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A Quasi Experimental Study to Assess the Effectiveness of Epsom Salt Compress versus Plain Water Compress on Joint Pain among Patients with Arthritis in a Selected Hospital of Gurugram, Haryana

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Abstract: ***A Quasi experimental study to assess the effectiveness of Epsom salt compress versus Plain water compress on joint pain among patients with Arthritis. In this study a quantitative approach and pre-test post-test experimental design was used. 60 arthritis patients were selected convenience sampling technique in Civil Hospital Gurugram Haryana. Numerical pain rating scale was used to assess the pain level of the patient. the mean of pain score in post intervention of Epsom salt compress (1.900) was lower than their mean of pain score in post intervention of Plain water compress (4.93). The obtained mean difference is found to be statically significant (p<0.001) as evident from obtained from "t´´ value 9.02 for df 58. Thus the difference obtained in mean of pain score of Epsom salt compress was found effective in reducing the joint pain of patients.***

Keywords: Effectiveness, Epsom salt compress technique, Plain water compress technique and joint pain

1. Introduction

Arthritis may be a term typically won't to mean any disorder that affects joints.[1] The foremost common forms square measure degenerative joint disease (Osteoarthritis) and rheumatism. Degenerative joint disease typically happens with age and affects the fingers, knees and hips. Rheumatism is associate degree autoimmune disease that always affects the hands and feet.[2] Alternative varieties enclosed gouty arthritis, lupus and septic inflammatory disease.[3] Osteoarthritis affects over three.8% of individuals whereas rheumatism affects regarding zero.24% of individuals.[4] In Australia regarding V-day of individuals square measure affected,[5] whereas North American country over 2 hundredth have a sort of inflammatory disease.6 Overall the sickness becomes a lot of common with age.[3]

2. Review of Literature

Odabasi .S did an experimental study conducted to reveal the efficacy of heated mud pack treatment in patients with knee osteoarthritis and to find the contribution of chemical factors to the build-up of these effects. 60 clients were randomly allocated in to 2 groups. The intervention and followed up for 24 weeks at 4 weeks intervals. A significant number of patients in the study group showed minimal clinically important improvement as compared to the control group. The result showed heat mud pack treatment significantly improved the pain and functional status of patients with knee osteoarthritis.[7]

Bernacki EJ did a comparative study conducted to assess the therapeutic benefits of thermo care heat wrap with education programme on reducing pain and disability in osteoarthritis clients. 43 clients at US have been randomly assigned to two groups. One group received education alone and the other group received education and topical heat application 400C for 87 hours. The results evaluated on day 4, 7 and 14 and it showed a significant reduction in pain intensity, increased pain relief and improved disability scores after treatment with heat therapy.[8]

Jomen Joy did an experimental study to evaluate the effectiveness of Epsom salt hot application on joint pain. There were 60 sample and divided in to two groups experimental and control group. Result showed that in pre-test, patients were having 7.77 pain score and in post-test they were having 2.26 pains score, so the difference was 5.51. This difference was statistically significant. It was confirmed by using paired t-test and in control group: In pre-test, patients were having 7.97 pain score and in post-test they were having 7.26 pains score, so the difference was 0.71. This difference was statistically not significant. It was confirmed by using paired t-test. So the conclusion was Epsom salt hot water was effective for reducing the pain.[9]

3. Objectives of Study

1) To compare the level of joint pain among patient with arthritis receiving Epsom salt compress and Plain Water compress.
2) To determine the association of joint pain with selected demographic variables.

4. Methodology

Quantitative research approach and experimental research design was used in this study.
Population: Adult patient with arthritis.
Sample: All the adult patient with arthritis attending OPD in Civil hospital Gurugram, Haryana.
Sample: 60
Sampling Technique: Convenient sampling
Hypotheses
H_1 There will be a significant difference in the mean pre-test and post-test pain score among adults receiving Epsom salt compress as assessed by NRS at 0.05 level of significance.
H_2 There will be a significant difference in the mean pre-test and post-test pain score among adults receiving Plain water compress as assessed by NRS at 0.05 level of significance.
H_3 There will be a significant difference in the mean post-test pain score between experimental group and control group at 0.05 level of significance.
H_4 There will be a significant association of joint pain among adults in experimental group with selected demographic variables such as age, gender, religion, education background, occupation, monthly income, treatment of joint pain at 0.05 level of significance.
H_5 There will be a significant association of joint pain among adults in control group with selected demographic variables such as age, gender, religion, education background, occupation, monthly income, treatment of joint pain at 0.05 level of significance.

Variables of the Study
Dependent Variables: Joint pain
Independent Variables: Epsom salt compress & Plain water compress.

Data Collection Tool and Techniques
Based on objectives of the study, following are the tools:
- Tool I: Structured Interview schedule
- Tool II: Numerical Rating scale (NRS)

Reliability

Name of the Tool	*Method*	*Reliability*
Numerical rating scale	Test Re-Test	0.95

Content validity of the tool
The Content validity of the tools was obtained by submitting the tools to seven(7) experts. All experts were agreed with statement except for few suggestions.

Final study
The final study was conducted in the **Civil Hospital Gurugram, Haryana**. The patient coming in physiotherapy department of Civil hospital, Gurugram Haryana during the period of data collection.15/Sep/2018 to 5/Jan/2019.

Table 1: Frequency and percentage distribution of adult patients according to their demographic profile in both the groups and their comparability, N=60

S.N	Variables	Experimental Group I (n1=30) Frequency (%)	Control Group II (n2=30) Frequency (%)	test value	df	p value
1.	**Age in Years**					
	a. 40-50	6 (20%)	5(17%)	0.79	3	0.8
	b. 51-60	11 (37%)	13(43%)	(Fisher exact test)		
	c. 61-70	1 3 (43%)	12(40%)			
2.	**Gender**					
	a) Male	13(43.3%)	12(40%)	0.61	1	0.63
	b) Female	17(56.7%)	18(60%)	(x2)		
3.	**Religion**		18(60%)			
	a. Hindu	1 5(50%)	5(17%)	0.83	3	0.81
	b. Muslim	7(23%)	4(13%)	(Fisher exact test)		
	c. Christian	5(17%)	3(10%)			
	d. Any Other	3(10%)				
4.	**Educational status**					
	a. Illitrate	11 (37%)	10(33%)			
	b. Primary	7 (23%)	5(17%)	5.12	4	0.31
	c. Secondary	9 (30%)	8(27%)	(Fisher exact test)		
	d. Graduate	1(3%)	4(13%)			
	e. Post Graduate	2(7%)	3(10%)			
5.	**Occupation**					
	a. Govt job	2(7%)	4(13%)	7.14		
	b. Private job	7(23%)	6(20%)	(Fisher exact test)		
	c. Retired	-7%	0(0%)		5	0.14
	d. Labour	11(37%)	6(20%)			
	e. Any other	6(20%)	12(40%)			
	f. Not working	2(7%)	2(7%)			
6.	**Monthly income**					
	a) <10,000	6 (20%)	12 (40%)	2.32		
	b) 10,001-15,000	9 (30%)	6 (20%)	(Fisher exact test)	3	0.31
	c) 15001-20,000	7 (23%)	8 (27%)			
	d) >20000	8 (27%)	4 **(** 13%**)**			

7.	**Treatment of joint pain**					
	a. <6 months	5(17%)	5(17%)	0.66		
	b. 6months-1year	11(37%)	8(27%)	(Fisher exact test)	3	0.61
	c. 1year-2year	10(33%)	11(37%)			
	d. >2year	4(13%)	6(20%)			
8.	**Diet**					
	a) Vegetarian	**23 (77%)**	**18 (60%)**	0.36	1	0.6
	b) Non-vegetarian	7 (23%)	12 (40%)	(x2)		

***Significance at 0.05 level, p<0.05 level**

Table 1 shows there was no significant difference among the patient in group 1 and group II with respective to demographic variable such as age(0.80), gender(0.63), religion(0.81), education status(0.31), occupation(0.14), monthly income(0.31), treatment of joint pain(0.61) and diet (0.60).Thus both the group were homogenous**.**

Table 2: Frequency and percentage distribution of level of Pre-test and post-test pain of adult patients after receiving Epsom salt compress technique.
N=30

Technique	Level of pain	Pre- Test pain score		Post-Test pain score	
		Frequency	%	Frequency	%
Epsom salt compress	Severe (7-10)	0	0%	0	0%
	Moderate (4-6)	27	90%	6	20%
	Mild (1-3)	3	10%	19	63.3%
	No pain (0-0)	0	0%	5	16.7%

The above table 2 shows that out of 30 adult patients in Pre-test 0% had no pain, 10% had mild pain, 90% had moderate pain and after receiving Epsom salt compress level of pain 16.7% had no pain, 63.3% had mild pain, 20% had moderate pain.

Table 3: Frequency and percentage distribution of level of Pre-test and post-test pain of adult patients after receiving Plain water compress technique, N=30

Technique	Level of pain	Pre-Test pain score		Post-Test pain score	
		frequency	Percentage	Frequency	Percentage
Plain water compress	Severe (7-10)	0	0%	0	0%
	Moderate (4-6)	27	90%	24	76.6%
	Mild (1-3)	30	10%	5	16.7%
	No Pain (0-0)	0	0%	2	6.6%

The above table 3 shows that out of 30 adult patients in Pre-test 0% had no pain, 10% had mild pain,90% had moderate pain and after receiving Plain water compress level of pain 6.6% had no pain, 16.7% had mild pain and 76.6% had moderate pain.

Table 4: Comparison of mean, SD, Standard error and t value of Pre-test and post-test pain score of adult patients while receiving Epsom salt compress, N=30

Paired t Test	Mean ± SD	SEM	Mean Diff.	df	t value	p value
Pre-test	5.333± 1.373	.268	3.43	29	23.01	.000***
Post-test	1.900± 1.470	.250				
***significant at 0.001 level						

The result in table 4 reveals that the mean of pain score of post intervention of Epsom salt compress (1.900) was lower than their mean pre intervention of Epsom salt (5.333). It indicates the reduction in mean post intervention ESC. The obtained mean difference is found to be statistically significant (p<0.001) as evident from obtained value of 23.01 for df 29. Thus, the difference obtained in pre intervention and post intervention of Epsom salt compress.

Hence the null hypothesis H_{01} was rejected and research hypothesis H_1 was accepted.

Table 5: Comparison of mean, SD, Standard error and t value of Pre-test and post-test pain score of adult patients while receiving Plain water compress, N=30

Paired T test	Mean ± S.D	SEM	Mean Diff.	df	t value	p value
Pre test	5.200 ± 1.29	.236	.266	29	1.43	.012*
Post test	4.93 ± 1.22	.224				
*significant at 0.05 level						

The result in table 5 reveals that the mean of pain score in post intervention of Plain water compress (4.93) was lower than their mean pre intervention of Plain water compress was (5.200). It indicates the reduction in mean score of Plain water compress. The obtained mean difference is found to be statistically significant (p<0.05) as evident from obtained value of 1.43 for df 29. Thus, the difference obtained in pre intervention and post intervention of Plain water compress. **Hence the null hypothesis H_{02} was rejected and research hypothesis H_2 was accepted.**

Table 6: Comparison of mean, SD, standard error and t value of post test scores of adult patients in group I group II with Epsom salt and Plain water compress, N=60

Group	Mean± S.D	SEM	Mean Diff.	df	t value	p value
Epsom Salt Compress	1.900±1.470	.250	3.03	58	9.02	.000***
Plain water compress	4.93± 1.22	.224				
***significant at 0.001 level						

The result in table 6 reveals that the mean of pain score in post intervention of Epsom salt compress (1.900) was lower than their mean of pain score in post intervention of Plain water compress (4.93). The obtained mean difference is found to be statically significant (p<0.001) as evident from obtained from "t´´value 9.02 for df 58. Thus the difference obtained in mean of pain score of Epsom salt compress is less than Plain water compress post-test. So Epsom salt is more effective for reducing the pain level of adult patients.

Hence the null hypothesis H_{03} was rejected and research hypothesis H_3 was accepted.

Table 7: Association of selected variables like gender, religion, educational status, occupation, monthly income, treatment of joint pain and diet of post-test pain score of group I who received Epsom salt compress, N=30

Variables	Options	Mean	SD	Df	test value	p value
Age	40-50 Years	0.50	0.84	13	F=4.874	.108
	51-60 Years	2.09	1.30			
	61-70 Years	2.38	1.26			
Diagnosis	Arthritis	0.50	0.71	12	F=0.50	0.51
	joint pain	1.13	1.46			
	OA	3.00	0.87			
	RA	1.82	1.17			
Gender	Male	1.80	1.26	13	T =0.538	0.64
	Female	2.00	1.51			
Religion	Hindu	2.27	1.28	13	F=3.023	0.65
	Muslim	1.29	1.50			
	Christian	1.40	1.34			
	Any Others	2.33	1.53			
Education Background	Illiterate	1.91	1.38	12	F=3.055	.091
	Primary	2.00	1.41			
	Secondary Education	1.89	1.69			
	Graduate	2.00				
	Post Graduate	1.50	0.71			
Occupation	Government Job	0.50	0.71	13	F=4.324	0.01**
	Private Job	1.43	1.27			
	Retired	3.00	1.41			
	Labour	2.18	1.33			
	Any Other	1.83	1.72			
	Not Working	2.50	0.71			
Monthly Income	< Rs.10, 000	2.33	1.03	12	F=.702	.560
	Rs. 10,001-15,000	2.22	1.48			
	Rs. 15,001-20,000	1.57	1.51			
	>Rs. 20,000	1.50	1.41			
Treatment for joint pain	< 6 months	1.40	1.67	13	F=.1432	.703
	6 months - 1 year	1.73	1.49			
	1 yr- 2 yrs	2.50	1.27			
	> 2 yrs	1.50	0.58			
Diet	Vegetarian	2.04	1.33	12	F=.467	.500
	Non-Vegetarian	1.43	1.51			

****Significant at 0.01 level**

Association of occupation with post-test pain score was assessed by One way ANOVA. There was a significant association found between occupation and post-test pain score while receiving Epsom salt compress F value 4.324 and p value 0.01. The calculated F value was greater than F critical value was statistically significant at p<0.01 level.

Hence the null hypothesis H_{04} was partially rejected with respect to occupation post-test pain score (p<0.001) and research Hypothesis **H_4 partially accepted.**

Table 8 Association of selected variables like age, gender, diagnosis, religion, educational status, occupation, monthly income and diet of post-test pain score of group II who received plain water compress, N=30

Variables	Options	Mean	SD	test value	df	p value
Age	40-50 Years	3.60	0.89	F=.108	13	0.12
	51-60 Years	5.08	1.12			
	61-70 Years	5.33	1.15			
Diagnosis	Arthritis			F=9.503	12	0.154
	joint pain	4.38	1.04			
	OA	5.63	1.06			
	RA	5.11	1.36			
Gender	Male	5.00	1.46	T=1.036	2,12	0.433
	Female	4.87	0.99			
Religion	Hindu	5.00	1.28	F=3.23	12	0.697
	Muslim	4.40	0.55			
	Christian	5.25	1.26			
	Any Others	5.00	2.00			
Education Background	Illiterate	5.10	1.37	F=4.134	13	0.01**
	Primary	4.80	1.48			
	Secondary Education	4.50	1.20			
	Graduate	5.25	1.26			
	Post Graduate	5.33	0.58			
Occupation	Government Job	5.50	0.58	F=3.456	13	1.56
	Private Job	4.83	1.60			
	Retired					
	Labour	5.00	1.55			
	Any Other	4.75	1.22			
	Not Working	5.00	0.00			
Monthly Income	< Rs.10, 000	5.08	1.44	F=4.321	13	0.02
	Rs. 10,001-15,000	4.67	1.21			
	Rs. 15,001-20,000	4.88	0.99			
	>Rs. 20,000	5.00	1.41			
Treatment for joint pain	< 6 months	4.80	1.79	F= 1.32	12	.256
	6 months – 1 year	4.75	1.28			
	1 yr- 2 yrs	4.73	0.79			
	> 2 yrs	5.67	1.37			
Diet	Vegetarian	5.06	1.30	T=234	12	.432
	Non Vegetarian	4.75	1.14			

****Significant at 0.01 level**

Association of Education background with post-test pain score was assessed by One way ANOVA. There was a significant association found between education background and post-test pain score while receiving Plain water compress F value 4.134 and p value 0.01. The calculated F value is greater than F critical value was statistically significant at p<0.01 level.

Hence the null hypothesis H_{05} was partially rejected with respect to educational background post-test pain score (p<0.01) and research Hypothesis **H_5 partially accepted.**

5. Discussion

Similar study on effect of Epsom salt compress on pain among adult patients. It was found that pain score of post-

test 10% had no pain, (18%) had mild pain, (22%) had moderate pain while receiving Epsom salt compress technique and in post-test of plain water compress (28%) had mild pain, (33%) had moderate pain while receiving Plain water compress technique and the mean of pain score in post intervention of Epsom salt compress (1.25) and Plain water (2.48) and mean difference is 1.03. The computed "t" value ("t"=6.02) was significant at 0.01 level of significance by **Satralkar Parag Shilpa(2018).**

6. Conclusion

Epsom salt Technique is more effective to measure in decreasing the level of pain in patients as compared to plain water compress technique on joint pain.

7. Limitations

Adults were only included in the study who having joint pain on arthritis.
Broad generalization cannot be made due to limited area of setting and limited sample size

8. Recommendations

1) Similar kind of study can be conducted for a larger group to generate the findings.
2) A longitudinal study can be conducted to assess the effect of Epsom salt compress in reducing pain.
3) The same study can be conducted among different age group.
4) A comparison study can be done to determine the effect of Epsom salt compress in different settings.
5) The study can be conducted by using other techniques of the Epsom salt that was Cold water compress with Epsom salt.

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