Evaluate the effectiveness of cryotherapy on reduction of pain during arterio-venous fistula puncturing among patients undergoing he modialysis at Amaravathi Hospital, Karur (Dt), Tamil Nadu.

KasthuriM[1], Muniamma Devi K[2]

[1]Assistant Professor, Sakthi College of Nursing, Karur, Tamil Nadu,[2]Professor, Nootan College of Nursing, Sankalchand Patel University, Visnagar, Gujarat

Abstract

Introduction: The study's objective was to assess how well cryotherapy reduces pain during arterio-venous fistula puncturing in hemodialysis patients.
Materials and Method: Thirty samples were chosen for the experimental group and thirty samples for the control group, totaling sixty samples. The Numerical Pain Rating Scale was used to gather the data. Cryotherapy was given to the experimental group. The post-test was administered without intervention to the control group. During the data collecting period, five to ten hemodialysis patients are evaluated every day. Both descriptive and inferential statistics were used to analyze the data.
Results: Following cryotherapy, there was a notable difference between the experimental and control groups. The degree of pain decreased. To link the post-test result to specific demographic characteristics, chi square analysis was performed. The post-test score and the experimental group's demographic characteristics are significantly correlated.
Conclusion: Arteriovenous fistula puncturing pain can be significantly decreased by cryotherapy.
Keywords: *cryotherapy, hemodialysis, and arterio-venous fistula puncture*

Corresponding author: Muniamma Devi K, Nootan College of Nursing, Sankalchand Patel University, Visnagar, Gujarat. 9787169951, 8248466240, dev3kajo@gmail.com

Date of Submission: 25 January 2024
Date of Revision: 28 February 2024
Date of Acceptance: 19 March 2024

Introduction

A worldwide health emergency is chronic kidney disease. The prevalence of chronic renal disease is rising globally. According to the 2015 Global Burden of illness Study, renal illness accounted for 1.1 million fatalities globally, making it the 12th most prevalent cause of death. Over the past ten years, the overall mortality rate from CKD has risen by 31.7%, making it one of the leading causes of death with the quickest rate of increase.[1,2]

In India, around 1,75,000 new patients require dialysis each year due to kidney failure. Hemodialysis patients frequently experience pain during arteriovenous fistula cannulation, which makes them less likely to adhere to the lifelong maintenance of hemodialysis.3. Despite the fact that local anesthetic is not commonly utilized because of the risk of vasoconstriction, burning sensation, scarring, and infection, arterio-venous fistula punctures are painful. Frequent fistula puncture discomfort can cause sadness, avoidance, or condensed session duration. Cryotherapy is the use of cold materials to lower tissue temperature by removing heat from the body. Through vasoconstriction, it lowers tissue blood flow, tissue metabolism, and muscle spasm.

A local anesthetic effect known as cold-induced neuropraxia is the outcome of these.[4,5]

Objectives

1. To assess how well cryotherapy works to lessen the discomfort associated with arteriovenous fistula punctures in patients receiving hemodialysis in the experimental and control groups.
2. To determine the association between hemodialysis patients' chosen demographic characteristics and their post-test arteriovenous fistula puncture pain level.

Hypotheses

H1: Patients receiving hemodialysis in the experimental and control groups have significantly different levels of arteriovenous fistula puncture pain.
H2: The degree of discomfort experienced during an arteriovenous fistula puncture is significantly correlated with the demographic characteristics chosen for hemodialysis patients.

Material and methods

An evaluative research methodology was adopted. The design of the search is one group post-test only. The Amaravati Hospital in Karur, Tamil Nadu, was the site of this investigation. The group consists of hemodialysis patients with chronic renal failure.

The director of Amaravati Hospital in Karur, the ethical committee, and the principal of Sri Aurobindo College of Nursing all formally gave the researcher permission to carry out the study. Using the convenience sampling strategy, 60 samples were chosen. The experimental group received thirty samples, while the control group received the remaining thirty. There are both males and females. The age range is 18–70 years old, and patients with peripheral vascular disease, Raynaud's disease, or cardiovascular disease are not included.

The experimental group received the cryotherapy. Ten minutes prior to the puncture, and two minutes following the procedure, Researcher filled the glove with ice cubes and began massaging the web between the thumb and index finger with ice. After two minutes, the post-test was administered. It went on for a month. The efficiency of the intervention was compared with the control group, which did not receive the intervention. Five to ten hemodialysis patients are evaluated every day.

Materials:

Tool consists of three sections.
Section A - Demographic variables,
Section B - clinical variables,
Section C - numerical pain rating scale.

Results

The majority of the experimental group experienced minor pain after receiving cryotherapy; 16 (53.33%) experienced mild discomfort, and 14 (46.67%) experienced moderate pain. (Table 1) Of those in the control group, 24 (80%) reported having severe pain, 6 (20%) reported having moderate pain, and 0 reported having no pain. This indicates that hemodialysis patients' arterio-venous fistula puncture pain scores differ significantly between the experimental and control groups (Table 2).

The post-test score of arteriovenous fistula puncture pain was compared to demographic variables such as age, gender, education, occupation, place of residence, marital status, family income, nutritional habits, bad habits, length of disease, frequency of dialysis, presence of an arm arteriovenous fistula, co-morbidity illness, arteriovenous fistula site, and duration of current arteriovenous fistula using the chi-square test. Post-test scores are significantly correlated with age ($p=0.05$), gender ($p=0.01$), and the location of the arterio-venous fistula ($p=0.03$). The experimental group's post-test level of pain score is not significantly impacted by the remaining demographic factors. None of the demographic factors in the control group were related to the posttest pain score. (Table 3)

Table1: Shows the post-test Level of pain score among the Experimental and Control group

Level of pain	Group			
	Experimental Group(n=30)		Control Group(n=30)	
	F	%	F	%
No Pain	0	0.00	0	0.00
Mild Pain	16	53.33	0	0.00
Moderate Pain	14	46.67	6	20.00
Severe Pain	0	0.00	24	80.00

Table 2: Post-test Mean,SD,and‘t’testscoreof Arterio-venous fistula puncture pain level among patients undergoing hemodialysis

Group				Meand ifferen ce	t-test	Table Value
Experimental(n =30)		Control(n =30)				
Mean	SD	Mean	SD			
3.37	1.65	7.93	1.34	4.56	t=11. 77p= 0.0 01** *(S)	2.20

post-test mean score is 7.93, SD1.34 and the mean difference is 4.56, the calculated ‘t’ value is =11.77 (p=0.001). The table ‘t’ value is 2.20. It inferences that the calculated ‘t’value is higher than the table ‘t’ value. It shows that cryotherapy is highly effective in reducing arteriovenous fistula puncture pain among hemodialysis patients. So, the research hypothesis H1 is accepted

Table3: Shows the association between post-test level of pain score with demographic variables of hemodialysis patients in the experimental group

Demographic variables	**Level of pain score**						**n**	**Chi square test**
	Mild		**Moderate**		**Severe**			
	F	**%**	**F**	**%**	**F**	**%**		
Age in years								2=8.92 P<0.05* (S)
a)18– 30yrs	1	14.29	6	85.71	0	0.00	7	
b)31–45yrs	2	33.33	4	66.67	0	0.00	6	
c)46– 60yrs	6	75.00	2	25.00	0	0.00	8	
d)61– 70yrs	7	77.78	2	22.22	0	0.00	9	
Gender								2=6.46 p>0.01** (S)
a)Male	12	66.67	4	33.33	0	0.00	16	
b)Female	4	28.57	10	71.43	0	0.00	14	
Site of AV Fistula								2=9.19 p<0.03* (S)
a) Radio-cephalic-AVF	4	100.00	0	0.00	0	0.00	4	
b) Brachio-cephalic-AVF	2	28.57	5	71.43	0	0.00	7	
c) Brachio-basilic-AVF	10	62.50	6	37.50	0	0.00	16	
d)Ulnar-basilic-AVF	0	0.00	3	100.0 0	0	0.00	3	

The post-test score of arteriovenous fistula puncture pain was compared to demographic variables such as age, gender, education, occupation, place of residence, marital status, family income, nutritional habits, bad habits, length of disease, frequency of dialysis, presence of an arm arteriovenous fistula, co-morbidity illness, arteriovenous fistula site, and duration of current arteriovenous fistula using the chi-square test. Post-test scores are significantly correlated with age (p=0.05), gender (p=0.01), and the location of the arterio-venous fistula (p=0.03). The experimental group's post-test level of pain score is not significantly impacted by the remaining demographic factors. None of the demographic factors in the control group were related to the posttest pain score. (Table 3)

Conclusion

According to the findings, cryotherapy was successful in reducing the level of pain experienced by patients receiving hemodialysis at the locations of arteriovenous fistula punctures. It is advised as a pain-relieving method for hemodialysis patients undergoing AV fistula puncture and can be utilized as a non-pharmacological intervention. Cryotherapy is a simple, low-risk technique that appears to be helpful in easing pain.

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How to cite the article:

Kasthuri M, Muniamma Devi K. Evaluate the effectiveness of cryotherapy on reduction of pain during arterio- venous fistula puncturing among patients undergoing hemodialysis at Amaravathi hospital, Karur (Dt), Tamil Nadu. JIHR 2024;1(1);10-13.