40%) between 25-30, the subjects belongs to 3(10%) between more than30.

In regard to duration of knee pain, most of them in experimental group10(33.3%) had below one year of knee pain,14(46.7%)were 1-3 years of knee pain, and 6(20%)were 4-6 years of knee pain. In control group 7 (23.3%) were got below one years of knee pain,16(53.3%)were got one year to three years of knee pain and 7(23.3%)were got 4-6 years knee pain.

Table 1: Frequency and percentage distribution of hydrotherapy on pain among arthritis patients according to their Socio-demographic data **n = 60**

Demographic data	Experimental group(n=30)		Control group(n=30)	
	f	%	f	%
Age (in years)				
a. 41 to 50 years	17	56.7%	15	50%
b. 51 to 60years	13	43.3%	15	50%
c. 61to 70 years	0	0%	0	0%
sex				
a. Male	7	23.3%	8	26.7%
b.Female	23	76.7%	22	73.3%
Education				
a. Non formal	11	36.7%	7	23.3%
b. Primary	9	30%	14	46.7%
c. Higher secondary	9	30%	9	30%
d. Degree	1	3.3%	0	0%
Marital status				
a. Married	29	96.7%	30	100%
b. Unmarried	1	3.3%	0	0%
Occupation				
a. Sedentary worker	11	36.7%	13	43.3%
b. Heavy worker	5	16.7%	3	10%
c. Moderate worker	14	46.7%	14	46.7%
Monthly Income				
a.Rs.2000 to 5000	24	80%	22	73.3%
b.Rs.5001 to 10,000	4	13.3%	7	23.3%
c.Rs.10001 to 15,000	0	0%	0	0%
d.Above Rs.15,000	2	6.7%	1	3.3%
Religion				
Hindu	25	83.3%	19	63.3%
Muslim	2	6.7%	8	26.7%
Christian	3	10%	3	10%
Diet habits				
a .Vegetarian	3	10%	1	3.3%
b .Non vegetarian	27	90%	29	96.7%
Exercise				
Regular exercise	8	26.7%	11	36.7%
Irregular exercise	22	73.3%	19	63.3%
Not doing	0	0%	0	0%
Body mass index				
a.<18.5	2	6.7%	0	0%
b.18.5- 25	12	40%	15	50%
c.25- 30	11	36.7%	12	40%
d. More than 30	5	16.7%	3	10%
Duration of Knee pain				

a.<1 year	10	33.3%	7	23.3%
b.1-3 years	14	46.7%	16	53.3%
c.4-6 years	6	20%	7	23.3%

Table 2: Frequency and percentage distribution of pre-test level of pain among arthritis patients in experimental and control group. n=60

S.No	Interpretation	Control group		Experimental group	
		Pre test		Pre test	
		f	%	f	%
1.	None	-	-	-	-
2.	Mild	6	20%	3	10%
3.	Moderate	22	73.3%	23	76.7%
4.	Severe	2	6.7%	4	13.3%
5.	Extreme	-	-	-	-
	Total	30	100%	30	100%

Table 3. Frequency and percentage distribution on level of pain among arthritis patients in experimental and control group

n=60

S.NO	Level of pain	Control group				Experimental group			
		Pre test		Post test		Pre test		Post test	
		f	%	f	%	f	%	f	%
1.	None	-	-	-	-	-	-	-	-
2.	Mild	-	-	-	-	2	6.7%	11	36.7%
3.	Moderate	16	53.3%	16	53.3%	8	26.7%	19	63.3%
4.	Severe	14	46.7%	14	46.7%	20	66.7%	-	-
5.	Extreme	-	-	-	-	-	-	-	-
	Total	30	100	30	100	30	100	30	100

Table 4. Frequency and percentage distribution for level of stiffness among arthritis patients in experimental and control

n=60

S.NO	Level of stiffness	Control group				Experimental group			
		Pre test		Post test		Pre test		Post test	
		f	%	f	%	f	%	f	%
1.	None	-	-	-	-	2	6.7%	4	13.3%
2.	Mild	17	56.7%	16	53.3%	19	63.3%	19	63.3%
3.	Moderate	12	40%	13	43.3%	9	30%	7	23.3%
4.	Severe	1	3.3%	1	3.3%	-	-	-	-
5.	Extreme	-	-	-	-	-	-	-	-
	Total	30	100%	30	100%	30	100%	30	100%

Table 5. Frequency and percentage distribution for level of physical function among arthritis patients in experimental and control group

n=60

S.NO	Level of physical activity	Control group				Experimental group			
		Pre test		Post test		Pre test		Post test	
		f	%	f	%	f	%	f	%
1.	None	-	-	-	-	-	-	-	-
2.	Mild	9	30%	10	33.3%	7	23.3%	22	73.3%

3.	Moderate	20	66.7%	19	63.3%	19	63.3%	8	26.7%
4.	Severe	1	3.3%	1	3.3%	4	13.3%	-	-
5.	Extreme	-	-	-	-	-	-	-	-
	Total	30	100%	30	100%	30	100%	30	100%

Table 6: Comparison of frequency and percentage distribution on pain in experimental group and control group among arthritis patients. n=60

S.NO	Overall	Control group				Experimental group			
		Pre test		Post test		Pre test		Post test	
		f	%	f	%	f	%	f	%
1.	None	-	-	-	-	-	-	-	-
2.	Mild	6	20%	3	10%	3	10%	21	70%
3.	Moderate	22	73.3%	25	83.3%	23	76.7%	9	30%
4.	Severe	2	6.7%	2	6.7%	4	13.3%	-	-
5.	Extreme	-	-	-	-	-	-	-	-
	Total	30	100%	30	100%	30	100%	30	100%

Table 7: Effectiveness of hydrotherapy on pain among arthritis patients in experimental and control group

n=60

Group	EXPERIMENTAL GROUP			CONTROL GROUP			Unpaired t-test value
	Mean	Standard deviation	Paired t- test value	Mean	Standard deviation	Paired t- test value	
Pre test	38	9.16	t-value 0.50 p<0.05 – significant	34.6	9.29	t-value 10.33 p<0.01** Highly significant	1.43 P >0.05
Post test	21.8	6.26		34.5	8.97		6.36 p<0.001 Highly significant

p<0.05 –significant ,** p<0.01 , *** p<0.001 Highly significant

Table 8. Paired 't'-test to evaluate the effectiveness of hydrotherapy on pain among arthritis patients. n=60

WOMAC	Experimental group Pre test		Experimental group Post test		Difference in mean	Difference SD	't'- value (df)	p-value
	Mean	SD	Mean	SD				
Pain	11.17	3.07	6.47	2.46	4.7	1.15	22.4	P<0.001***
Stiffness	2.3	1.02	1.6	1.07	0.7	1.42	2.70	0.013*
Physical function	24.53	7.80	13.7	4.37	10.8	8.29	7.13	P<0.001***
Overall	38	9.16	21.8	6.26	16.2	8.58	10.33	P<0.001***

Table 9: Un Paired 't'-test to evaluate the effectiveness between control and experimental group in pre test regarding hydrotherapy on pain among arthritis patients. n=60

WOMAC	ontrol group Pre test		Experimental group Pre test		ifference in mean	bined SD	't'- alue (df)	p-value
	Mean	SD	Mean	SD				
Pain	10.27	2.53	11.17	3.07	0.9	2.83	1.24 (df=58)	0.22(NS)

Stiffness	2.83	1.21	2.3	1.02	0.53	1.14	1.85 (df=58)	0.069(NS)
Physical function	21.5	6.79	24.53	7.80	23.02	7.41	1.61 (df=68)	0.113(NS)
Overall	34.6	9.29	38	9.16	3.4	9.31	1.43 (df=58)	0.16 (NS)

Table 10: Un Paired 't'-test to evaluate the effectiveness of hydrotherapy between control and experimental group in post test on pain among arthritis patients. n=60

Level of	Control group post test		Experimental group Post test		Difference in mean	Combined SD	't'- value (df)	p-value
	Mean	SD	Mean	SD				
Pain	10.2	2.54	6.47	2.46	3.73	3.11	5.78 (df=58)	P<0.001*** (HS)
Stiffness	2.80	1.03	1.6	1.07	1.2	1.2	4.24 (df=58)	P<0.001*** (HS)
Physical function	21.5	6.46	13.7	4.37	7.77	6.72	5.45 (df=58)	P<0.001*** (HS)
Overall	34.5	8.97	21.8	6.26	12.7	9.99	6.36 (df=58)	P<0.001*** (HS)

Table 11: Comparison of pre test and post test of hydrotherapy on pain among arthritis patients in experimental and control group. n=60

S.N0	Womac scale	Max Score	EXPERIMENTAL GROUP			CONTROL GROUP		
			Pre Test Mean	Post Test Mean	Mean Difference	Pre Test Mean	Post Test Mean	Mean Difference
1.	Pain	20	11.17	6.47	4.7	10.27	10.27	0.00
2.	Stiffness	8	2.30	1.60	0.7	2.83	2.80	0.03
3.	Physical function	68	24.53	13.70	10.83	21.50	21.50	0.00
	Total	96	38.00	21.77	16 .2 3	34.60	34.57	0.03

Table-12: Karl Pearson correlation between pre test and post test of hydrotherapy on pain among arthritis patients in experimental and control group. n=60

S.NO	Variables	Control group		Experimental group	
		pre test	Post test	pre test	post test
		'r'-value p-value	'r'-value p-value	'r'-value p-value	'r'-value p-value
1.	**Pain –stiffness**	0.579 (0.0008***)	0.595 (0.0005***)	0.422 (0.020*)	-0.0839 (0.659)
2.	**Pain –physical function**	0.613 (0.0003***)	0.649 (0.0001***)	0.111 (0.558)	0.635 (0.0002***)
3.	**Stiffness – physical function**	0.473 (0.008**)	0.501 (0.0047**)	0.281 (0.131)	-0.023 (0.9013)

Table 13: Association between level of pain in pre test of control group with their selected socio demographic data.

n=60

Demographic variables	No		Mild		Moderate		Severe		Extreme		χ2	p- value
	f	%	f	%	f	%	f	%	f	%		
1.Age (in years): 41-50 years	0	0	5	16.7	9	30	1	3.3	0	0		
51-60 years	0	0	1	3.3	13	43.3	1	3.3	0	0	3.39	0.183
61-70 years	0	0	0	0	0	0	0	0	0	0	(df=2)	NS
2.Sex: Male	0	0	2	6.7	6	20	0	0	0	0	5.35	0.069
Female	0	0	4	13.3	16	53.3	2	6.7	0	0	(df=3)	NS
3.Education: Non formal Primary	0	0	1	3.3	6	20	0	0	0	0		
Higher secondary	0	0	3	10	10	33.3	1	3.3	0	0	1.09	0.895
Degree	0	0	2	6.7	6	20	1	3.3	0	0	(df=4)	NS
	0	0	0	0	0	0	0	0	0	0		
4.Marital status : Married	0	0	6	20	22	73.3	2	6.7	0	0		1
Unmarried	0	0	0	0	0	0	0	0	0	0	0	NS
5.Occupation: Sedentary workers Heavy workers	0	0	2	6.7	10	33.3	1	3.3	0	0		0.952
Moderate workers	0	0	1	3.3	2	6.7	0	0	0	0	0.69	NS
	0	0	3	10	10	33.3	1	3.3	0	0	(df=4)	
6.Monthly income: 2000-5000	0	0	4	13.3	17	56.7	1	3.3	0	0		
5001-10000	0	0	2	6.7	4	13.3	1	3.3	0	0	1.71	0.789
10001-15000	0	0	0	0	1	3.3	0	0	0	0	(df=4)	NS
Above 15000	0	0	0	0	0	0	0	0	0	0		
7.Religion : Hindu Muslim												
Christian	0	0	2	6.7	16	53.3	1	3.3	0	0	7.22	
	0	0	3	10	5	16.7	0	0	0	0	(df=4)	0.125
	0	0	1	3.3	1	3.3	1	3.3	0	0		NS
8.Diet habits : Vegetarian												
Non vegetarian	0	0	0	0	1	3.3	0	0	0	0	0.376	0.826
	0	0	6	20	21	70	2	6.7	0	0	(df=2)	NS
9.Exercise : Regular												
Irregular	0	0	0	0	0	0	0	0	0	0		
Not doing	0	0	1	3.3	9	30	1	3.3	0	0	1.36	0.507
	0	0	5	16.7	13	43.3	1	3.3	0	0	(df=2)	NS
10.Mass index :												
<1 year	0	0	0	0	0	0	0	0	0	0		
1-3 years	0	0	4	13.3	10	33.3	1	3.3	0	0		0.260
4-6 years	0	0	2	6.7	10	33.3	0	0	0	0	5.27	NS
>6 years	0	0	0	0	2	6.7	1	3.3	0	0	(df=4)	
11.Duration of knee pain :												
<1 year	0	0	3	10	4	13.3	0	0	0	0	4.72	0.317
1-3 years	0	0	3	10	12	40	1	3.3	0	0	(df=4)	NS
4-6 years	0	0	0	0	6	20	1	3.3	0	0		

*-P<0.05 ,significant and **-P<0.01 &***-P<0.001 , Highly significant

Table shows that there was no association between the level of pain and their socio demographic variables among arthritis patients in the control group. Hence research hypothesis H2 is rejected.

Table 14: Association between level of pain in pre test experimental group with their selected socio demographic data.

Demographic variables	No		Mild		Moderate		Severe		Extreme		χ2	p-value
	f	%	f	%	f	%	f	%	f	%		
1.Age (in years): 41-50 years												
51-60 years	0	0	1	3.3	13	43.3	3	10	0	0		
61-70 years	0	0	2	6.7	10	33.3	1	3.3	0	0	1.21	0.545
	0	0	0	0	0	0	0	0	0	0	(df=2)	NS
2.Sex:												
Male Female	0	0	2	6.7	6	20	0	0	0	0	0.87	0.648
	0	0	4	13.3	16	53.3	2	6.7	0	0	(df=2)	NS
3.Education: Non formal Primary												
Higher secondary	0	0	1	3.3	6	20	0	0	0	0		
Degree	0	0	3	10	10	33.3	1	3.3	0	0	1.09	0.895
	0	0	2	6.7	6	20	1	3.3	0	0	(df=4)	NS
	0	0	0	0	0	0	0	0	0	0		
4.Marital status :												
Married Unmarried	0	0	6	20	22	73.3	2	6.7	0	0		1
	0	0	0	0	0	0	0	0	0	0	0	NS
5.Occupation: Sedentary workers												
Heavy workers	0	0	2	6.7	10	33.3	1	3.3	0	0		
Moderate workers	0	0	1	3.3	2	6.7	0	0	0	0	0.69	0.952
	0	0	3	10	10	33.3	1	3.3	0	0	(df=4)	NS
6.Monthly income: 2000-5000												
5001-10000	0	0	4	13.3	17	56.7	1	3.3	0	0		
10001-15000	0	0	2	6.7	4	13.3	1	3.3	0	0	1.71	0.789
Above 15000	0	0	0	0	1	3.3	0	0	0	0	(df=4)	NS
	0	0	0	0	0	0	0	0	0	0		
7.Religion :												
Hindu	0	0	2	6.7	16	53.3	1	3.3	0	0	7.22	0.125
Muslim	0	0	3	10	5	16.7	0	0	0	0	(df=4)	
Christain	0	0										NS
			1	3.3	1	3.3	1	3.3	0	0		
8.Diet habits :												
Vegetarian Non vegetarian	0	0	0	0	1	3.3	0	0	0	0	0.37	0.829
	0	0	6	20	21	70	2	6.7	0	0	(df=2)	NS
9.Exercise : Regular Irregular												
Not doing	0	0	0	0	0	0	0	0	0	0		
	0	0	1	3.3	9	30	1	3.3	0	0	1.36	0.507
	0	0	5	16.7	13	43.3	1	3.3	0	0	(df=2)	NS
10.Mass index :												
<1 year	0	0	0	0	10	33.3	1	3.3	0	0		
1-3 years	0	0	4	13.3	10	33.3	0	0	0	0		0.260
4-6 years	0	0	2	6.7	2	6.7	1	3.3	0	0	5.27	NS
>6 years	0	0	0	0	0	0	0	0	0	0	(df=4)	
11.Duration of knee pain :												
<1 year	0	0	3	10	4	13.3	0	0	0	0	4.72	0.317
1-3 years	0	0	3	10	12	40	1	3.3	0	0	(df=2)	NS
4-6 years	0	0	0	0	6	20	1	3.3	0	0		

*-P<0.05, significant and **-P<0.01 &***-P<0.001 , Highly significant

Table shows that there was no association between the level of pain and their socio demographic variables among arthritis patients in the experimental group. Hence research hypothesis H2 is rejected.

Table 15: Association between level of pain in post test experimental group with their selected socio demographic data. **n = 60**

Demographic variables	No		Mild		Moderate		Severe		Extreme		χ^2	p- value
	f	%	f	%	f	%	f	%	f	%		
1.Age (in years): 41-50 years	0	0	14	46.7	3	10	0	0	0	0		
51-60 years	0	0	7	23.3	6	20	0	0	0	0	2.85	0.091
61-70 years	0	0	0	0	0	0	0	0	0	0	(df=1)	NS
2.Sex: Male	0	0	6	20	1	3.3	0	0	0	0	1.07	0.30
Female	0	0	15	50	8	26.7	0	0	0	0	(df=1)	NS
3.Education: Non formal	0	0	7	23.3	4	13.3	0	0	0	0		
Primary	0	0	8	26.7	1	3.3	0	0	0	0	3.06	0.382
Higher secondary	0	0	5	16.7	4	13.3	0	0	0	0	(df=3)	NS
Degree	0	0	1	3.3	0	0	0	0	0	0		
4.Marital status : Married	0	0	20	66.7	9	30	0	0	0	0	0.44	0.506
Unmarried	0	0	1	3.3	0	0	0	0	0	0	(df=1)	NS
5.Occupation: Sedentary workers	0	0	7	23.3	4	13.3	0	0	0	0		
Heavy workers	0	0	4	13.3	1	3.3	0	0	0	0	0.46	0.793
Moderate workers	0	0	10	33.3	4	13.3	0	0	0	0	(df=2)	NS
6.Monthly income: 2000-5000	0	0	16	53.3	8	26.7	0	0	0	0		
5001-10000	0	0	3	10	1	3.3	0	0	0	0	1.03	0.597
10001-15000	0	0	0	0	0	0	0	0	0	0	(df=2)	NS
Above 15000	0	0	2	6.7	0	0	0	0	0	0		
7.Religion : Hindu	0	0	17	56.7	8	26.7	0	0	0	0	0.902	0.631
Muslim	0	0	2	6.7	0	0	0	0	0	0	(df=2)	NS
Christian	0	0	2	6.7	1	3.3	0	0	0	0		
8.Diet habits : Vegetarian	0	0	1	3.3	2	6.7	0	0	0	0	2.13	0.144
Non vegetarian	0	0	20	66.7	7	23.3	0	0	0	0	(df=1)	NS
9.Exercise : Regular	0	0	0	0	0	0	0	0	0	0		
Irregular	0	0	6	20	2	6.7	0	0	0	0	0.13	0.719
Not doing	0	0	15	50	7	23.3	0	0	0	0	(df=1)	NS
10.Mass index :	0	0	2	6.7	0	0	0	0	0	0		
<1 year	0	0	7	23.3	5	16.7	0	0	0	0	1.91	0.591
1-3 years	0	0	8	26.7	3	10	0	0	0	0	(df=3)	NS
4-6 years	0	0	4	13.3	1	3.3	0	0	0	0		
>6 years												

11.Duration of knee pain :												
<1 year	0	0	6	20	4	13.3	0	0	0	0		
1-3 years	0	0	11	36.7	3	10	0	0	0	0	0.99	0.607
4-6 years	0	0	4	13.3	2	6.7	0	0	0	0	(df=2)	NS

*-P<0.05 ,significant and **-P<0.01 &***-P<0.001 , Highly significant

Above the table shows that non of association between the level of pain and their socio demographic variables among arthritis patients in the experimental group. Hence research hypothesis H2 is rejected.

CONCLUSION

The following conclusions were drawn from the study:- There was an association between the arthritis patients with their selected demographic variables justifications for understandings this study was to reduce the arthritis pain with the clients by hydrotherapy and to determine its effectiveness. so that this hydrotherapy can be used for arthritis patients to promote their health and also comfort.

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