

Effectiveness of Cryotherapy on Pain relief during intravenous Cannulation among Adult Patients admitted at tertiary care hospital.

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Objective: Study investigated Effectiveness of Cryotherapy on Pain relief during intra venous Cannulation among Adult Patients.

Method: Post test only control group design was used to conduct the study among adult patients and totally 40 patients were allotted 20 each in the experimental and control groups by Purposive Sampling technique. Ethical permission was obtained before the data collection. After obtaining permission from the setting, the patients were asked their willingness to participate in the study and informed consent was obtained. The experimental group receives Cryotherapy and control group was not receives Cryotherapy during intra venous Cannulation. The pain level was assessed by using numerical pain scale in both groups. The collected data were studied and analyzed in terms of objectives of the study using descriptive and inferential statistics.

Results: The result shows the mean pain score of experimental group was 2.45 and control group was 7.15. The unpaired t test value was 11.321 found significant difference between mean pain score level among adult patients.

Conclusions: Cryotherapy can be used as practical modality of choice that promotes comfort and cost effective, means of reducing intravenous pain in adult patients.

Key words: Cryotherapy, Pain, Intravenous Cannulation,

Introduction:

It has been reported around 1.2 billion peripheral intravenous catheters are inserted in hospitalized patients across the world annually and nearly four out of five patients admitted to the hospital receive a peripheral intravenous catheters, which makes peripheral intravenous catheters insertion one of the most regularly practiced invasive procedures by both medical and nursing staff. It is common for peripheral intravenous catheters insertion to be a painful and invasive procedure, which therefore increases the anxiety and discomfort of the patients. [1]

In medical practice, up to 80% of patients admitted in hospital receive intravenous therapy at some point during their admission. Medication, fluids, nutrition, and blood products can all be given via the intravenous route, which can be either peripheral or central. In another study it also stated that Peripheral intravascular cannula/catheter insertion is the most widely performed invasive procedure in hospitals with up to 70% of inpatients requiring a PIVC during their stay. [2,3] Patients in postoperative wards 100 % of patients had intravenous cannula line. In comparison 56.5% of male patients and rest of them were female and children.[4]

Performing a veinpuncture for intravenous therapy is the process of puncturing a vein with a needle, using aseptic technique. The introduction of large amount of fluid into the body via veins is term as intravenous infusions. The Purpose of Intravenous infusion to meet basic requirement for calories, water, minerals and vitamins another purpose to prevent and treat shock and to administer medicine.[5,6] In most institution, policies and procedures identifies the medication that nurses are allowed to administer intravenously. These policies are based on the medication, capabilities and availability of staff, and type of monitoring equipment available.[7]

Cryotherapy is one of the simplest therapeutic techniques used in physical rehabilitation. It involves reducing injury symptoms, aiding the healing process and cooling of a target tissue to promote a decrease in local metabolism.[8] Cryotherapy used to relieve symptoms of various diseases including inflammation, pain, muscle spasms, and swelling, especially chronic inflammatory ones, injuries, and overuse symptoms. It also called as Local and systemic cold therapies. [9] Cryotherapy increases the threshold of pain and promotes physiological changes. It influences reduction of skin- and muscle temperature through vasoconstriction. Cryotherapy may be used as long term therapy (more than 20 min) as well as short term therapy (less than 15 min) For maximal effectiveness the intensity of application as well as the application medium must be considered. Due to biorhythm, cold application seems to be more effective in the afternoon. [10] Cryotherapy has many positive physiologic effects which is reduction in blood flow, edema, hemorrhage, enzyme activity, and tissue damage. Cryotherapy was shown to increase the pain threshold and tolerance by reducing nerve conduction velocity and muscle spasm. [11] Doctors and nurses who are working in the clinical settings responsible for administering intra venous Cannulation. While introducing Intravenous cannulation patient's experiences pain and discomfort for this concerns aim of the study to find effectiveness of Cryotherapy on Pain relief during intra venous Cannulation among Adult Patients.

Methods:

Post test only control group design was used to conduct the study among adult patients and totally 40 patients were allotted 20 each in the experimental and control groups by Purposive Sampling technique. The samples included in this study were who fulfilled the inclusion criteria with who were willing to participate in the study. The patient with extremities that have massive

edema, burns or injury, patient with phlebitis and previous intravenous infiltration were excluded from the study. Ethical permission was obtained before the data collection. After obtaining permission from the setting, the patients were asked their willingness to participate in the study and informed consent was obtained. The cryotherapy was applied on the site of venipuncture prior to intravenous procedures and after the application of cryotherapy pain was assessed by using numerical pain scale in the experimental group. In the control group cryotherapy was not applied on the site of venipuncture prior to intravenous procedures and was assessed by using numerical pain scale.

Statistical test: Unpaired t test was used to compare two different means of pain score in experimental group and control group and chi square test was used to find out association between socio-demographic variables and pain score.

Results:

Table no .1 Frequency and Percentage distributions of Samples according to demographic variables:

Sr.No	Demographic Variables		Experimental Group		Control Group	
			Frequency	Percentage	Frequency	Percentage
1.	Age	21- 30 yrs	8	40	8	40
		31-40yrs	6	30	7	35
		41-50yrs	4	20	3	15
		50-above	2	10	2	10
2.	Gender	Male	14	70	14	70
		Female	6	30	6	30
3.	Educational status	No formal Education	4	20	3	15
		Primary school	2	10	3	15
		Secondary school	3	15	3	15
		Higher secondary school	6	30	7	35
		Graduate	5	25	4	20
4.	Employment status	Employed	14	70	14	70
		Unemployed	6	30	6	30
5.	Marital status	Married	17	85	17	85
		Unmarried	3	15	3	15
6.	Residence	Urban	12	60	12	60
		Rural	8	40	8	40

Description of sample characteristics

The data presented in Table 1 reveals distribution of samples according to demographic variables. In Experimental group Majority of samples 8 (40%) between the age group 21-30 years. In control group Majority of samples 8 (40%) between the age group 21-30 years. As regards to gender In Experimental group most of the samples 14(70%) were Male and in control group most of the samples 14(70%) were male. In relation to Educational Status in Experimental group most of the samples 6(30%) were having Higher secondary school educational status and in control group majority 7(35%) were having Higher secondary school educational status. As regards to Employment status In Experimental group Majority of samples 14(70%) were Employed and in control group were 14(70%) were Employed. In Experimental group most of the samples 17(85%) were Married and in control group 17(85%) were Married. Majority in Experimental group 12(60%) were from Urban area and in control group 12(60%) were from Urban area.

Table no .2 Pain Scores during intravenous procedures in experimental group and control group

Pain Score	Experimental group		Control group	
	F	%	F	%
Mild (1-3)	16	80	0	0
Moderate (4-6)	4	20	7	35
Severe (7-10)	0	0	13	65

Pain during intravenous procedures:

Table 2 reveals pain score wise distribution of samples in Experimental group 16(80%) were having mild pain, 4(20%) were having moderate pain and there was no sever pain measured Experimental group. In control group most of the samples 13(65%) were having severe pain, 7(35%) were having moderate pain and there was no mild pain measured control group.

Table no .3 Effectiveness of Cryotherapy on Pain relief during intra venous Cannulation among Adult Patients:

Parameters	Group	Mean	SD	Mean Difference	t statistics	p Value
Pain Level	Experimental group	2.45	1.146	4.7	11.321	<0.0001
	Control group	7.15	1.461			

Effectiveness of Cryotherapy on Pain relief during intra venous Cannulation among Adult Patients:

Unpaired t test was performed to check the difference for pain score level among adult patients admitted in general ward during intravenous procedures between control group and experimental group. It was found that mean pain score level was higher among samples from control group

(7.15) than experimental group (2.45). There was significant difference present between mean pain score in control and experimental group at the level of $p < 0.05$.

Table no. 4 Association between pain scores with demographic variables of experimental group

Sr. No.	Demographic Variables		Pain Level			Chi square valve	P value	Result
			Mild	Moderate	Severe			
1	Age	21- 30 yrs	7	1	0	9.844	0.0199*	Significant
		31-40yrs	6	0	0			
		41-50yrs	1	3	0			
		50-above	2	0	0			
2	Gender	Male	12	2	0	0.9524	0.3291	Not Significant
		Female	4	2	0			
3	Educational status	No formal Education	2	1	0	2.500	0.6446	Not Significant
		Primary school	1	1	0			
		Secondary school	4	0	0			
		Higher secondary school	5	1	0			
4	Employment status	Employed	12	2	0	0.9524	0.3291	Not Significant
		Unemployed	4	2	0			
5	Marital status	Married	14	3	0	0.3922	0.5312	Not Significant
		Unmarried	2	1	0			
6	Residence	Urban	11	1	0	2.552	0.1101	Not Significant
		Rural	5	3	0			

Table no. 5 Association between pain scores with demographic variables of control group

Sr.No.	Demographic Variables		Pain Level			Chi square value	P value	Result
			Mild	Moderate	Severe			
1.	Age	21- 30 yrs	0	2	6	0.7431	0.8630	Not Significant
		31-40yrs	0	3	4			
		41-50yrs	0	1	2			
		50-above	0	1	1			
2.	Gender	Male	0	10	4	0.8477	0.3572	Not Significant
		Female	0	3	3			
3.	Educational status	No formal Education	0	3	0	7.075	0.1320	Not Significant
		Primary school	0	1	2			
		Secondary school	0	1	2			
		Higher secondary school	0	1	6			
		Graduate	0	1	3			
4.	Employment status	Employed	0	4	10	0.8477	0.3272	Not Significant
		Unemployed	0	3	3			
5.	Marital status	Married	0	7	10	1.900	0.1680	Not Significant
		Unmarried	0	0	3			
6.	Residence	Urban	0	3	9	1.319	0.2508	Not Significant
		Rural	0	4	4			

Association between pain score and selected demographic variables:

Table 4 reveals association between demographic variables and experimental group. There was no significant association between pain score and demographic variables at the level of $p < 0.05$. Age has found significantly associated with pain score at the level of $p < 0.05$.

Table 5 reveals association between pain score and demographic variables in control group. There was no significant association between pain score and demographic variables in control group at the level of $p < 0.05$.

Discussion:

The present study was held to assess the Effectiveness of Cryotherapy on Pain relief during intra venous Cannulation among Adult Patients. The result shows the mean pain score of experimental group was 2.45 and control group was 7.15. The unpaired t test value was 11.321 found significant difference between mean pain score level among adult patients. The result of the present study shows that the patients in the control group most of those 13(65%) was having severe pain. In the Experimental group those received Cryotherapy were having mild pain i.e. 16(80%) There was no association between demographic variables and pain score in experimental group at the level of $p < 0.05$. Only age has found significantly associated with pain

score at the level of $p < 0.05$. There was no significant association between pain score and demographic variables in control group at the level of $p < 0.05$.

There were studies done to see the effect of cryotherapy on pain on different patient conditions. A clinical trial conducted by MortezaDehghan et al. in this study, mean age of the patients was 34.48 (20–50) years and 51.72 per cent were female. Patients with Thermotherapy reported less pain compared to cryotherapy and control ($p \leq 0.05$). In thermotherapy and cryotherapy groups, mean pain in the first visit was 12.70 ± 3.7 and 12.06 ± 2.6 , and on the 15th day after intervention 0.75 ± 0.37 and 2.20 ± 2.12 , respectively. The results concluded that the application of thermo-therapy and cryotherapy accompanied with a pharmacologic treatment could relieve pain in the patients with acute low back pain. [12]

A study conducted by ApisadaChumkam et al. to examine the effectiveness of cryotherapy for reducing postoperative pain in patients who underwent exploratory laparotomy for gynecologic surgery. The study concluded that the Cryotherapy can reduce postoperative pain. In this presented study patients who underwent gynecologic surgery had improved pain relief and prolonged time for the first dose of the analgesic drug. The use of cryotherapy can improve postoperative pain control. [11] The results of the present study and various studies conducted to see the effect of cryotherapy on pain describes that the cryotherapy play important role on reducing pain on different conditions of the patients. Cryotherapy can be used as non pharmacological therapy to reduce the pain on patients.

Conclusion:

The mentioned study concludes the mean pain score level was higher in adult patients from control group than experimental group. Hence Cryotherapy can be used as practical modality of choice that promotes comfort and cost effective, means of reducing intravenous pain in adult patients.

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