

Effectiveness Of Cryotherapy On Atrioventricular Fistula Puncture Pain Among Adults

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Abstract

The vascular access needed for hemodialysis is called an atrioventricular fistula. A patient must endure this excruciating operation. Prior to the atrioventricular fistula puncture, this pain can be managed using cryotherapy. According to this perspective, the goal of this study is to assess the impact of cryotherapy on pain induced due to atrioventricular fistula puncturing in hemodialysis patients'. On 60 hemodialysis patients with renal failure and an atrioventricular fistula from a chosen hospital in Pune, India, a Quazi experimental non-randomized control group post-test design was used. Data for demographic and clinical factors were gathered using a tool devised by the researcher, and non-probability purposive sampling technique was used. Both the pain and the pain behavior were measured using a numerical pain rating scale. Result: Researcher used two groups namely control group and experimental group. The analysis depicts that 56.7% of adults were experiencing moderate level of pain and 23.3% of adults are experiencing severe level of pain in the control group. In the experimental group only 26.7% of adults are having moderate pain and no adult were having severe pain. Minimum numerical pain rating score in experimental group was 0 and in control group it was 1. Hence it is statistically interpreted that the atrioventricular fistula puncture pain can be reduced with cryotherapy.

Conclusion: This study conclude that hemodialysis patients were experiencing moderate to severe pain during atrioventricular fistula puncture and after providing cryotherapy the pain has been reduced to mild to no pain

Keywords: Effectiveness, cryotherapy, atrioventricular fistula, pain, adults

Introduction

Pain is one of the most common and distressing symptoms among patients with kidney failure. The atrioventricular fistula is one of the most important vascular access used in hemodialysis. The atrioventricular fistula puncture pain is painful experience for all the patients. This pain is associated with the intensity, mainly diameter and length of needle. During atrioventricular fistula the vascular access is taken with two big needles size 16 or 17 which cause moderate to severe pain and it is most discomforting experience. Health care provider specially nurses play major role is reducing this pain and discomfort. Many studies has been shown that cryotherapy (ice application) can be really helpful to minimize the pain.

Purpose:

The study is directed towards assessing level of pain and pain behavior of patients undergoing atrioventricular fistula puncture for hemodialysis pre and post cryotherapy.

Problem Statement

A study to assess Effectiveness of Cryotherapy on Atrioventricular Fistula Puncture Pain among Adults in selected Hospital of Pune city.

Research methodology:

Research approach: Quantitative Approach

Research design: Quazi experimental non randomized control group post-test design

Sample: Adults undergoing hemodialysis through atrioventricular fistula

Sample size: 60

Sampling technique: Non-probability purposive sampling technique

Data collection technique: Data is collected by tool developed by researcher. The tool used in the study has three sections. Section A was questionnaire related to demographic data and clinical data of patient. Section B is aimed to monitor pain level with the help of numerical pain rating scale, and section C was intended to check the pain behavior of patient using checklist.

Result:

Table 1: Demographic variables

n=60

Demographic variables	Experimental Group	Control Group
Age(yrs.)		
20-30 yrs.	8(26.7%)	7(23.3%)
31-40 yrs.	9(30%)	7(23.3%)
41-50 yrs.	4(13.3%)	2(6.7%)
>50 yrs.	9(30%)	14(46.7%)
Gender		
Male	20(66.7%)	15(50%)
Female	10(33.3%)	15(50%)
Other	0(0%)	0(0%)
Educational Status		
Illiterate	0(0%)	3(10%)
Middle Class Degree	6(20%)	5(16.7%)
High School Degree	16(53.3%)	16(53.3%)
Graduation	8(26.7%)	6(20%)
Other	0(0%)	0(0%)
Marital Status		
Unmarried	1(3.3%)	6(20%)
Married	25(83.3%)	18(60%)
Widow	4(13.3%)	6(20%)
Divorced	0(0%)	0(0%)
Residence		
Urban	13(43.3%)	10(33.3%)
Rural	17(56.7%)	20(66.7%)
Family Income(Rs)		
<10000 Rs	0(0%)	0(0%)
11000-20000 Rs	10(33.3%)	13(43.3%)
21000-30000 Rs	19(63.3%)	15(50%)
>30000 Rs	1(3.3%)	2(6.7%)
Work Status		
Student	0(0%)	1(3.3%)
Employed	21(70%)	16(53.3%)
Self Employed	3(10%)	5(16.7%)
Unemployed	6(20%)	8(26.7%)

FigureNo.1: Age distribution (years)

n=60

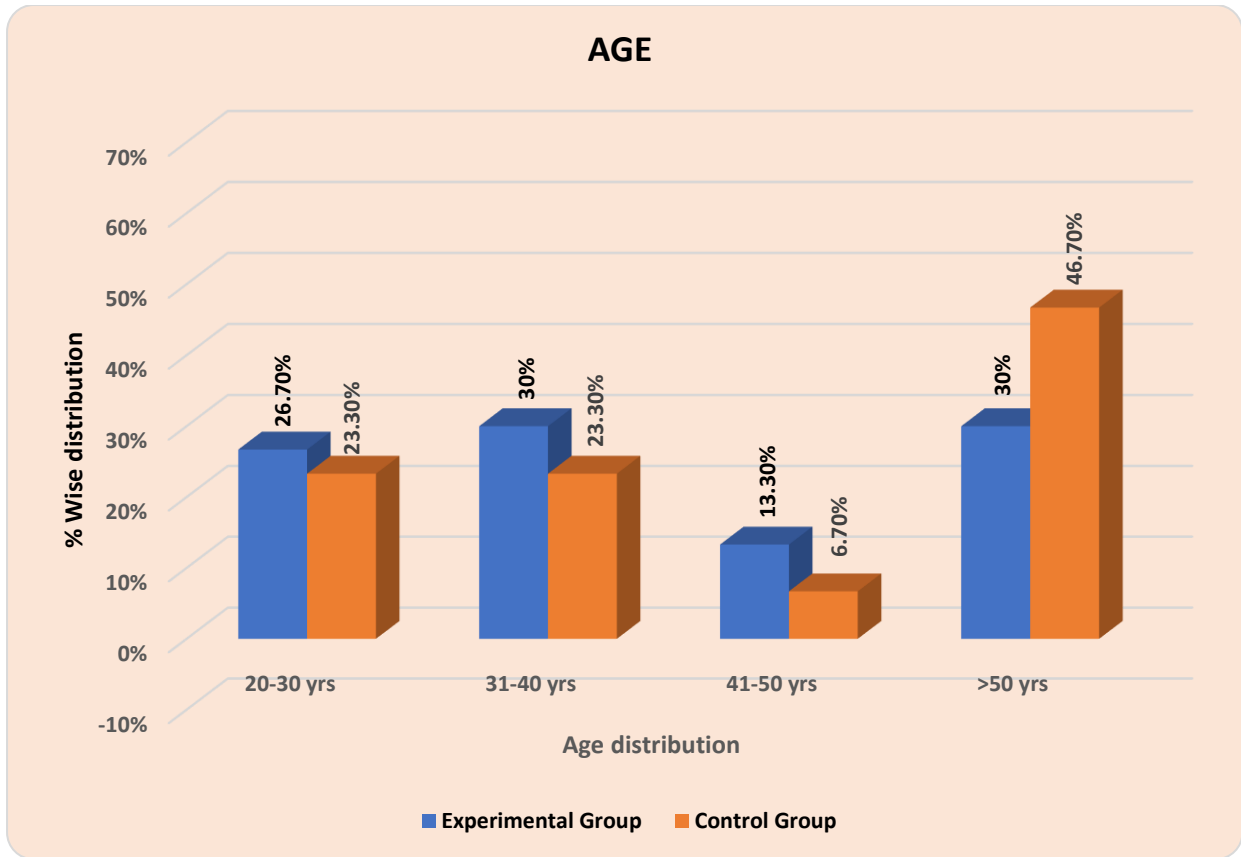


Figure No.2: Gender distribution

n = 60

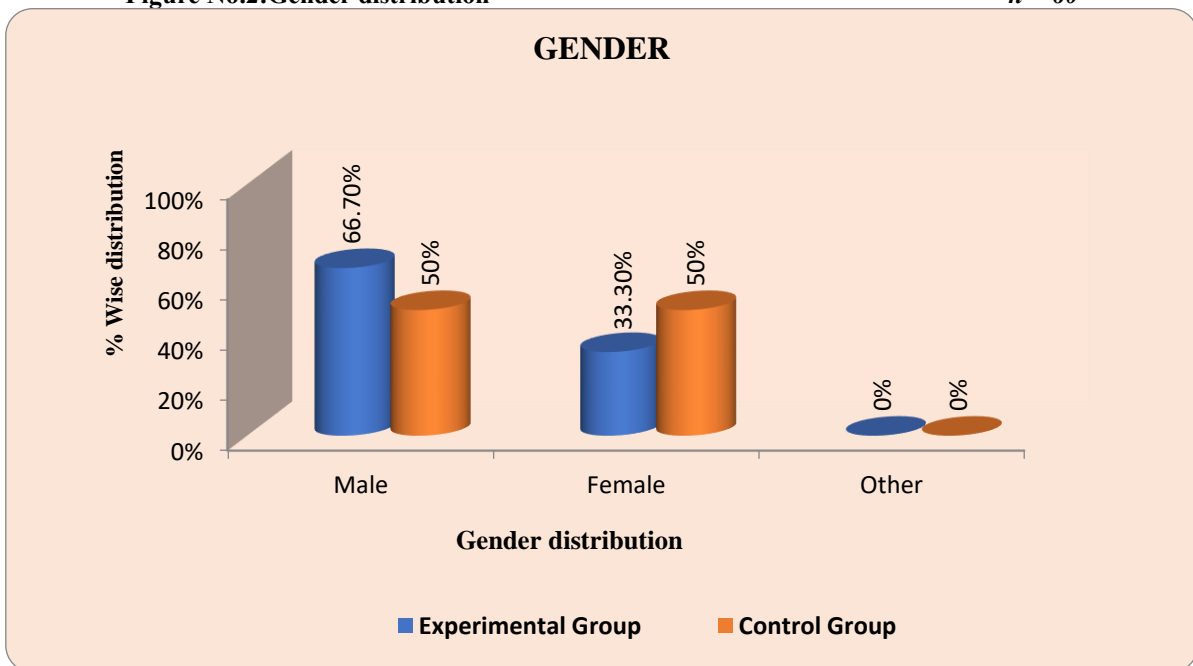


Figure No.3: Educational status

n=60

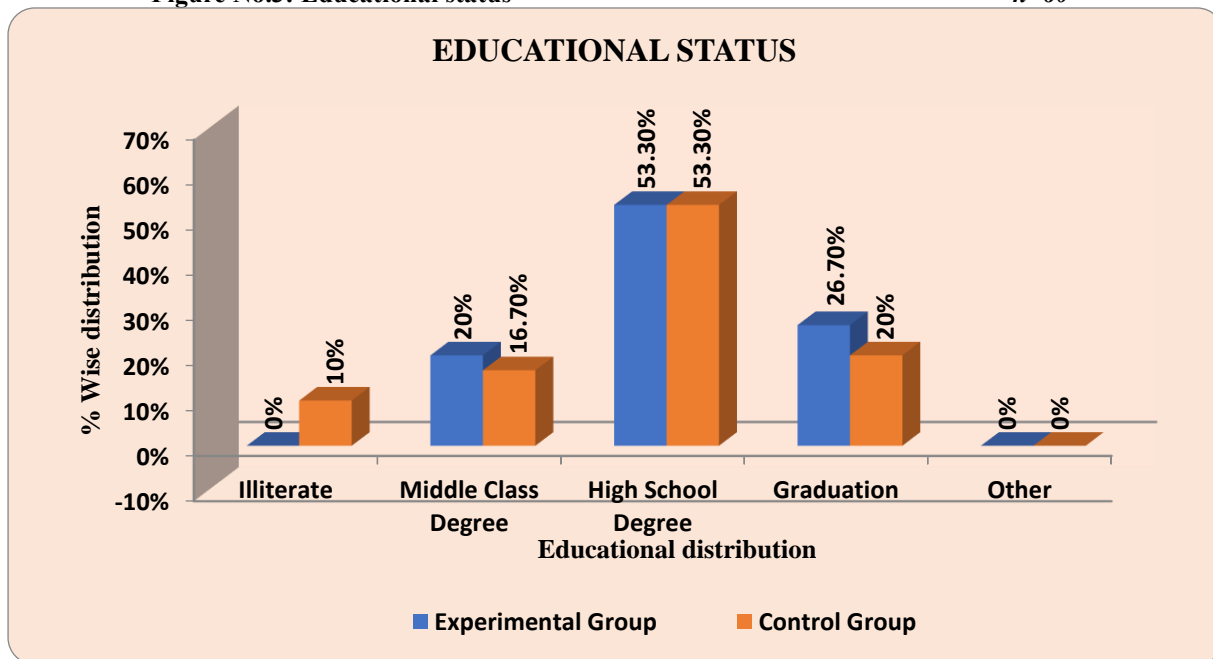


Figure No.4: Marital Status

n=60

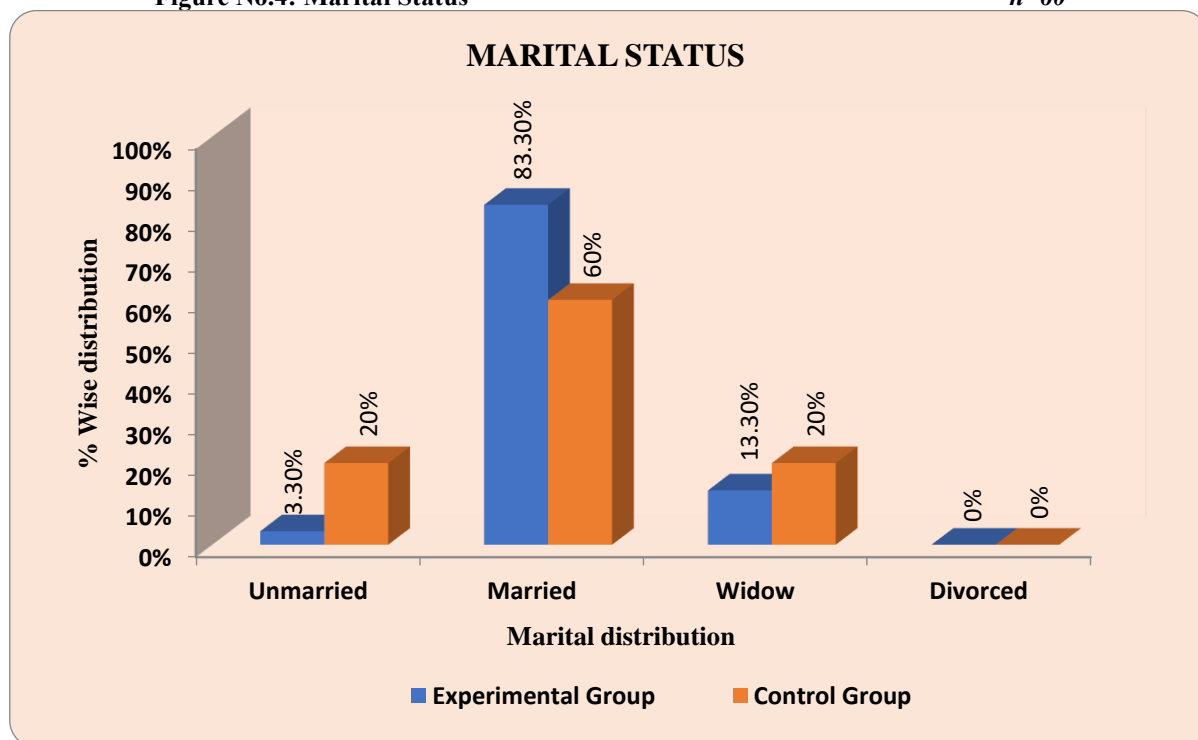


Figure No.5: Residence distribution

n=60

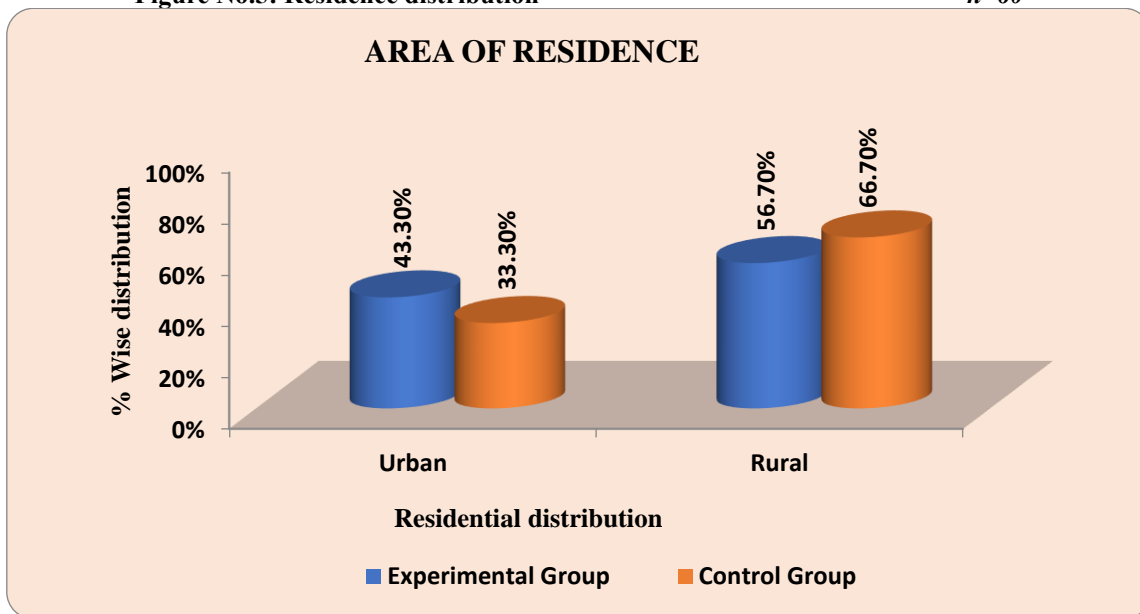


Figure No.6: Monthly family income

n=60

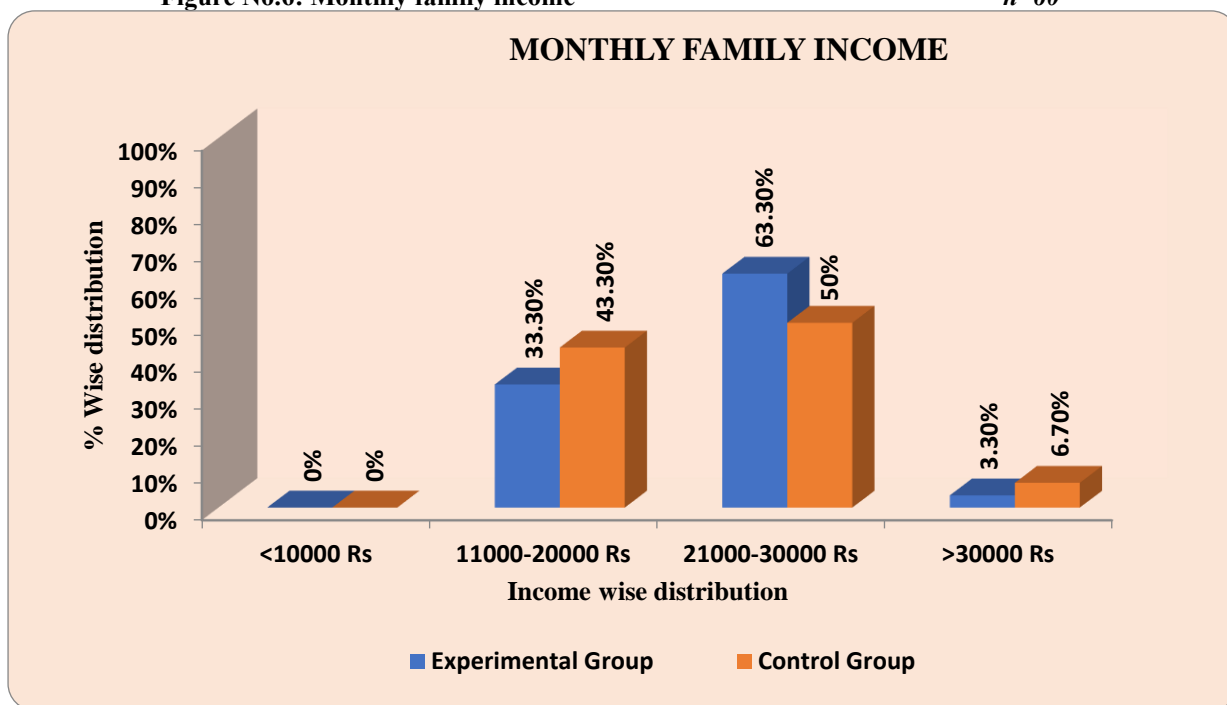


Figure No.7: Work status

n=60

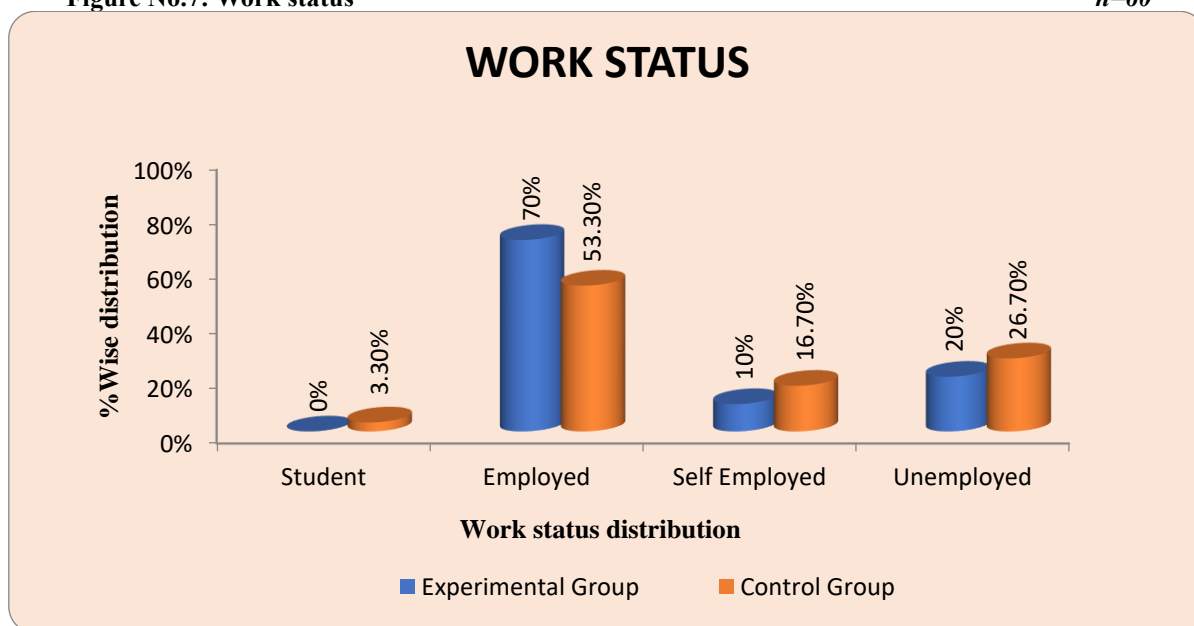


Table 2: Distribution of Clinical variables

n=60

Clinical Data	Experimental Group	Control Group
Duration of disease in years		
<5 yrs.	10(33.3%)	17(56.7%)
5.1-10 yrs.	20(66.7%)	13(43.3%)
>10 yrs.	0(0%)	0(0%)
History of disease		
Acute	10(33.3%)	9(30%)
Chronic	20(66.7%)	21(70%)
Congenital	0(0%)	0(0%)
Duration of dialysis		
0-1 yrs.	8(26.7%)	11(36.7%)
1.1-2 yrs.	11(36.7%)	15(50%)
>2 yrs.	11(36.7%)	4(13.3%)
No of dialysis per week		
Once a week	12(40%)	11(36.7%)
Twice a week	18(60%)	19(63.3%)
Thrice a week	0(0%)	0(0%)
Place of AV fistula		
Right Arm	19(63.3%)	15(50%)
Left Arm	10(33.3%)	15(50%)
Central Venous Access	1(3.3%)	0(0%)
Period of Cryotherapy		
< 2 min	0(0%)	0(0%)
3-10 mins	30(100%)	30(100%)
>10 mins	0(0%)	0(0%)
No of AV fistula insertion		
Once	14(46.7%)	15(50%)
Twice	16(53.3%)	15(50%)
Thrice	0(0%)	0(0%)
Side effects of AV fistula puncture		
Redness	10(33.3%)	15(50%)
Swelling	20(66.7%)	15(50%)
Other	0(0%)	0(0%)
Occurrence of sensitivity in minutes		

<2 min	30(100%)	30(100%)
2-10 mins	0(0%)	0(0%)
>10 mins	0(0%)	0(0%)

Figure No.8: Duration of disease in years

n=60

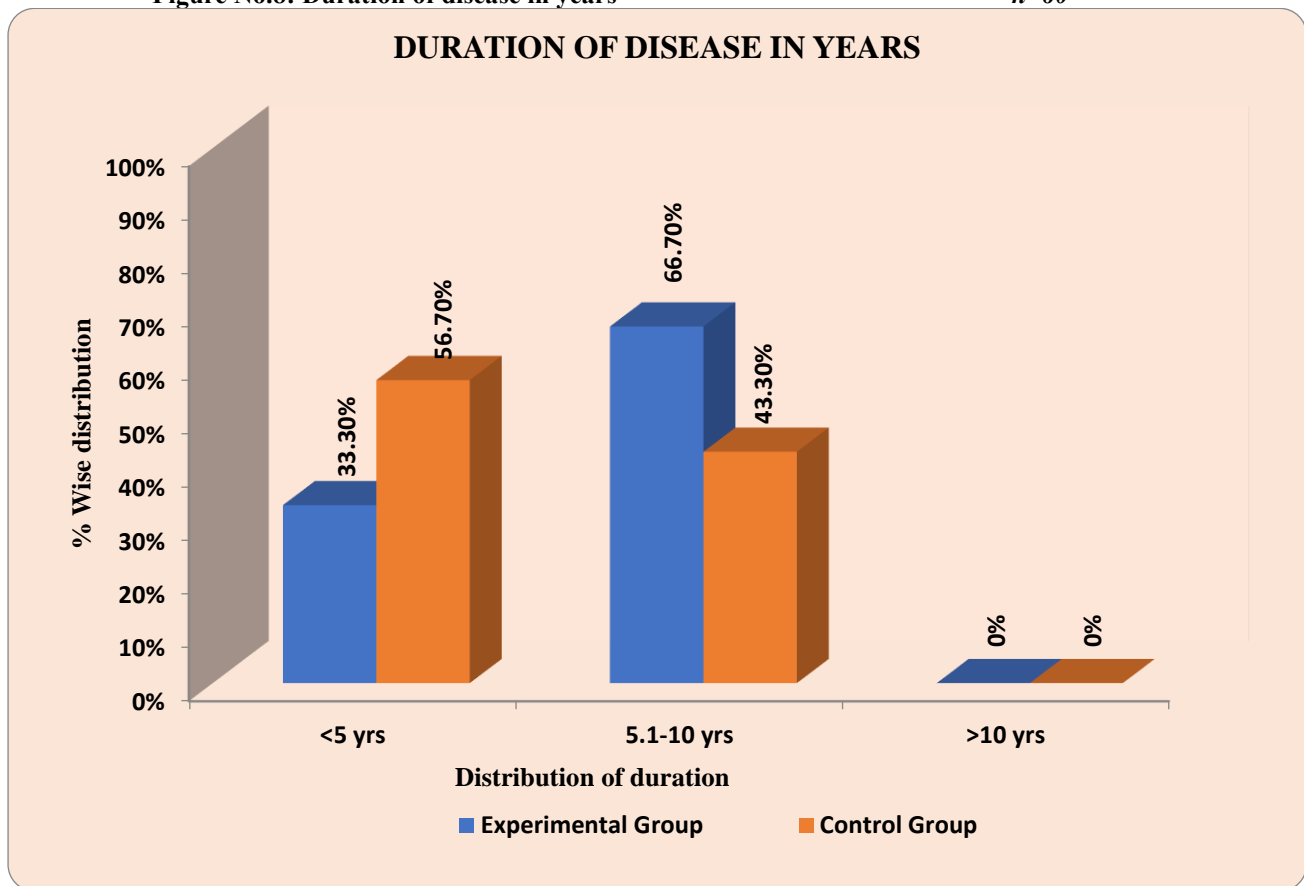


Figure No.9: History of disease

n=60

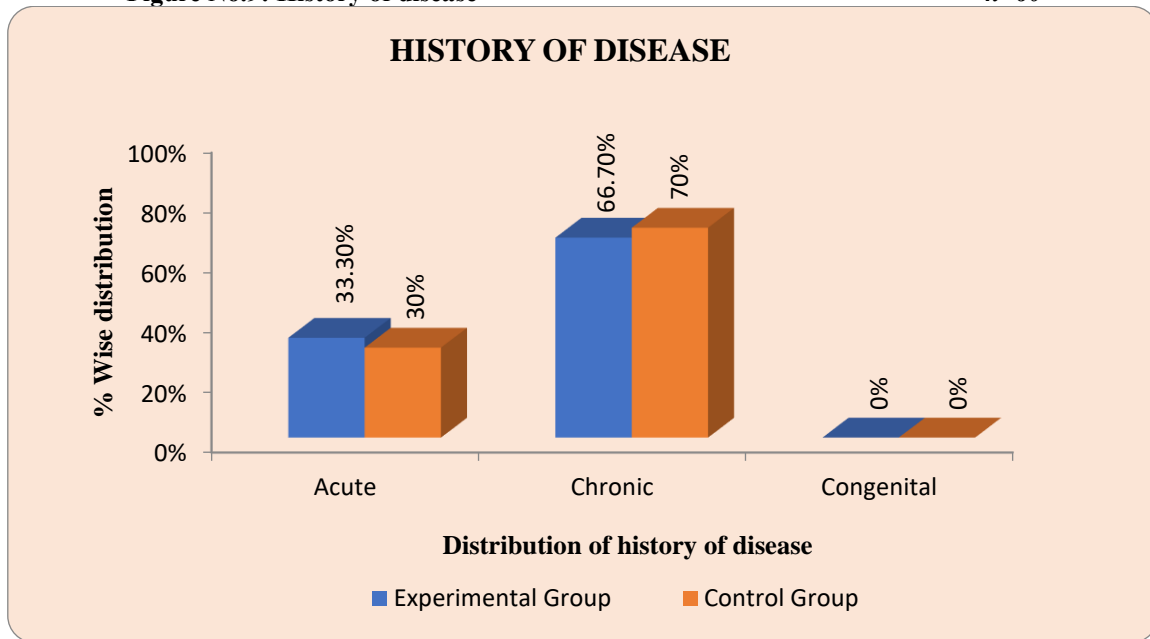


Figure No.10: Duration dialysis

n=60

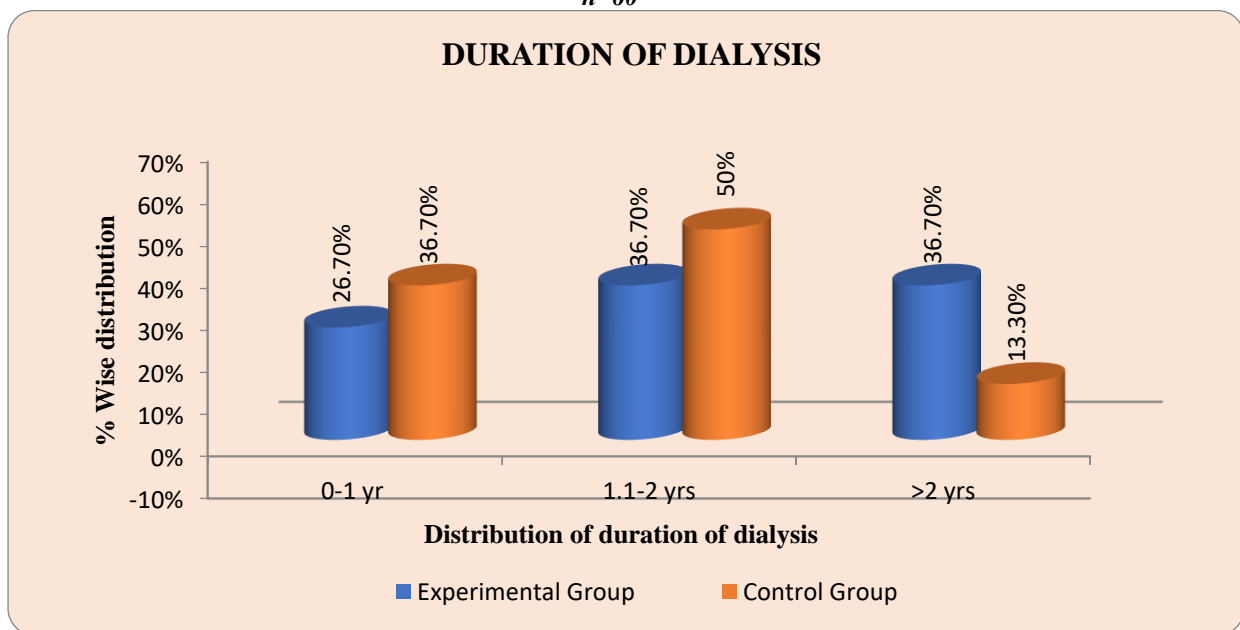


Figure No.11: Dialysis per week

n=60

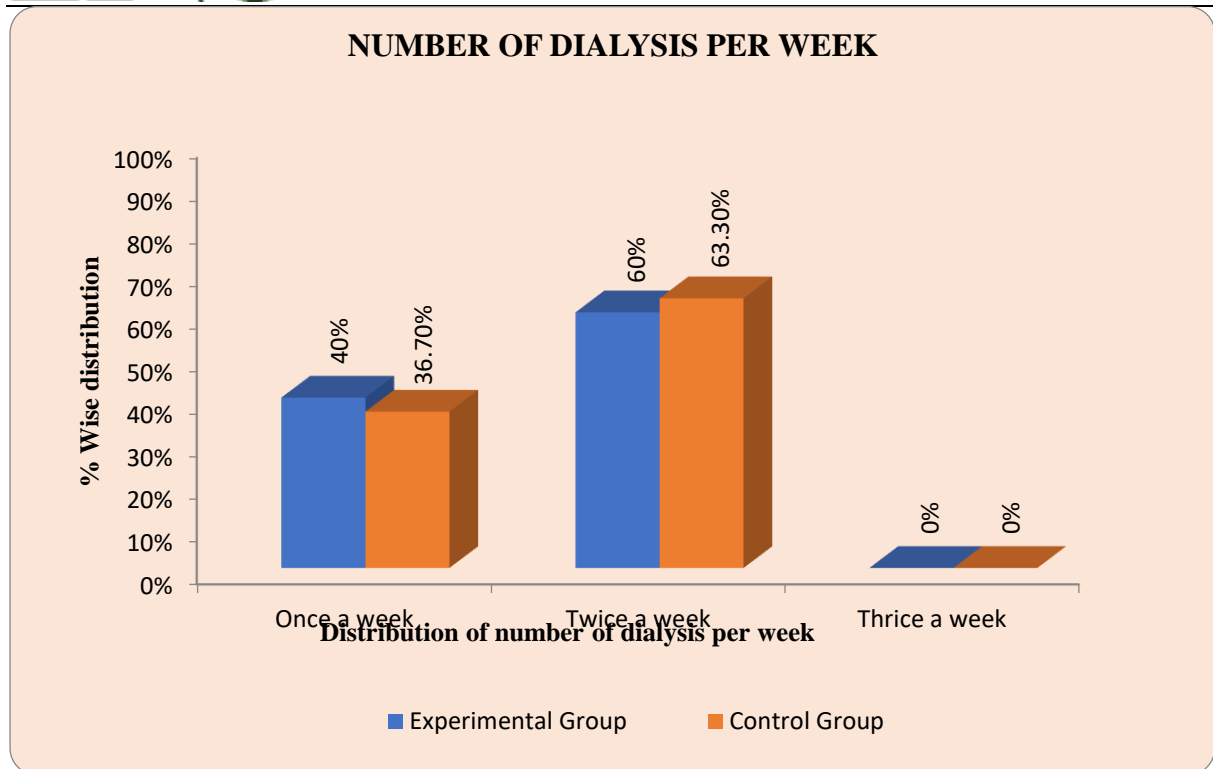


Figure No.12: Place of AV fistula
n=60

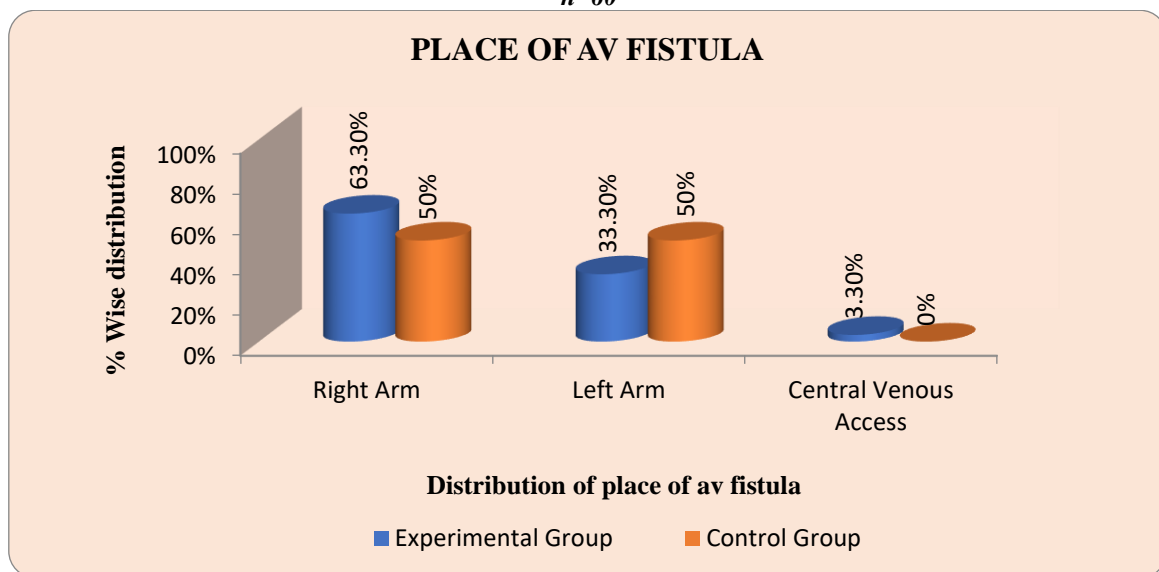


Figure No.13: Period of cryotherapy
n=60

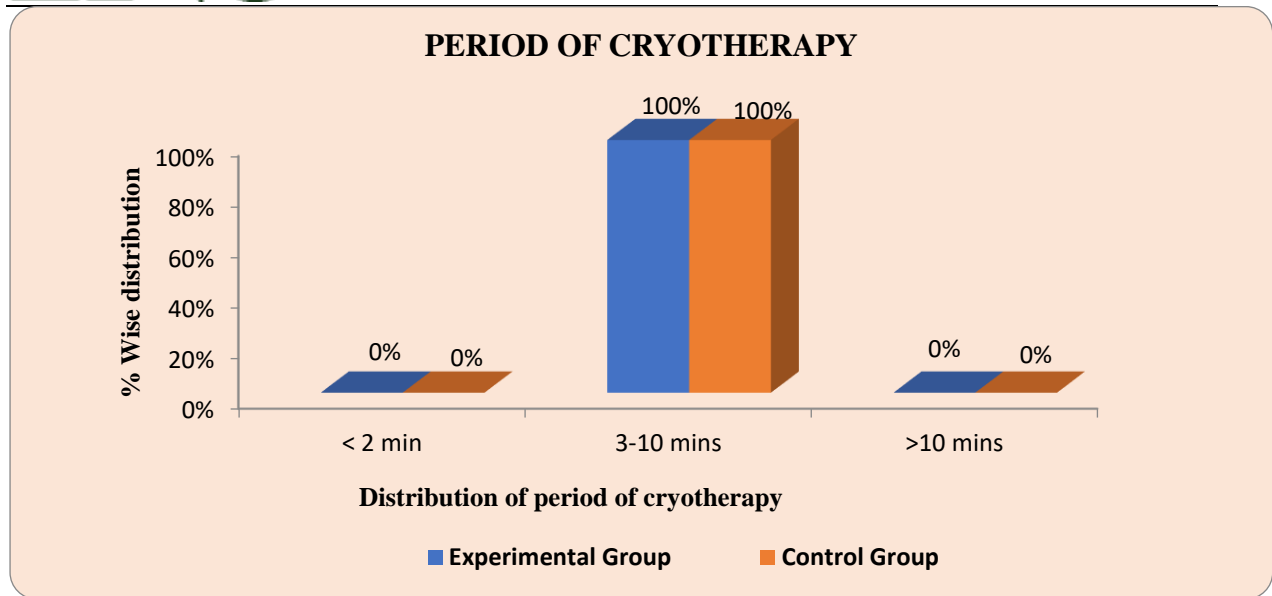


Figure No.14: Number of AV fistula
n=60

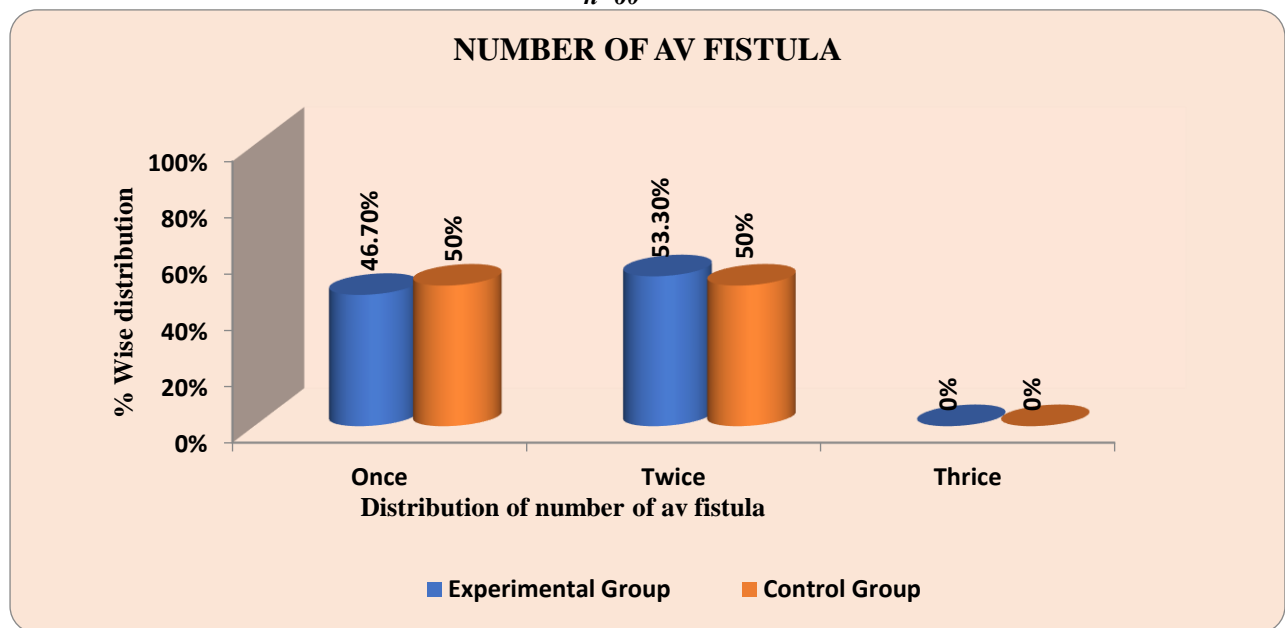


Figure No.15: Side effect of AV fistula
n=60

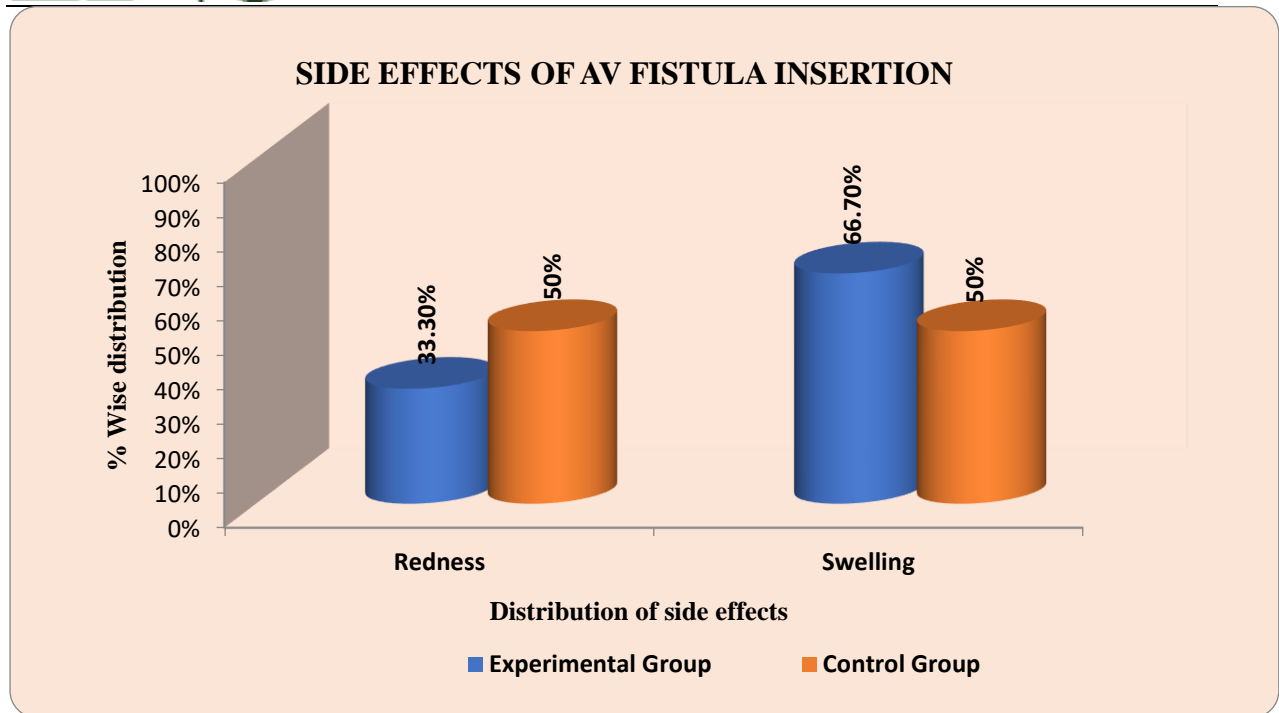
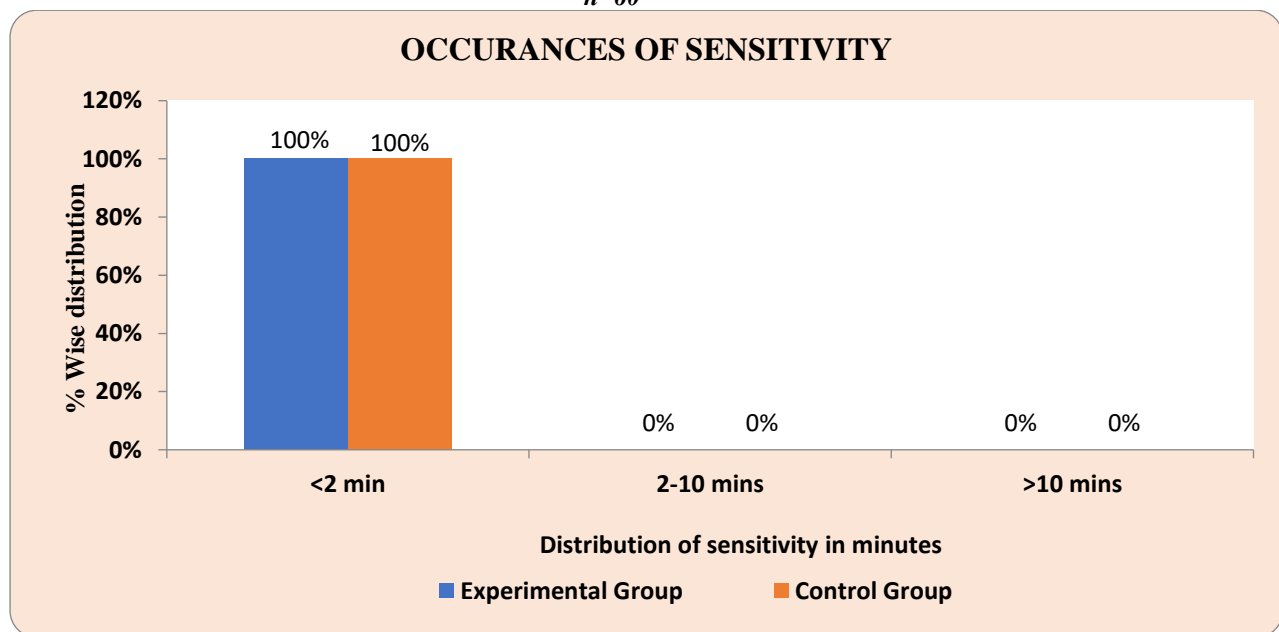


Figure No.16: Occurrence of sensitivity
n=60



SECTION-B

Table 2: Evaluation of Numerical Pain Rating Scale Score n=30

Level of NPRS Score	Score Range	Level of NPRS Score	
		Experimental Group	Control Group
No Pain	0	6(20%)	0(0%)
Mild Pain	1	16(53.3%)	6(20%)
Moderate Pain	2	8(26.7%)	17(56.7%)
Severe Pain	3	0(0%)	7(23.3%)
Total		30	30
Minimum score		0	1
Maximum score		2	3
Mean NPRS score		1.06 ± 0.69	2.03 ± 0.66

SECTION-C

Table 3: Evaluation of Pain Behavior Scale Score $n=30$

Level of pain behavior scale score	Score Range	Level of pain behavior scale Score	
		Experimental Group	Control Group
Good	0-2	16(53.33%)	0(0%)
Average	3-5	14(46.67%)	13(43.33%)
Poor	6-8	0(0%)	17(56.67%)
Total		30	30
Minimum score		1	3
Maximum score		5	7
Mean NPRS score		2.50 ± 1.13	5.40 ± 1.24

Discussion:

According to the study's statistical analysis, cryotherapy relieves the pain associated with atrioventricular fistula puncture. With the help of the distribution of the pain behavior scale score and the numerical pain rating scale, the hypothesis is statistically tested. To demonstrate the effectiveness of cryotherapy, the pain scores in the experimental and control groups are contrasted. Chi-square test is used to examine the significance of the difference between the numerical pain rating scale score and the pain behavior scale score, and the tabulated and computed "2" values are compared. Additionally, the calculated 'p' values are contrasted with the acceptable 'p' value of 0.05.

The present study's results are consistent with a 2019 study by **ThamariThankam and YimarHotessaDukele** on the impact of cryotherapy on hemodialysis patients' pain from atrioventricular fistula puncture. This study shows that ice application is a straightforward, non-pharmacological, and effective treatment option. It is efficient in hemodialysis patients' pain control at the AV fistula puncture site in medical facilities.

The findings of a study by **Hamad S. Al Amer, Wireen Leila Dator, Hamzeh Y. Abunab, and Mohammad Mari (2017)** on the use of cryotherapy to treat hemodialysis patients' pain associated with arteriovenous fistula cannulation serve as additional support for the current study. According to a study, adult hemodialysis patients can effectively treat AVF cannulation-related pain with cryotherapy. Consequently, it is advised that

A 2019 study by **RashaRady, Prof. Dr. Wafaa, Dr. FatenShafik Mahmoud, and Dr. BasmaRabee** examined the impact of cryotherapy on the level of discomfort felt at arteriovenous fistula puncture sites in children receiving hemodialysis. The study found that among children receiving hemodialysis, cryotherapy was beneficial in reducing intensity of pain at puncture. The study suggested that hemodialysis centers use cryotherapy to lessen AVF puncture discomfort in pediatric hemodialysis patients.

Conclusion:

This study conclude that hemodialysis patients were experiencing moderate to severe pain during atrioventricular fistula and after providing cryotherapy the pain has been reduced to mild to no pain. Thus it indicates that cryotherapy is effective in reducing pain.

ETHICAL CLEARANCE:

The Institutional Research Committee (IRC) of Pune's Symbiosis International (Deemed University) has given its approval to this study. Additionally, the administrative head of the chosen hospital in Pune granted permission for this study to be carried out

SOURCE OF FUNDING: Nil

CONFLICT OF INTEREST: Nil

References:

1. Shehab Mariam (2019), Effectiveness of cryotherapy related pain management among patients undergoing hemodialysis at the site of atrioventricular fistula puncture. 97-103.

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4. Azar jafari-koulaee, Mahmood Moosazadeh, Masoumeh BagheriNesami, Amir Hossein Goudarzian, Effect of cryotherapy on arteriovenous fistula puncture-related pain in hemodialysis patients, Volume 49, 2020