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Effectiveness of local cold application on pain and behavioral distress during invasive intravenous procedures - A pilot study

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Abstract

Pain induced by the medical procedures is one of the reasons for avoidance of health care services. During hospitalization intravenous cannulation is the most common procedure done. This preliminary study aimed to evaluate the effectiveness of local cold application in preventing or minimizing pain among children while undergoing invasive intravenous procedures and conducted this study.

Objectives – To assess and evaluate the intensity of pain and behavioural distress among children during invasive intravenous procedures with and without local cold application and to determine the association between the intensity of pain, behavioural distress in children undergoing invasive intravenous procedures and selected variables.

Methods- An experimental approach with post test only control group design was used for the study. The sample for the study comprised of 24 children with age group of 3 - 12 years; 12 children for each experimental group and control group selected by purposive sampling with random assignment. Pain and behavioural distress were assessed using Revised Faces Pain Assessment Scale and behavioural distress Scale respectively.

Findings- Majority of children were between the age group of 3 to 5.9 years. Most (79.2%) had history of hospitalization and invasive procedures. The results of the pilot study show that cold application before the invasive intravenous procedures reduces pain and pain associated behavioural distress among children caused due to invasive intravenous procedures.

Keywords: pain, behavioural distress, children, cold application, invasive procedures, intravenous.

Introduction

Pain, one of the most frightening words for all human beings. Medical procedures are the cause of induced pains during hospitalization. These are though negative experiences, but essential to prevent illness and promote health. Atraumatic care i.e.do no harm is essential to prevent the negative psychological, physiological and social effects of pain ^[1]. Non pharmacological techniques can be independently used by nurses to relieve pain ^[2]. This preliminary study aimed to evaluate the effectiveness of a non pharmacological technique, i.e. local cold applications in preventing or minimizing pain among children while undergoing invasive intravenous procedures.

Need For the study

Every individual wants to stay away from pain. During young age pain is frequent and inescapable phenomenon. Apart from a symptom of an acute, long-term illness or a result of hits, sudden falls, trauma and injuries when they adapt to their quickly developing body, pain is also a part of routine healthcare such as immunization injections ^[3]. A survey conducted in the year 2012 in United States Hospital depicted almost 5.9 million childhood hospital admissions ^[4]. In a stressful hospital environment, pain due to clinical illness, surgery, or procedures adds to the stressors. Such experiences may disrupt a child's life and can interfere with further normal development. A survey⁵ depicted that both doctors and nurses primarily detected that acute pain is associated with medical procedures. The occurrence of pain uncovered by physicians was 38%. According to them, the pain is intense in 41.93% of children. Physicians gave an account of pain with three main events that included pain related to clinical procedures (59 %), clinical development of a disease (20%), and 11% of children had pain due to post-surgical recovery or rehabilitation. The nurses reported pain in

half of the population. According to them, the pain was acute in 92% of children. Holistic care of a pediatric client takes into account pain, distress and it's the related factors in a timely, compassionate, effective, and multidimensional manner. A nurse can prevent such negative effects by preventing or minimizing pain. Local cold application is a very commonly used technique to reduce the intensity of pain [6]. Cold applications provide transient anesthesia to the skin within moments of application [7]. Its effectiveness in preventing pain of pricking need to be evaluated. Thus, the researcher aimed to evaluate the effectiveness of a non pharmacological technique, i.e. local cold applications in preventing or minimizing pain among children while undergoing invasive intravenous procedures and conducted this preliminary study.

Statement of the problem

An experimental study to assess the effectiveness of local cold application on pain and behavioral distress during invasive intravenous procedures among hospitalized children-a pilot study

Objectives

The objectives of the study are to:

1. Assess and evaluate the intensity of pain and behavioural distress among children during invasive intravenous procedures with and without local cold application.
2. Find the association between the intensity of pain, behavioural distress in children undergoing invasive intravenous procedures and selected variables.

Assumptions

1. Invasive intravenous procedures cause pain among children
2. Invasive intravenous procedures cause pain leading to behavioral distress.
3. Local cold application is effective in reducing the intensity of procedural pain and behavioral distress during invasive intravenous procedure among children.

Research Hypotheses

H1-The mean pain and behavioural distress score of children exposed to local cold application will be a significantly lower than that of those who are not exposed to local cold application at 0.05 level of significance.

H2-There will be a significant association between pain, behavioral distress score of children undergoing invasive intravenous procedure and selected variables at 0.05 level of significance.

Delimitation

The study will be delimited to:

- Children admitted in paediatric wards of selected hospitals of Mumbai.
- Children aged between 3 to 12 years of age.
- Children undergoing invasive intravenous procedure.
- Single observation only.
- Child will be exposed to the intervention once only.

Research Methodology

An experimental approach with posttest only control group design was used for the study.

E	X	E-O
C	-	C-O

E - Experimental group

C - Control group

X - Intervention in the form of local cold application prior to intravenous procedure

-- Usual care - No specific therapy

O - Observation

The data was collected from children and their primary caregivers during intravenous procedures admitted in the pediatric units of selected hospitals.

Purposive sampling with random assignment of subjects to various groups will be used to select the samples by using Sequentially Numbered Opaque Envelopes. The sample for the study will comprised of 24 children with age group of 3 - 12 years; 12 children for each experimental group and control group who are undergoing intravenous procedures. The sample criteria set was

Inclusion criteria

Inclusion criteria for sampling refers to the children,

- Within the age of 3 -12 years.
- Admitted to paediatric ward or attending other units and undergoing intravenous procedures.
- Willing to participate in the study.

Exclusion criteria

Exclusion criteria for sampling refers to children,

- Those who are critically ill.
- Those who are unable to verbalize.
- Children with skin abrasions or any type of skin lesions at procedure site.
- Admitted with surgical condition.

Data collection methods: The investigator obtained formal permission from the selected hospital and also ethical clearance to conduct the study. The purpose of the study was explained to the children and their parents and informed written consent and assent were obtained from their child and parents.

For the experimental group intervention in the form of local cold application prior to intravenous procedure was administered. After deciding the site of intravenous cannulation procedure an ice pack was placed on the site for three minutes. After administering the interventions, pain was assessed by using Faces Pain Rating Scale and behavioural distress assessed using behavioural distress checklist.

No specific intervention was be provided to the control group.

Findings

The majority of the children were between the age group of 3 to 5.9 (45.83) followed by 29.16 % in 9 to 12.9 groups. Among the participants, 75 % were male. The majority of them 21 (87.5 %) children were school going children. The findings showed that an equal number of children belonging to nuclear and joint family participated in the study. There were 8 (33.3%) children who were the eldest among siblings 20.8% were younger and a similar number of children were the only child. Parents (75.5%) reported that their children had some type of illness in the past and 79.2 % among those

reported that their children required hospitalization sometimes during those illnesses and had undergone intravenous cannulation.

For 14 (58.3%) children a caregiver was present during the intravenous cannulation.

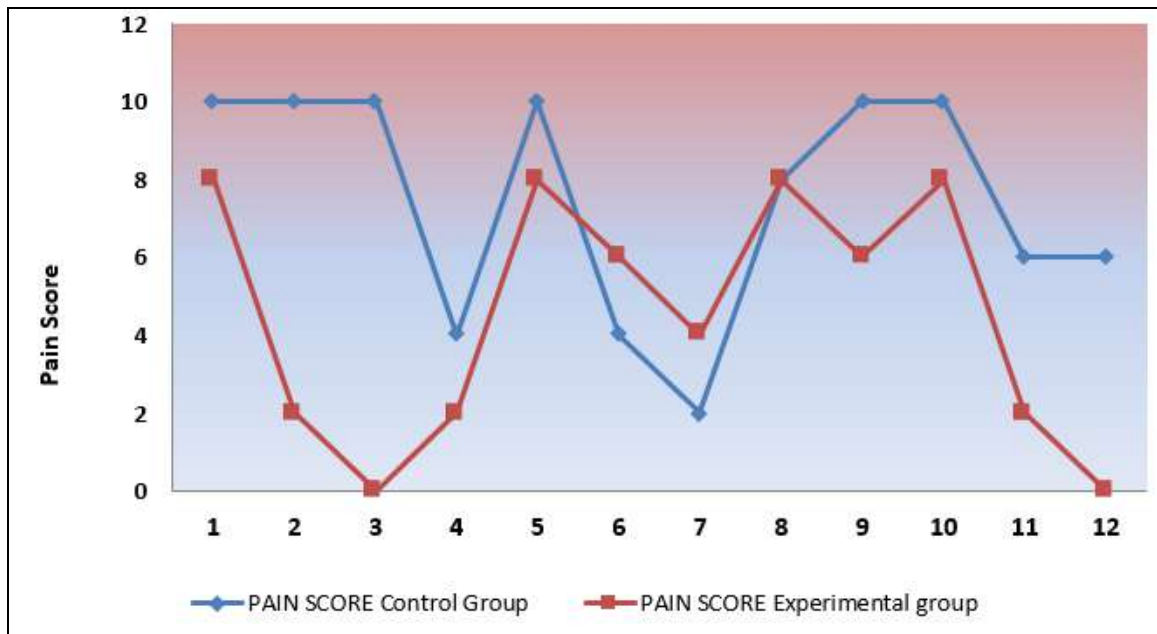


Fig 1: Pain score of Children in experimental and Control Group

Table 1: “Mean score, Standard deviation, Standard error of mean difference and “t” value of pain score and behavioural distress score of experimental group and control group.” N =24

Group	Pain Score		Behavioural Distress Scores	
	Control (n =12)	Experimental-I (n=12)	Control (n =12)	Experimental-I (n=12)
Mean Score	7.50	4.50	15.92	9.75
Mean Difference	3		6.17	
Std. Deviation	2.97	3.21	5.98	6.37
Std. Error Difference	1.26		2.52	
‘t’ value	2.38*		2.35	

$t_{(22)}=2.38 p<0.05$

$t_{(22)}=2.35 p<0.05$

Mean difference of pain score of children as evident from ‘FACES pain scale’ exposed to local cold application was found to be significantly lower than control group. ($t_{(22)}=2.38 p<0.05$)

And the mean difference of behavioural distress score of children exposed to local cold application was found to be significantly lower than control group ($t_{(22)}=2.35 p<0.05$)

Discussion

The results of the present pilot study show that cold application before the invasive intravenous procedures reduces pain and pain associated behavioural distress among children caused due to invasive intravenous procedures.

The data analysis and findings supported the hypothesis that pain and behavioural distress score of children exposed to local cold application would be lower than that of those who are not exposed to local cold application. These results were consistent with the findings of studies which establishes local cold application as an effective technique to reduce the perceived pain during a needle-related procedure [8-11] these studies found cold application on the injection site as efficacious in minimizing pain. Similar studies also reported its effectiveness in reducing behavioural-distress associated with this pain. Application of ice was meaningfully reduced injection pain among the toddlers. Similarly, another study

depicted that the study group with ‘external cold and stimulation using buzzy’ showed much lower pain while the collection of a blood sample in children. There was significant less behavioural distress among children exposed to local cold application. Studies found that this intervention also reduced the level of anxiety levels as compared to the group not receiving cold stimulation [12-16] A study to evaluate “the effectiveness of cryotherapy in managing the pain at pricking site found that “pain score and most of the behaviors associated with pain decreased after ‘cryotherapy’ [17].

Nurses are the key personnel to use non-pharmacological techniques to relieve pain as they come in close contact with the patient and present at the time of procedure. They can use such techniques like cold application in day-to-day practice to prevent reduce or relieve pain and suffering of children.

Conclusion

Pain prevention and relief is one of the key goals of a paediatric nursing. Injections and intravenous cannulations are the most commonly done and most challenging pain inducing procedures. As nonpharmacological management can be independently practiced by nurses. Local cold application can be found as easiest and effective way to

prevent or minimize pain thus preventing the negative effect of such procedures.

Conflict of Interest- None

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