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"A Comparative Study On Effectiveness Of Selected Topical Anesthetic Agent Versus Cutaneous Stimulation On Level Of Pain At Av Fistula Puncture Site In Patients Undergoing Hemodialysis In Selected Hospitals Ofa Metropolitan City."

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Abstract:

Background: Pain is one of the most frequent complaints of patients during Arterio-venous fistula vein puncture. Pain inflicted by insertion of large cannula into Arterio-venous fistula on regular hemodialysis is a significant cause of concern for both children and adult patients. **Objectives**:1- To compare the pain scores of patients during AV Fistula puncture between Topical anesthetic agent and Cutaneous stimulation groups. 2- To elicit opinion from pt. undergoing Hemodialysis about effect of Topical Anesthetic agent vs cutaneous stimulation on pain during AV Fistula cannulization. 3- To associate the physiological variables with pain scores in pt. undergoing dialysis using Topical anesthetic agent and Cutaneous stimulation groups. **Methods:** In this study, a Quasi Experimental Non-equivalent 2 group research design was used to recruit hemodialysis patients undergoing AV Fistula puncture. Based on the selection criteria 74 patients were conveniently assigned into two groups, experimental group 1 (n=37) and experimental group 2 (n=37) from AKD units of multispecialty hospitals. On the day of hemodialysis during AV Fistula puncture, the experimental 1 group was provided with the application of Topical Anesthetic agent (Prilocaine and Lidocaine) prior 30 minutes of AV Fistula puncture and Cutaneous stimulation (application of ice pack done on the web between the thumb and index finger of the hand having AV Fistula) prior 10 minutes of AV Fistula puncture in Experimental group 2. This intervention was continued for three consecutive dialysis sessions in each experimental groups. **Result-** Comparison of average of total pain score in each groups was taken, it is found that for topical anesthetic mean pain score was more (10.06) with standard deviation (SD) 1.07, as compared with the cutaneous stimulation group where the mean pain score was (9.49) with standard deviation (SD) was 1.33. When both averages were analyzed by Mann Whitney U test, calculated value was 0.009. As both the interventions are not making any changes in the physiological parameters both can be used as an intervention in reducing pain in AV fistula puncture. The subjects strongly agreed to the fact that cutaneous stimulation is more effective in reducing AV fistula puncture pain as compared to Topical anesthetic agent. **Conclusion-** The study aimed to examine the effect of Topical anesthetic agent vs cutaneous stimulation on reducing the level of pain during arterio-venous fistula puncture among Hemodialysis patients. The findings of the study show that even modest difference in pain reduction is also

important in management of pain. Both the interventions will reduce pain and improve the quality of life which includes the stability in physiological, psychological and life style aspects. As Cutaneous stimulation is found to be a non-pharmacological, cost effective and time saving intervention, so it can be used as an alternative therapy and independent nursing intervention to ease the level of pain in AV Fistula puncture in patients undergoing hemodialysis.

Index Terms **–** Hemodialysis, Cutaneous Stimulation, Topical anesthetic agent, Pain reduction during AV Fistula puncture.

I. INTRODUCTION

The true burden of End stage kidney disease in India is not known, with few dedicated centers for care, lack of universal access to RRT, and absence of a registry. Even today, over 90% of patients requiring RRT in India die because of inability to afford care, and even in those who do start RRT, 60% stop for financial reasons. Hemodialysis (HD) is the most frequently used RRT with the Arteriovenous fistula (AVF) being the gold standard for vascular access in Hemodialysis patients. Continuous vascular access for hemodialysis is a critical procedure in the treatment of patients with end-stage renal disease (ESRD). An Arteriovenous fistula is a surgically made connection between an artery and vein, to make a specialized vein that blood can be removed from and passed through the dialysis machine for filtering wastes. There are different access points in the body where the fistula is placed.[2] Patients undergoing hemodialysis are exposed to stress and pain due to approximately 300 punctures per year they receive for their Arteriovenous fistula. Alleviation of the pain can improve acceptance of the procedure and quality of life among the patients.[3] Pain inflicted by the insertion of large cannula into the AV Fistula is a significant cause of concern for patients who are on regular Hemodialysis. Although AV Fistula causes pain, but local anesthesia is not frequently used due to concerns of vasoconstriction, burning sensation, scarring, and infection. Thus patients undergoing Hemodialysis frequently report pain while AV Fistula puncture and alleviation of pain might improve their acceptance of the procedure and quality of life. The care givers in the hospitals for patients are obligated to minimize the emotional and physical effects of painful procedures. They are advocates for adults and are committed to minimize the emotional and physical impacts of painful procedures. Providing pain relief is considered a most basic human right and it is the obligation of the care giver to utilize best way to deal with pain control. There are many strategies for pain management that include pharmacological and non-pharmacological interventions. Effort on pain management from health professionals at all department levels should be implemented as an important measure toward changing in effective pain management practices. Similarly there has been the usage of different experiments like use of topical anesthetic agent or cutaneous stimulation in order to reduce the AV Fistula puncture pain among patients undergoing Hemodialysis, such interventions have solid utilization potential and could be easily incorporated into practice in dialysis unit before doing artery & vein puncture for hemodialysis.

PROBLEM STATEMENT

"A comparative study on Effectiveness of selected Topical Anesthetic agent versus Cutaneous stimulation on level of pain at AV Fistula puncture site in patients undergoing Hemodialysis in selected hospitals of a Metropolitan city."

OBJECTIVES OF THE STUDY

1. To compare the pain scores of patients during AV Fistula puncture betweenTopical Anesthetic agent and Cutaneous stimulation groups
2. To elicit opinion from patients undergoing Hemodialysis about effect of Topical Anesthetic agent vs cutaneous stimulation on pain during AV Fistula cannulization.
3. To associate the physiological variables with pain scores in patients undergoing dialysis using Topical Anesthetic agent and Cutaneous stimulation groups.

II. MATERIAL AND METHODS

Research approach: The quantitative research approach is adopted to compare the effectiveness of Topical anesthetic agent versus Cutaneous stimulation on pain reduction at AV Fistula puncture in patients undergoing hemodialysis.

Research design: A Quasi Experimental Non-equivalent 2 group research design was adopted.

Research setting: The setting is selected as AKD units in a multispecialty hospitals located in a metropolitan city based on feasibility, permission and availability of sample based on inclusion and exclusion criteria.

Research variables: Here in this study, research variable was the Application of Topical anesthetic agent Versus Cutaneous stimulation.

Population: Targeted population was all the subjects undergoing hemodialysis. The accessible population consisted of subjects undergoing hemodialysis throughAV Fistula.

Sample Size: The total sample size was 74 which comprises of 2 Experimental group 37 subjects each in experimental group allotted by non-randomization based on prevalence rate of patient undergoing Hemodialysis during two months in selected hospitals.

Sampling technique: In the present study non-probability Convenience sampling method was adopted to allocatethe subjects into two experimental groups.

CRITERIA FOR SELECTION OF SAMPLE:

Inclusion criteria:

- Adult patients on hemodialysis having AV Fistula.
- Subjects with AV Fistula created more than 1 month ago to 10 years.
- Subjects communicating in English/ Hindi.
- Subjects willing to participate.

Exclusion criteria

- Subjects who are using Analgesic drugs for past 8 hours
- Subjects having presence of skin problem or Denuded fistula
- Subjects with Raynaud's syndrome or Peripheral disorders
- Subjects having sensitivity to Anaesthetic agent (Prilocaine / Lidocaine) or Ice.

III. TOOLS AND TECHNIQUES

Section A: It comprises of demographic variables including items related to age, gender, education, work pattern, fistula assessment, duration of AV fistula, location of AV fistula, duration of hemodialysis, provisional diagnosis and use of distractors.

Section B: The tool is to identify the level of pain through subjects's self-report – NRS (Numerical Rating Scale).

Level of pain	Score
0	No pain
1-3	Mild pain
4-6	Moderate
7-10	Severe

Section C: Observation checklist- **APAS (Av fistula puncture pain assessment Scale)** The AV Fistula Puncture Pain Assessment Scale is an instrument designed by the investigator and validated by 10 validators, to assist in the assessment of pain in subjects who are undergoing Hemodialysis through AV fistula.

The scale has 2 components –

I- Behavioural response to AV Fistula puncture associated pain.
II- Physiological response to AV Fistula puncture associated pain.

(In this study, AV Fistula Puncture Pain assessment Scale used by the investigator to assess the pain among subject sample study.)

Level of pain	Score
0	No pain
1-4	Mild
5-8	Moderate
9-12	Severe

SECTION D: OPINIONNAIRE

It includes 4 questions. The questions are regarding participants comfort and reduction in pain during AV Fistula cannulation with Topical Anesthetic agent vs Cutaneous stimulation and suggestions for future use of both the interventions for pain relief in both groups.

CONTENT VALIDITY: A total 10 experts consisting of 3 Doctors- Nephrologist, Pain management Specialist and Anesthetist, 1 Pain management Nurse, 1 Statistician, and 5 Nursing Experts have validated tool.

RELIABILITY: Reliability of the AV Fistula puncture pain assessment scale was done by the Cronbach's alpha for internal consistency. The reliability was calculated as 0.70, which shows that the tool AV Fistula puncture pain scale is acceptable.

DATA COLLECTION:

The permission to conduct the study was granted by the Ethical Review Committee for research in the desired hospital. Approval was also taken from the concerned authorities and Nephrologist for including the patients undergoing hemodialysis through AV Fistula for the study. Data collection period began from 17th May 2022. A list of patients undergoing Hemodialysis was prepared each previous day by the investigator. Once the subjects were considered to be eligible participant, the investigator introduced self to each subject and explained about the process thoroughly and provided them the patient information sheet. The investigator established subject's willingness to participate in the study and obtained informed consent from them. The Demographic data was filled by the Investigator after taking consent. Assessment of Blood Pressure and Heart rate was done and then after that application of Intervention in both the groups was initiated i.e. Application of Topical Anesthetic agent before 30 minutes of AV Fistula puncture in Experimental group 1 and application of Cutaneous Stimulation before 10 minutes of AV Fistula puncture in Experimental group 2 was done. During the AV Fistula puncture, the investigator also monitored the Blood Pressure and Heart rate and all readings of APAS (AV Fistula Puncture pain Assessment) scale was noted. After 10 minutes of AV Fistula puncture procedure, the investigator again monitored the Blood Pressure and Heart rate of the subject. This process happened till 3 dialysis sessions. On the 3rd day, An Opinionnaire was given to the subjects of both the groups on effectiveness of application of both the intervention in reducing the pain during AV Fistula puncture procedure.

DATA ANALYSIS:

The collected data analysed in terms of objectives of the study using descriptive and inferential statistics.

- ✓ Frequency and percentage distribution is used to analyse the demographic data, age, gender, education, duration of AV Fistula, Duration of Hemodialysis
- ✓ Comparison of level of pain reduction between both the experimental groupswould be done by Mann Whitney U Test
- ✓ Opinionnaire would be analysed by frequency and percentage.
- ✓ Analysed data is presented in the form of tables, graphs and diagrams.

The investigator prepared a master sheet to enter data obtained from the subjects. The data is then analysed using both descriptive and inferential statistics.

IV. RESULTS AND DISCUSSION

SECTION I: Findings Related to Demographic Data:

This section deals with the sample characteristics under study. Majority of the subjects belonging to TAA group 14 (37.84 %) belongs >49 to 65 years of age and 18 (48.65) belongs to >49 to 65 years of age in CS group. It was also seen in both the groups that the number of males subjects were more in TAA group 27 (72.97 %) and CS group, 26 (70.27 %). In TAA group majority (57.05 %) subjects were having normal fistula assessment, followed by (32.43 %) were having cuts and scars in assessment (5.41 %) were having redness

and swelling in assessment and only (2.70%) having bruises in assessment, Whereas in CS group majority (43.25%) subjects were having cuts and scars in assessment, followed by (40.54 %) were having normal fistula assessment (10.81%) were having redness in assessment and only (2.70%) having bruises and swelling. In TAA group majority (48.64 %) samples were having AV fistula from 0-3 years, whereas it was same in the CS group, majority (45.95 %) subjects were having AV fistula within 0-3 years.

SECTION II- a: Findings Related to Comparison of Numerical rating scale:

NRS score of TAA was 4.94 and mean NRS score of CS was 4.80. When both the NRS scores was compared by Mann-Whitney U Test , the calculated p value was >0.05, which means there is no significant difference between the mean NRS of both the groups.

SECTION II- b: **Comparison of APAS (AV fistula puncture pain assessment- behavioral) scale:**

In the TAA group mean behavioral response was more (5.11) whereas, in CS group wherethe mean behavioral response was (4.68). When both averages were analyzed by Mann Whitney U test, calculated value was 0.004 which refers that there is a significant association between the mean total behavioral pain score both the groups.

SECTION III: Comparison of combined pain scores- NRS and APAS (Behavioral) between 2 groups

Comparison of the average of total pain score (NRS and Behavioral) (TAA vs CS) was taken, it is found that for topical anesthetic mean pain score was more (10.06) with standard deviation (SD) 1.07, as compared with the cutaneous stimulation group where themean pain score was (9.49) with standard deviation (SD) was 1.33. When both averages were analyzed by Mann Whitney U test, calculated value was 0.009 which means there is a statistically significant association between the mean total pain scores in both the groups.

TABLE 4.14: COMPARISON OF AVERAGE OF TOTAL PAIN SCORE (NRS AND BEHAVIORAL) (TOPICAL ANESTHETIC VS CUTANEOUS STIMULATION) (N=37)

S.No.	Average total pain score	N	Min	Max	Mean	Median	SD	p value (Mann-WhitneyU Test)
14	Topical Anesthetic	37	7.66	13	10.06	10	1.07	0.009
	Cutaneous Stimulation	37	7.33	14.67	9.49	9.33	1.33	

SECTION IV: Association of Physiological variables with pain scores:

The mean Heart rate of TAA group was (90.62) and CS group was (89.13). When the heart rate was compared with Mann Whitney U Test it showed a p value of 0.45 .Whereas, the Systolic BP of TAA group was (92.29) and CS group was (92.51). When the Systolic BP was compared with Mann Whitney U Test it showed a p value of 0.99 Similarly, in the Diastolic BP of TAA group was (91.73) and CS group was (92.40). When the Diastolic BP was compared with Mann Whitney U Test it showed a p value of 0.686, this suggests that no significant association in any of the physiological response to AV fistula puncture associated pain.

SECTION V: Opinionnaire:

Both the groups agreed about the use of Topical anesthetic agent and Cutaneous Stimulation for future dialysis sessions were same, TAA group (11) and CS group (11). Similarly both the groups agreed for recommending the use of Topical anesthetic agent and Cutaneous Stimulation to all dialysis patients with the same opinion TAA group (20) and CS group (20).Subjects were satisfied with the application of Cutaneous stimulation during AV Fistula puncture. Opinionative scores favored the application of Cutaneous stimulation during AVFistula cannulization procedure.

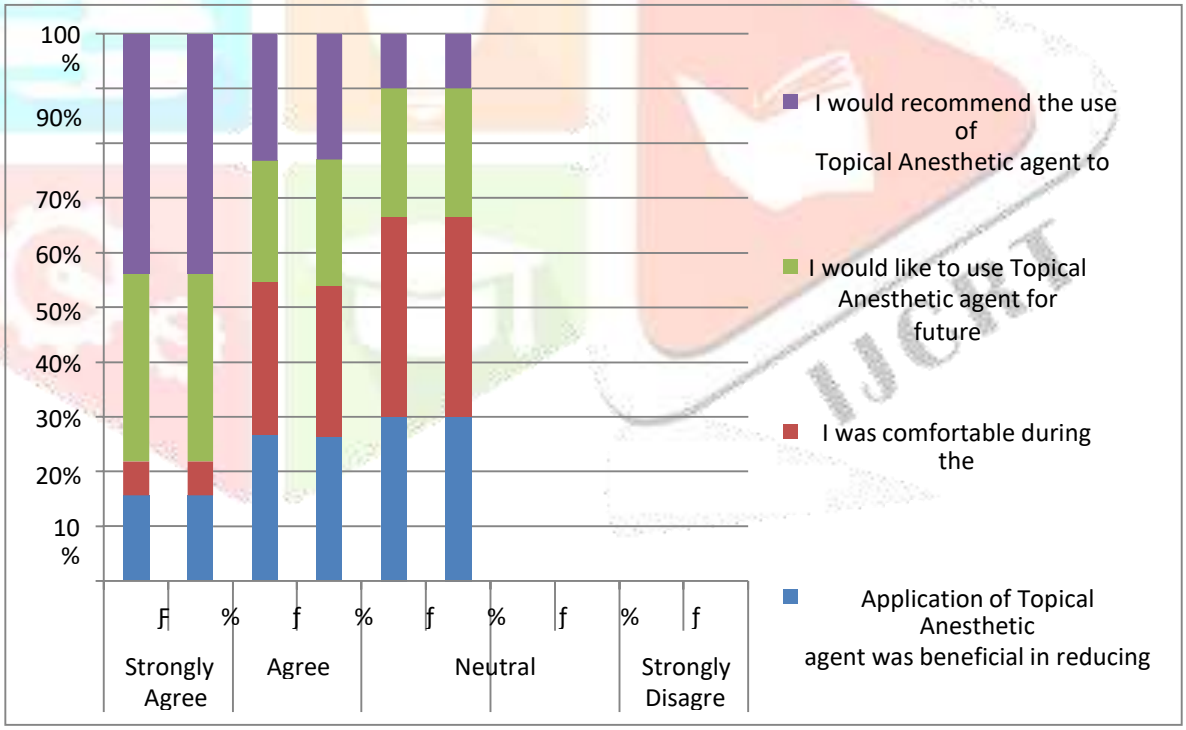

FIGURE 4.11 DISTRIBUTION OF SUBJECTS AMONG EXPERIMENTAL GROUP 1 IN RELATION TO THEIR OPINION ABOUT APPLICATION OFTOPICAL ANESTHETIC AGENT

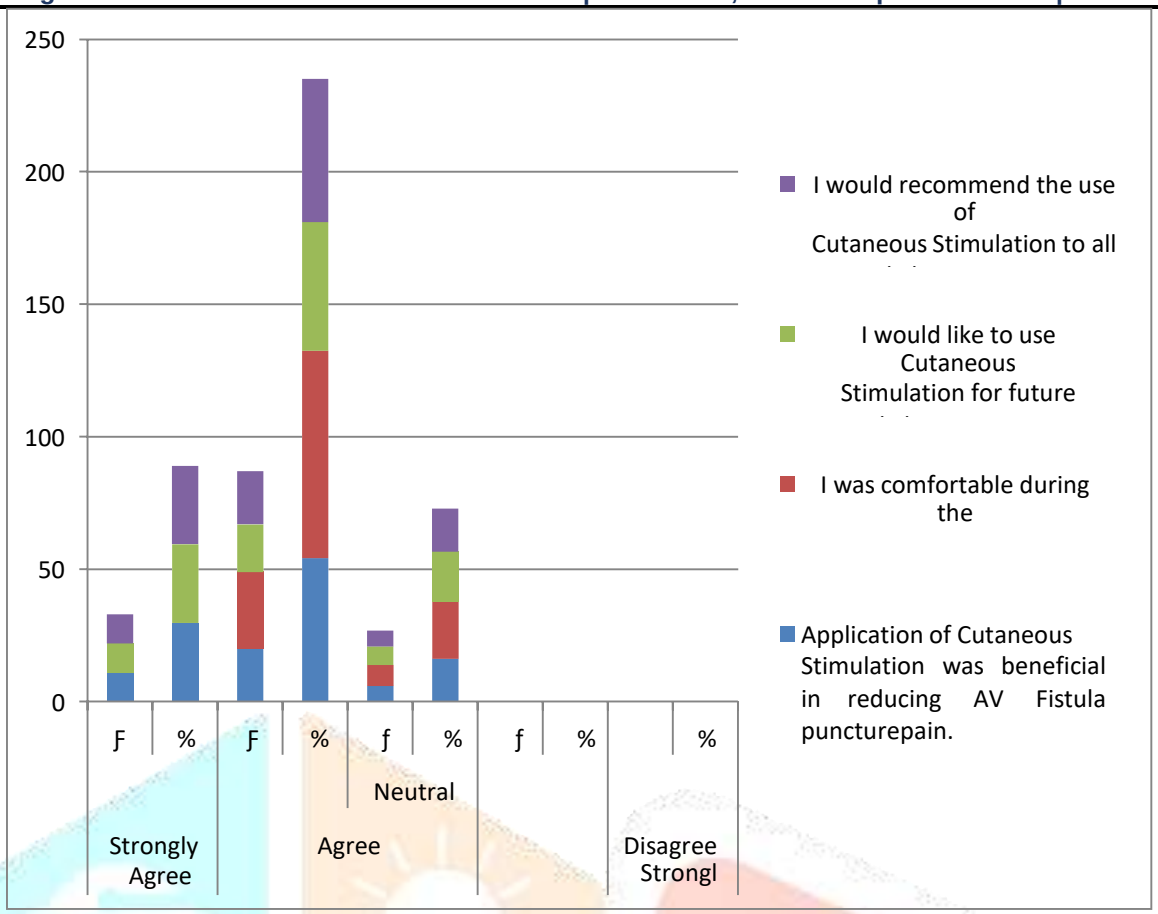

FIGURE 4.12 DISTRIBUTION OF SUBJECTS AMONG EXPERIMENTAL GROUP 2 IN RELATION TO THEIR OPINION ABOUT APPLICATION OFCUTANEOUS STIMULATION

CONCLUSION: The present study aimed to compare Topic Anesthetic agent vs Cutaneous stimulation among AV Fistula puncture procedure. The study showed that both the interventions will reduce pain and improve the quality of life which includes the stability in physiological, psychological and life style aspects. Moreover, the Cutaneous Stimulation technique can be easily practiced by the nurses in reducing the pain, as it is cost effective. The findings are consistent with most of the recent studies. The study can be a useful tool in reducing the AV Fistula puncture associated pain in patients undergoing Hemodialysis. The study helped the investigator to go through each step very diligently so as to complete the whole process successfully.

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REFERENCES:

1. Varughese S, Abraham G. Chronic Kidney Disease in India: A Clarion Call for Change. Clin J Am Soc Nephrol. 2018

2. Bin-ayesh HN, Alhussein SH, Alahmari NF, Alanzi RQ, Alanaz IF, Almaimani RF, et al. Review on Arteriovenous Fistula Techniques and Complications. Entomol Appl Sci Lett. 2021

3. Aghajanloo, Ali & Ghafourifard, Mansour & Haririan, Hamidreza & Gheydari, Parvin. (2016). Comparison of the effects of cryotherapy and placebo on educing the pain of arteriovenous fistula cannulation among hemodialysis patients: A randomized control trial. Journal of Nursing and Midwifery Sciences.

4. P B S, Khakha DC. Mahajan S et al. Effect of cryotherapy on Arteriovenous fistula puncture-related pain in hemodialysis patients. Indian J Nephrol. 2008

5. Molaie E, Royani Z, Moujerloo M, Behnampour N, Golage J, Khari M. Anxiety, depression and quality of sleep related to fatigue in patients undergoing hemodialysis. J Res Dev Nurs Midwifery 2014.