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A Study to Assess the Effectiveness of Topical Application of Ice Cubes on Level of Pain after Intravenous Blood Sample Collection among Patients Admitted In Tertiary Care Hospital

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ABSTRACT:
Background: The collection of intravenous blood samples continues to be a common and sometimes uncomfortable process among the many medical procedures individuals endure. The discomfort involved with this treatment should not be underestimated, even forpatients referred to tertiary care facilities who are frequently already dealing with difficult medical problems. Although it serves an important diagnostic and therapeutic function.
Objective: To assess the level of pain among patients undergoing blood sample collection. To assess the effectiveness of the topical application of ice cubes on the level of pain after blood sample collection. To find out the association between the pretest level of pain of patients with selected socio-demographic and clinical variables.
Methodology: A Quantitative research approach & Descriptive research design was used in the research. The research selected 80 samples admitted to Parul Seva Ashram Hospital through a probability convenience sampling technique and divided into to control group and an experimental group. The sociodemographic data and numerical pain rating scale were used**. RESULT:** The findings of the study revealed that in the post-test level of thirst in the control group on the Pain day of assessment, 13 subjects (32.5%) had Moderat Pain and 27 subjects (67.5%) had Severe Pain, whereas the post-test level of Pain in experimental group on the third day of assessment, 1 subject (2.5%) had not Pain and 35 subjects (87.5%) had Mild Pain and 4 subjects (10.0%) had Moderate pain. level of pain between the experimental and control group was 27.898 which was highly significant at $p<0.001$ The post-test mean of the experimental group was 2.08 whereas in the control group was 4.68 and the mean difference was 2.600 which showed greater improvement than other

parameters.

Conclusion: it is considered that almost all patients in the experimental group get relief from pain as compared to the control group

Keywords: topical application of ice cubes, intravenous blood sample collection, Pain

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INTRODUCTION AND BACKGROUND

Intravenous blood sample collection is one type of invasive procedure also with intravenous incision occurs in the patients not only admitted patients but this procedure is followed in the routine checkups. The invasive procedure means the puncture of the skin by inserting an instrument into the body. long-term collecting Intravenous blood sampling can increase the level of stress and anxiety. The existence of anxiety helps to maintain pain in the long term. If pain and fear are not effectively managed, however, post-traumatic stress symptoms may occur in children and cause a negative attitude toward medical procedures, which may lead to avoiding medical care and needle interventions in the future.[1,2]

The potential of cold treatment in reducing pain and offering comfort to patients undergoing various medical operations has been recognized in recent studies and clinical reports. The localized numbing impact of cold treatment has been shown to affect pain receptors and reduce the perception of pain, perhaps making intravenous blood collection more tolerable for patients. However, the precise use of ice cubes in this situation is still largely unexploredin the literature on nursing and medicine.[3] By performing a thorough analysis of the efficiency of topical ice cube application for controlling pain levels after intravenous blood sample collection, this study seeks to fill this gap.[4]

Pain management during invasive procedures is a challenge to direct care providers. Different physical, and psychological interventions and injection techniques have to be implemented to reduce pain. The pain is often the result of injury to the nerve fiber ending in the skin and tissue from mechanical trauma caused by needle puncture. Ecchymosis is a small hemorrhage in the mucous membrane or skin. It is also known as a contusion or bruise. Ice application facilitates vasoconstriction of the ruptured blood vessels which in turn prevents ecchymosis from extending to the nearby unaffected site.[5]

Ice is a therapeutic agent used in medicine as an integral part of injury treatment and rehabilitation. The use of ice packs is widespread because of their 3 effectiveness, convenience, low cost, and ease of transportation. Ice packs can be made with any form of ice; however, 2 commonly used forms are cubed ice and crushed ice. Ice is believed to help control pain by inducing local anesthesia around the treatment area. Investigators have also shown that it decreases edema, nerve conduction velocities, cellular metabolism, and local blood flow.[6]

2. MATERIALS AND METHODS

The research design is a quasi-experimental post-test only design and a quantitative approach was used. Admitted patients in hospitals are the target population probability convenience sampling technique is used, 80 was the sample size and demographic tool, and

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physical parameter and numerical pain rating scales were tool in this study. Inclusion Criteria were both genders between 18 to 60 years of age, Patients who willingly participate in the study, and Patients in the study must be undergoing a blood collection procedure Exclusion Criteria was Children and Pregnant women who are not willing to participate in the study and who not available at time of data collection. The study was examined and approved by the ethical committee of the institution. The Data collection permission was obtained from and concerned authority, the medical superintendent in the tertiary care hospital. Written consent was taken from the participants. To ensure the content validity of the tool, the physical parameters. The data collection tools were Demographic variables like gender, age, education status, occupation, and monthly family income of the patients. Physical parameters like Height, weight, BMI, co-morbidity, daily intake and output, and vital signs reading after implementation of comprehensive nursing strategies such as ice cube to the experimental group. Analysis and interpretation of data were done by using descriptive and inferential statistics. In this study Conceptual framework was used based on the basic idea of the gate control theory.

3. REVIEW OF LITERATURE

Yashodha.at.al., 2021 The purpose of this study was to determine whether using an ice pack can help individuals who are experiencing discomfort from vaccinations. Randomly, two groups of medical students getting the flu shot were splitinto intervention and control groups. The intervention group got an ice pack at the injection site for 30 seconds prior to the needle insertion. The VAS was used in the study to evaluate post-vaccination pain ratings, and adverse effects were observed during the next 24 hours. The findings revealed that the intervention group (n = 19) and the control group (n = 16) did not have any statistically significant differences in their pain levels. With no discernible differences, both groups experienced some degree of discomfort. The number of adverse events, such as site discomfort, local swelling, bruising, and erythema, between the two groups did not differ significantly either.[7]

Boediarsih .at.al., 2021. The purpose of this study was to look at how utilizing cold compresses with ice gel affected how painful the infusion technique was for school-aged children. The study used a two-group post-test-only design with a quasi-experimental structure. 32 kids aged 6 to 12, participated in the study. The OUCHER scale was designed to gauge the degree of the discomfort when applying ice gel compresses. The Mann-Whitney test and Wilcoxon test were used in statistical analysis. When employing ice gel compresses throughout the infusion procedure, the findings from 32respondents demonstrated a significantly reduced level of discomfort (p-value - 0.000> 0.05). School-aged children who experience pain during an infusion treatment can be adequately managed by using cold compresses with ice gel. It is advised to utilize this intervention throughout the infusion procedure.[8]

Bhattacharjee .at.al., 2020 The purpose of the study was to assess the impact of cold treatment on the degree of injection discomfort from needle sticks. With 60 adult patients 30 in the experimental group and 30 in the control group. the study was conducted using a quasi-experimental post-test only control design. The results demonstrated that using cold greatly lessened the discomfort from needle sticks in the experimental group as compared to the control group. . In the experimental group, the mean score for needle stick pain was 0.933 1.20 SD, whereasin the control group, it was 3.5 1.97 SD. With a 't' value of 6.153, the difference was statistically significant at the p0.01 level. The study concluded that intramuscular injection discomfort might be effectively decreased by applying ice.[9]

1. RESULTS

Section – A

Table 1: Frequency, and percentage distribution of demographic variables of patients of the experimental and the control group

Demographic data		Experimental group (n =40)		Control group (n =40)	
		Frequency	Percentage %	Frequency	Percentage %
Gender	Male	27	67.5%	14	35.0%
	Female	13	32.5%	26	65.0%
Age	18-27 Years	3	7.5%	6	15.0%
	28-37 Years	12	30.0%	12	30.0%
	38-47 Years	19	47.5%	10	25.0%
	48Years & above	6	15.0%	12	30.0%
Educational status	Illiterate	1	2.5%	0	0%
	Primary	6	15.0%	7	17.5%
	Secondary &High secondary	16	40.0%	14	35.0%
	Graduate & more	17	42.5%	19	47.5%
Occupation	Unemployed	10	32.5%	16	40.0%
	Employee	18	45.0%	18	45.0%
	Business	11	27.5%	6	15.0%
Monthly family income	<10.000	1	2.5%	5	12.5%
	10.001-15.000	9	22.5%	13	32.5%
	15.001-20.000	8	20.0%	6	15.0%
	>20.001	22	55.0%	16	40.0%

As per the data tabulated in the table no.1 13 (32.5%) subjects in the experimental group were females and the remaining were males. Considering the age, 3 (7.5 %) in experimental group belonged to the age group of 18 to 27 years, 12 (30.0 %) belonged to the age group 28 to 37 years, 19 (47.5 %) belonged to the age group 38 to 47 years and 6 (15.0 %) belonged to the age group of 48 year & above in experimental group. 26 (65.0%) subjects in the control group were females and the remaining were males. Considering the age, 6(15.0 %) in control group belonged to the age group of 18 to 27 years, 12(30.0 %) belonged to the age group 28 to 37 years, 10(25.0%) belonged to the age group 38 to 47 years and 12(30.0 %) belonged to the age group of 48 year & above in control group.

Table 2: Frequency and percentage distribution of level of Pain among the patients admitted in tertiary care in the experimental group and control group during the post-test

Pain Score	Experimental Group		Control group	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Not pain	1	2.5 %	0	00.0 %
Mild pain	35	87.5 %	0	00.0 %
Moderate Pain	4	10.0 %	13	32.5 %
Severe pain	0	0.00 %	27	67.5 %

Table 2 shows that the post-test level of Pain in the experimental group on the third day of assessment, 1 subject (2.5%) had not Pain and 35 subjects (87.5%) had Mild Pain and 4 subjects (10.0%) had Moderate pain. Pain in control group on the third day of assessment, 13 subject (32.5%) had Moderat Pain and 27 subjects (67.5%) had Severe Pain

SECTION-C

Table 5 unpaired 't' test for the control group and experimental group of level of pain among patients admitted in tertiary care.

Level of thirst	Control group		Experimental group		Mean difference	't` value
	Mean	SD	Mean	SD		
Experimental & Control Groups	4.68	0.474	2.08	0.350	2.600	27.898

Table 3 shows that the obtained overall 't' value for the level of pain between the experimental and control group was 27.898 which was highly significant at p<0.001 The post-test mean of the experimental group was 2.08 whereas in the control group was 4.68 and their mean difference was 2.600 which had greater improvement than other parameters. It is concluded that the cold therapy was highly effective in improving level of pain among patients admitted in tertiary care hospital.

5. DISCUSSION

The above findings are consistent with the findings of **Gideon Kamble, Tukaram Zagade et al.** conducted a study on the effect of ice cubes on the level of pain of arterial blood gas collection site. The one-group pre-test and post-test design included 40 samples undergoing arterial puncture. A purposive sampling technique was used and collected data were analyzed using Instat software. Statistical analysis: Statistical analysis was performed using Instat software. The outcome was measured by sociodemographic variables and a numerical pain rating scale, comparing pretest and post-test. The Wilcoxon matched-pairs signed rank test was used to test the hypothesis and significant difference in the level of pain between pre-test and post-test by patients during arterial puncture (p<0.0001). The pretest mean is 7.43 with a standard deviation of 0.87 and the posttest mean is 4.83 with a standard deviation of 0.78. The p-value was <0.0001 which was considered statistically significant. Hence it shows that there is efficacy of cryoanalgesia on arterial puncture-related pain among patients admitted in Krishna Hospital, Karad. On the whole, conducting this study was a learning experience for the investigator. The result of the study showed that, the cryoanalgesia was effective on reduction in pain among patients undergoing arterial puncture and it is useful in the areas of nursing practice and nursing research.[10]

The similar study was conducted by **Dayana K D** on the effectiveness of ice cube application on pain and ecchymosis among patients receiving heparin subcutaneously in the selected hospital. The study quasi experimental post-test only control group design with a quantitative research approach was adopted to find the effectiveness of ice cube application on pain and ecchymosis among patients receiving heparin subcutaneously. The sample consisted of forty adult patients - 20 in each group Ice application was given at the site of subcutaneous injection for 3 minutes prior to the insertion of heparin where as in control group underwent routine hospital care. The level of pain was assessed using a visual analogue scale immediately after the injection and ecchymosis was measured by using a transparent ruler scale after 48 hours of the injection. This shows that ice application reduces pain. Concerning the association there

was no significant association between post-test pain score and selected demographic variables.[11]

This study has shown that in admitted patients who have undergone blood collection procedures, the demographic variables are significantly associated with the level of pain of the patients. In experimental and control group patients, the level of pain is reduced after the implementation of the cold application of ice cubes.

6. CONCLUSION

The main conclusion of this present study was the cold application of ice cubes are effectively reducing the level of pain among the patients admitted to tertiary care hospitals. This study clearly stated that cold application of ice cubes plays a vital role in reducing the level of Pain after intravenous blood sample collection among patients admitted to tertiary care hospitals.

Ethical Consideration: Ethical approval was obtained from the respective institutional ethical committee and informed consent also obtained from participants and assured of anonymity before the data collection.

Competing Interests:

Authors have declared that no competing interests exist in this study.

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