

Effectiveness of cold application on pain relief during IV cannulation among cancer patients in selected hospital of Gandhinagar

Hemangi Chaudhari¹, Dr Hari Mohan Singh²

¹ Associate Professor, Department of Nursing, Apollo institute of Nursing, Gujarat, India

² Principal, Apollo Institute of Nursing, Gandhinagar, Gujarat, India

Abstract

Intravenous (IV) cannulation is a frequently performed procedure among cancer patients undergoing chemotherapy and is often associated with significant pain and discomfort. Non-pharmacological interventions such as cold application are simple, cost-effective methods for pain reduction. The present study aimed to assess the effectiveness of cold application on pain relief during IV cannulation among cancer patients in a selected hospital of Gandhinagar. A quasi-experimental posttest-only control group design was adopted for the study. A total of 50 cancer patients undergoing chemotherapy were selected using a purposive sampling technique and divided into experimental and control groups. Cold application was provided to the experimental group prior to IV cannulation, while the control group received routine care. Pain perception was assessed using the Visual Analogue Scale (VAS). The findings revealed that the mean pain score of the experimental group was 3.6, which was lower than the control group mean score of 5.68. Independent t-test analysis showed a statistically significant difference between the two groups, with the calculated t value (6.60) being higher than the table value and a p value of <0.0001. The study concluded that cold application is an effective intervention for reducing pain during IV cannulation among cancer patients.

Keywords:

Introduction

Cancer patients undergoing chemotherapy frequently require repeated intravenous (IV) cannulation for the administration of medications, fluids, and blood products. IV cannulation is one of the most commonly performed invasive procedures in hospital settings and is often associated with pain, anxiety, and discomfort, which can negatively affect patients' treatment experience and overall quality of care. Effective pain management during such routine procedures is therefore an essential component of comprehensive cancer nursing care. Pharmacological methods for pain relief may not always be feasible or desirable due to potential side effects, drug interactions, and increased healthcare costs. Consequently, non-pharmacological interventions have gained importance in clinical practice. Cold application is a simple, safe, and cost-effective method that works by reducing nerve conduction velocity, decreasing local blood flow, and stimulating the gate control mechanism of pain. Despite its benefits, cold application is not consistently used during IV cannulation in oncology settings.

Nurses play a vital role in implementing evidence-based interventions to reduce procedural pain. Evaluating the effectiveness of cold application during IV cannulation among cancer patients is essential to support its routine use in clinical practice. Hence, the present study was undertaken to assess the effectiveness of cold application on pain relief during IV cannulation among cancer patients in a selected hospital of Gandhinagar.

Methods & Tools Used

- 1. Research Approach:** Quantitative Research Approach
- 2. Research Design:** Quasi experimental Post test only design
- 3. Sampling Technique:** Non-probability purposive sampling technique

4. Samplingsize: 50

5. Research Setting: Selected hospital of Gandhinagar.

Tool Used

- Visual Analogue Scale

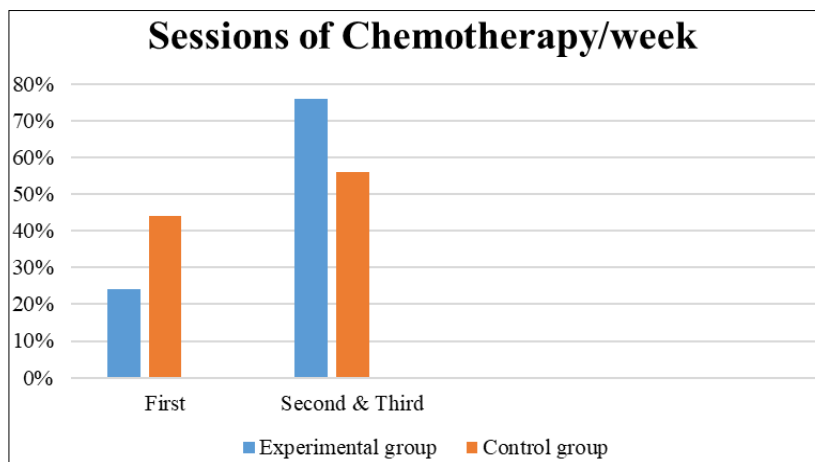
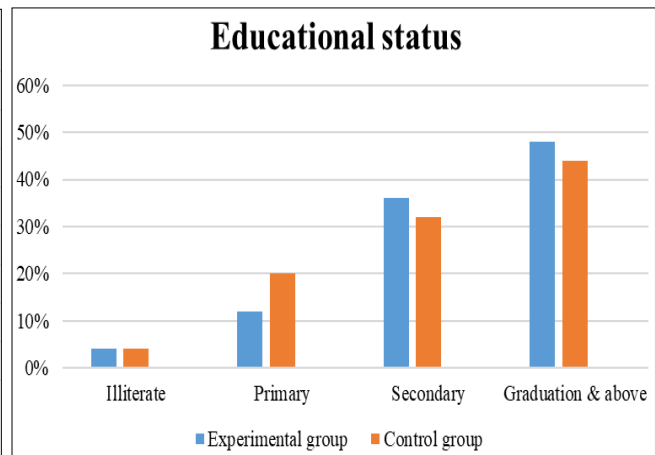
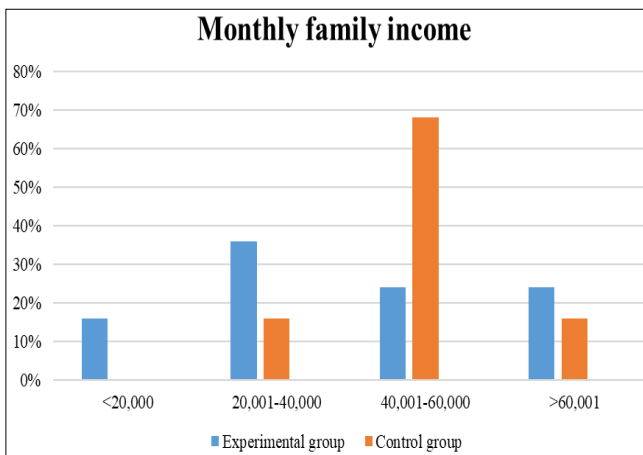
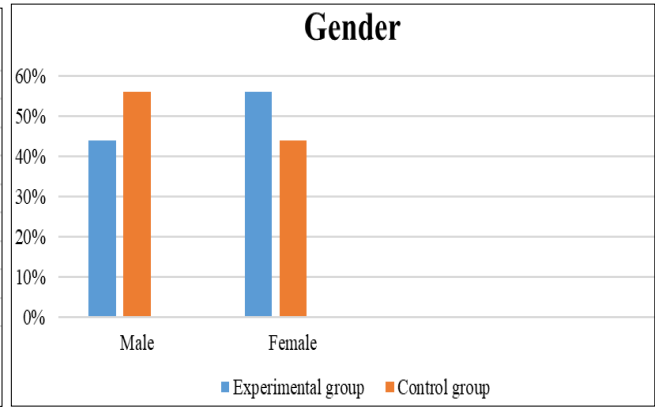
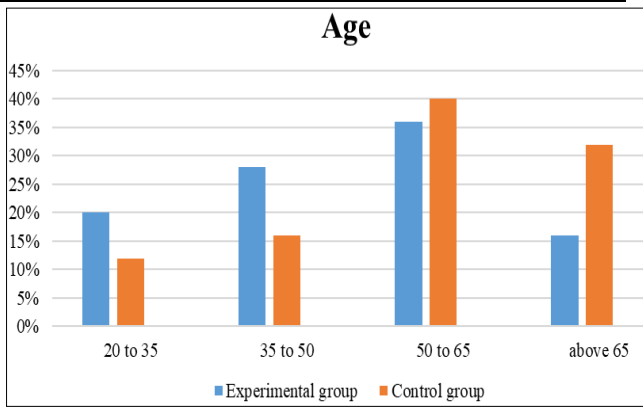
Results

Section-I: Frequency and percentage distribution of demographic variables. N=50

Sr. no	Demographic variables	Experimental group		Control group	
		F	%	F	%
1	Age:				
	20 to 35	5	20%	3	12%
	35 to 50	7	28%	4	16%
	50 to 65	9	36%	10	40%
	above 65	4	16%	8	32%
	Total	25	100%	25	100%
2	Gender:				
	Male	11	44%	14	56%
	Female	14	56%	11	44%
	Total	25	100%	25	100%
3	Monthly family income:				
	<20,000	4	16%	0	0%
	20,001-40,000	9	36%	4	16%
	40,001-60,000	6	24%	17	68%
	>60,001	6	24%	4	16%
	Total	25	100%	25	100%
4	Educational status:				
	Illiterate	1	4%	1	4%
	Primary	3	12%	5	20%
	Secondary	9	36%	8	32%
	Graduation & above	12	48%	11	44%
	Total	25	100%	25	100%
5	Session of chemotherapy/week:				

First	6	24%	11	44%
Second & Third	19	76%	14	56%

Total	25	100%	25	100%
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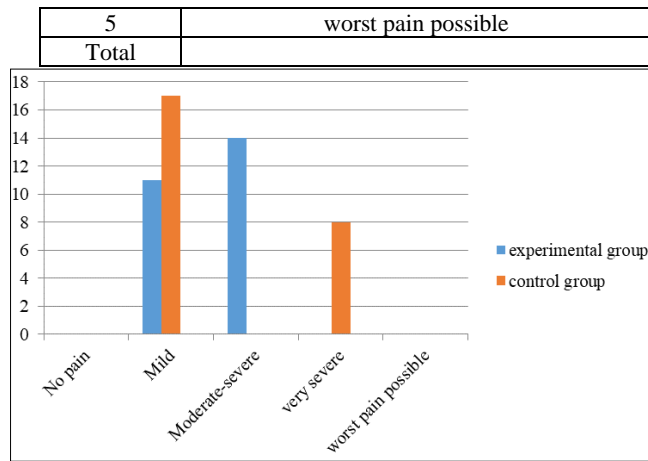
Interpretation

The experimental and control groups each consisted of 25 cancer patients. In both groups, the majority of participants were aged 50–65 years (36% in the experimental group and 40% in the control group). Females predominated in the experimental group (56%), whereas males were more common in the control group (56%). Regarding monthly family income, most participants in the experimental group belonged to the ₹20,001–40,000 range (36%), while the majority in

the control group were in the ₹40,001–60,000 range (68%). Educational status showed that nearly half of the participants in both groups had graduation and above education. Most patients in the experimental group (76%) were in their second or third chemotherapy session, whereas a higher proportion of control group patients (44%) were undergoing their first chemotherapy session.

Section-II: Assessment of Level of Pain in Experiment and Control Group.

Sr. No.	Categories of Pain Level	Experimental group	Control group
1	No pain	0	0
2	Mild	11	17
3	Moderate-severe	14	0
4	very severe	0	8



participants (17) than the experimental group (11). Interestingly, the experimental group had 14 participants reporting moderate to severe pain, whereas the control group had none in this category. On the other hand, the control group had 8 participants experiencing very severe pain, while the experimental group had none. This suggests that the experimental intervention may have shifted some individuals from very severe pain to moderate-severe pain but did not eliminate pain entirely. Overall, the control group showed a wider spread between mild and very severe pain, while the experimental group’s pain was concentrated in the moderate-severe and mild categories, indicating a possible alteration in pain intensity distribution due to the intervention.

Interpretation

The data compares pain levels between an experimental group and a control group after a test. Neither group reported experiencing no pain or the worst pain possible. In the mild pain category, the control group had more

Section-III: Effectiveness of Cold Application in Experimental and Control Group.

Mean and standard deviation, Independent t-test

Group	Mean	SD	Calculated value	Table value	DF	Significance
Experimental group	3.6	1.08	6.60	2	48	Significance
Control group	5.68	1.14				

Interpretation

The data indicate a significant difference between the experimental and control groups. The experimental group had a mean score of 3.6 with a standard deviation of 1.08, whereas the control group had a higher mean score of 5.68 with a standard deviation of 1.14. The calculated t-value of 6.60 is greater than the table t-value of 2 at 48 degrees of freedom. Additionally, the p-value of 0.0001 is much lower than the 0.05 level of significance. Therefore, the null hypothesis is rejected, and it can be concluded that the difference between the experimental and control groups is statistically significant, indicating that the intervention applied to the experimental group was effective.

safe, cost-effective, and non-pharmacological intervention for pain management in patients undergoing chemotherapy-related procedures.

Conclusion

The study shows that cold application effectively lowers the pain in cancer patients after IV cannulation. This easy, accessible activity can be used as practical method to decrease the level of pain.

Discussion

The present study demonstrated that cold application significantly reduced pain levels among cancer patients undergoing chemotherapy. A marked improvement was observed in the experimental group, while the control group showed no improvement. These findings support the hypothesis that cold application can relief the pain among cancer patients who are receiving chemotherapy.

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The findings of the present study are consistent with previous research that has demonstrated the effectiveness of cold application in reducing pain during invasive procedures such as intravenous cannulation. Similar studies conducted among cancer patients and other hospitalized populations have reported significantly lower pain scores in experimental groups receiving cold application compared to control groups receiving routine care. The analgesic effect of cold is attributed to reduced nerve conduction velocity and activation of the gate control mechanism of pain, which limits pain signal transmission. In line with earlier quasi-experimental and randomized controlled studies, the present study also observed a marked reduction in pain levels in the experimental group, whereas no significant improvement was noted in the control group. This similarity in outcomes strengthens the evidence that cold application is a simple,