

# A STUDY TO DETERMINE THE EFFECTIVENESS OF CRYOTHERAPY ON PAIN DURING ARTERIO VENOUS FISTULA PUNCTURING AMONG PATIENT UNDERGOING HEMODIALYSIS IN SMIH DEHRADUN

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**Abstract:** *Introduction* Patients with end-stage renal disease undergoing haemodialysis are repeatedly exposed to pain from approximately 300 punctures per year due to their AV Fistula associated with the insertion of large-gauge needles. Nurses play a pivotal role in pain assessment and intervention. The complementary therapies are used to relieve the symptoms of pain. One of these therapies, which are used to reduce the pain, is cryotherapy. *Methodology* The nature of the study was pre-experimental. The conceptual framework used for this study is based on The General Systems Model developed by I.W.Kenny. The research design adopted for the study was "pre-experimental one group pretest-posttest design". **Result** After pre test and post test the significance difference of level of pain was tested using 't' test and the result was 16.64 for numerical rating scale and 22.52 for body response scale; both had significant differences. **Conclusion** Results revealed that an average pain as per numeric rating scale before Cryotherapy was 236 which decreased to 90 after Cryotherapy and an average pain as per body response scale before Cryotherapy was 404 which decreased to 217 after Cryotherapy. This indicates that the Cryotherapy is significantly effective in improving the level of pain among patients undergoing Haemodialysis with AV fistula.

**Keywords:** cryotherapy, AV fistula, pain.

## 1. INTRODUCTION:

Chronic Kidney Disease (CKD) is a progressive irreversible deterioration in renal function in which body's ability to maintain metabolic, fluid and electrolyte balance fails. Chronic renal failure is a devastating medical, social, and economic problem for both patients and their families in India. Most CKD patients reporting to tertiary care centers in India are in the final stage where renal replacement therapy (RRT) is the only option at that stage. Hemodialysis (HD) is the most frequently used RRT with the arteriovenous fistula (AVF) being the gold standard for vascular access in HD patients. The most common vascular access sites are arteriovenous fistula, arteriovenous graft and venous catheter. Once mature the rates and rarely become infected. AV fistula can provide adequate vascular access for over 20 years. Pain inflicted by the insertion of large cannula into the AVF is a significant cause of concern for both children and adults on regular HD. Although AVF puncturing causes pain, local anesthesia is not frequently used due to concerns of vasoconstriction, burning sensation, scarring, and infection. On an average, a patient on maintenance hemodialysis undergoes ten AV fistula punctures a month and would continue to do so throughout their lifetime or until a successful renal transplant. His or her comfort with the procedure is therefore of utmost importance for long-term compliance with the treatment. Cryotherapy as a non pharmacological pain management is a complimentary therapy has the advantage of being effective, less cost, easy to provide and safe. It was clarified that cryotherapy is used for treatment of pain by slowing nerve conduction rate and blocking nerve impulses through lowering the temperature over the affected area. Cryotherapy is a common and useful therapeutic modality often used in treating a wide range of conditions. & care is taken over cautions and contraindications it he patients can be instructed to self treat to manage their condition independently

## 2. LITERATURE REVIEW:

Merlin Golda 2016, Most patients are in the final stage of chronic kidney disease where the glomerular filtration rate is less than 15 ml/hr. At present scenario approximately 100 per million people in a year globally, there could be 1, 00,000 patients from India. Most chronic kidney disease patients, reporting to tertiary care centres in India are in the

final stage where renal replacement therapy (RRT) is the only option at this stage. The availability of various renal replacement therapies helps in reducing the severity of symptoms and results in longer survival of end stage renal disease patient's. These patients largely depend on hemodialysis as a renal replacement therapy.

Assam Hasan 2016, performed a one-group pre-post quasi-experiment in two HD centers affiliated with Cairo University. The experiment involved 40 patients with AVF undergoing HD. Before puncturing, cryotherapy was applied using 2 cm–3 cm pieces of frozen distilled water in a plastic bag. Pain was assessed subjectively and objectively in two dialysis sessions before and after cryotherapy. Pain was assessed using the Wong–Baker Faces Pain and the Observed Pain Behavior rating scales. The Wong–Baker Faces Pain score and almost all observed pain behaviors significantly decreased after cryotherapy. Study concludes that Cryotherapy can effectively reduce the venipuncture pain among children with AVF undergoing maintenance HD

### 3. MATERIALS &METHOD:

The research design is selected for this study is pre- experimental one group pre-test & post- test research design.study was conducted in Shri Mahant Indresh hospital Dehradun uttrakhand. A total of 40 patient undergoing hemodialysis where selected as sample to assess the effectiveness of cryotherapy on pain during arterio venous fistula puncturing during hemodilysis. Numerical pain scale and body response scale were used as the tool to assess the level of pain. . The data will be analyzed in terms of descriptive (mean, percentage, standard deviation) and inferential statistics (paired “t” test).

### 4. DISCUSSION:

The table 1: Shows that the demographic data details according to their age group of age (25%) where in the age group of 20-30.in the age group of 31-40 years of (40%),in the age group of 41-50 years it was (25%) and (10%) in the age group >50 years.

Distribution of the dialysis patient in relation to their gender shows that both male and female are equal in percentage (50%).Percentage wise distribution of the dialysis patient in relation to their education Graduate and above(35%), secondary (45%)and primary (25%)In relation to their occupation shows that (72.5%) in private job, government job (20%), and (7.5% )are in daily wages. Percentage wise distribution of patients are (82.5%) married and (17.5%) are unmarried Percentage wise distribution of patient are (15%) belongs to joint. (60%) nuclear family, extended (20%) and (50%) are from separated family.

In relation to their Family income shows that the group of 5000-10,000 (25%),10,000-15,000 (32.55%),15,000-20,000 (37.5%) and >20,000 are (27.5%). Percentage wise distribution of patient are access to book for getting information from internet (35%),books (47.5%),and newspapers (17.5%).In the relation to their assisted by relatives during hospitalization relatives (65.5%),friends (32.5%) and none (2.5%).In the relation to their using AV fistula for < 6 month (15%),>6 month-1 year (45%),1-3year (27.5%) and >3 year (12.5%).

Percentage wise distribution of patient are using any apprehension during AV fistula canalization yes (2.5%) and no (97.5%)

In the relation to their knowledgeable regarding care of AV fistula (97.5%) yes and (2.5%) no. In the relation to their number of dialysis in a week (17.5%) once, (45.5%)are having twice, and ( 35%) are having thrice.

Findings related to level of pain of dialysis patient that is Data presented in table 2 shows that in Pre-test 46.66% of subjects had severe pain and in post test that was reduced to 6.66%. Moderate pain score in pretest was 46.66% that was reduced to 43.33%. Moderate pain was reduced to mild pain so that mild pain score was increased in post-test. Mild pain score in pre-test was 6.67% and in post-test was 50%.

Data show in table 3 revealed that the mean post-test pain score of Elderly was significantly lower than the mean pre-test scores. The calculated “t” value (8.68) was more than the table value at 5% level of significance. Therefore, it can be said that the home based exercises was found to be effective in reducing pain and improving functional performance. In this the hypothesis (H1) is accepted. And null hypothesis is rejected.

Data presented in table 4 shows that in Pre-test 50% of subjects had severe discomfort and in post test that was reduced to 23.33%. Moderate discomfort score in pretest was 40% that was reduced to 33.33%. Moderate discomfort was reduced to mild discomfort so that mild discomfort score was increased in post-test. Mild discomfort score in pre-test was 10% and in post-test was 43.33%.

Data show in table 5 revealed that the mean post-test WOMAC score of Elderly was significantly lower than the mean pre-test scores. The calculated “t” value (19.76) was more than the table value at 5% level of significance. Therefore, it can be said that the home based exercises was found to be effective in improving functional performance. In this the hypothesis (H2) is accepted and null hypothesis is rejected. Table (6) depicted that there was not significant association between pretest pain scale score and selected demographic variables Age, Gender, Educational status, Occupational status, Marital status, Family income per month, Source of information, Any assistance during hospital

stay, Use of AV fistula since, Apprehension during Av fistula cannulation, Knowledge regarding care of AV fistula, Number of haemodialysis in a week at 0.05 level of significance.

Table(7) There is significant association with selected demographic variables , Educational status, , Family income per month, Source of information, Any assistance during hospital stay, Use of AV fistula since, Apprehension during Av fistula cannulation, Number of haemodialysis in a week at 0.05 level of significance..

shows that there was not significant association with demographic variables Age, Gender, Occupation, Marital status, Type of family, Use of AV fistula since, Knowledge regarding care of AV fistula at 0.05 level of significance.

Hence the research hypothesis (H2) was accepted and null hypothesis was rejected

There is significant association between demographic variable type of family at 0.05 level of significance.

ANALYSIS: Section1: Description of sample characteristics.

Section2: Effectiveness of cryotherapy on AV fistula puncturing by checking numeric rating scale.

Section3: Effectiveness of cryotherapy on pain by checking body response scale.

Section1: description of sample characteristics.

These samples were selected through convenient sampling technique from Shri Mahant Indresh Hospital, Dehradun. The data obtained in sample characteristics was analyzed using descriptive statistics and is depicted in Table 1.frequency and percentage distribution of demographic variables among hemodialysis patients with respect to Age, Gender, Educational status, Occupational status, Marital status, Type of family, Family income per month, Source of information, Any assistance during hospital stay, Use of AV fistula since, Apprehension during Av fistula cannulation, Knowledge regarding care of AV fistula, Number of haemodialysis in a week.

**Table 1:- Frequency and percentage distribution of samples accords to demographic variables.**

**N=40**

S.No	Demographic variables	Frequency (f)	Percentage (%)
1	Age of patient -		
	20-30	10	25%
	31-40	16	40%
	41-50	10	25%
	>50 years.	4	10%
2	Gender:-		
	Male	20	50%
	Female	20	50%
3	Educational status:-		
	Graduate and above	14	35%
	Secondary	16	45%
	Primary	10	25%
	No formal education	0	
4	Occupational status:-		
	Private job	29	72.5%
	Government job	8	20%
	Daily wages	3	7.5%
5	Marital status:-		
	Married	33	82.5%
	Un married	7	17.5%
6	Type of family:-		
	Joint	6	15%
	Nuclear	24	60%
	Extended	8	20%
	Separated	2	5%

7	Family income per month:- 5,000-10,000 10,000-15,000 15,000-20,000 >20,000	1 13 15 11	25% 32.55% 37.55% 27.55%
8	Source of information:- Internet Books Newspaper Others	14 19 7 0	35% 47.5% 17.5% 0%
9	Any assistance during hospital stay:- Relatives Friends Health professionals None	26 13 0 1	65.5% 32.5% 0% 2.5%
10	Use of AV fistula since:- A. <6 month B. >6 month-1 year C. 1-3 year D. > 3 year	6 18 11 5	15% 45% 27.5% 12.5%
11	Apprehension during Av fistula cannulation:- Yes No	1 39	2.5% 97.5%
12	Knowledge regarding care of AV fistula:- Yes No	39 1	97.5% 2.5%
13	Number of haemodialysis in a week:- once in a week Twice in a week Thrice in a week.	7 19 14	17.5% 47.5% 35%

**The table 1:** Shows that the demographic data details according to their age group of age (25%) where in the age group of 20-30.in the age group of 31-40 years of (40%),in the age group of 41-50 years it was (25%) and (10%) in the age group >50 years.

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Percentage wise distribution of the dialysis patient in relation to their education Graduate and above (35%), secondary (45%)and primary (25%)

In relation to their occupation shows that (72.5%) were having private job, government job (20%), and (7.5%) were working in daily wages.

Percentage wise distribution of patients according to marital status (82.5%) married and (17.5%) were unmarried.

Percentage wise distribution of patient is (15%) belongs to joint.(60%) nuclear family, extended (20%) and (50%) are from separated family.

In relation to their Family income shows that the group of 5000-10,000 (25%) ,10,000-15,000 (32.55%),15,000-20,000 (37.5%) and >20,000 are (27.5%).

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In the relation to their number of dialysis in a week (17.5%) once, (45.5%) are having twice, and (35%) are having thrice.

## 5. FINDINGS:

- Highest percentage of hemodialysis patients 40% were in the age group of 31-40 years.
- Equal percentage of Male and females 50%.
- Education shows that 45% of hemodialysis patients acquired Secondary Education.
- Highest percentage 72.5% of hemodialysis patients were having Private job.
- Marital status shows highest percentage that is 85.2% were Married.
- Highest percentage of hemodialysis patients 60% were from Nuclear family.
- Family Income shows highest percentage that is 37.55% had 15,000-20,000 per month.
- Source of information shows that highest percentage 47.5% of hemodialysis patients were having information from Books
- Any assistance during hospital stay was from relatives that is 65.5%.
- Highest percentage of Use of AV fistula since >6 months to 1 year was 45.5%.
- Highest percentage of no Apprehension during Av fistula cannulation that is 97.5%.
- Highest percentage of Knowledge regarding care of AV fistula is 97.5%.
- Highest percentage of Number of haemodialysis in a week is twice 47.5%.

## 6. RESULT:

Based on the objectives of the study, Numeric Pain Rating scale and Body Response scale was used to assess the pain level and effectiveness of Cryotherapy on alleviating pain levels. It was considered to be an appropriate instrument.

## 7. RECOMMENDATIONS:

- The study can be replication on larger samples for generalization of findings.
- A comparative study can be conducted to determine the effectiveness of cryotherapy
- An experimental study can be conducted to assess the effectiveness of Cryotherapy on pain among Hemodialysis patients.
- A similar study can be replicated in different setting to strengthen the findings.
- The same study could be replicated on a large sample size with newly cannulated patients.
- Same study can be replicated on dental pain and for IV cannulation procedures.
- Haemodialysis units should involve Cryotherapy for managing needle puncture pain in the routine care for hemodialysis patient.

## 8. CONCLUSION:

On the basis of findings of the study the below said conclusion were drawn. It also brings out the limitations of the study in picture.

The numeric pain rating scale score and Body response scale score had increased when assessed during pre-test, where as the numeric pain scale score and WOMAC scale scores had increased during post-test.

Highest percentage of dialysis patients 40% were in the age group of 31-40 years. Equal percentage of Male and females 50%. Education shows that 45% of Dialysis patients acquired Secondary Education. Highest percentage 72.5% of dialysis patients was having Private Job. Marital status shows highest percentage that is 85.2% were Married. Highest percentage of dialysis patients 60% were from Nuclear family. Family Income shows highest percentage that is 37.55% had 15,000-20,000 per month. Source of information shows that highest percentage 47.5% of dialysis patients was having information from Books. Any assistance during hospital stay was from relatives that is 65.5%. Highest

percentage of Use of AV fistula since >6 months to 1 year was 45.5%. Highest percentage of no Apprehension during Av fistula cannulation that is 97.5%. Highest percentage of Knowledge regarding care of AV fistula is 97.5%. Highest percentage of Number of haemodialysis in a week is twice 47.5%.

The study was conducted to evaluate the effectiveness of Cryotherapy in pain on AV fistula puncturing among dialysis patients of SMIH Dehradun. The paired “t” test was computed between pre-test and post-test Numeric pain scale score and Body response scale score. The value of paired “t” test for numeric pain scale score is 16.64 with the table value 2.02 and for Body Response scale score is 22.52 with the table value 2.02 at 0.05 level of significance was found to be highly significant relationship between pre-test and post-test scores. So in this study it was found that Cryotherapy is effective in reduction of AV fistula pain.

This study proved that there is no significant association between the pre-test numeric pain scale scores and Body Response scores with their selected demographic variables.

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