

RESEARCH ARTICLE

EFFECT OF ICE APPLICATION IN REDUCING PAIN PERCEPTION OF TODDLERS DURING IMMUNIZATION

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ABSTRACT

Immunizations are an important part of health promotion and disease prevention strategy for all children. It is the most common source of iatrogenic pain in childhood. The pain associated with such injections is a source of distress for children. This study aims to assess the effectiveness of ice application on pain among toddlers receiving immunization in selected immunization clinics. A quasi experimental post-test only design was adopted. Convenience sampling technique was used to select the toddlers. Data was collected using FLACC behavioral pain assessment scale. Based on the objectives and hypotheses, the obtained data were analyzed using descriptive and inferential statistics. The result of the study showed that the mean post-test value computed between experimental and control group pain scores are statistically significant. The present study concludes that ice application is a safe and effective complimentary alternative method in pain management, and it can be safely added to many other tools used by pediatric nurses and physicians.

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INTRODUCTION

Children of today are the citizens of tomorrow. So they are our most valuable resource. According to the World population statistics, over 40% of the population is constituted of the children population (Hatfield N. B, 2008). Worldwide, children represent a higher proportion of the population, in which the children younger than 15 years accounting for 1.8 billion (28%) of the world's 6.4 billion persons (Kliegman. *et.al*, 2007)

Children are precious to their family. Parents want their child to be safe from diseases (S. Agras. *et.al*, 1999) for this reason, they choose immunization as a preventive measure; routine immunization is an almost universal experience for children (N.L Schecter *et.al*, 1990). Immunization is a proven tool for controlling and eliminating life-threatening infectious diseases and is estimated to avert 2 million deaths each year. Immunization is one of the best cost-effective health investments, with proven strategies which make it accessible to even the most hard to reach and vulnerable populations. Immunization has well defined target groups, it can be implemented effectively through outreach programmes, and vaccination does not require any major lifestyle modifications.

Immunization is painful and children show behavioral distress to pain while receiving immunization. A study was conducted at the University of Georgia to isolate and compare children's procedural pain and anxiety. Results suggested that anxiety and pain are highly correlated (Cohen LL. *et.al*). In toddlers, verbal skills remain limited and quite in-consistent. Pain-related behaviors are still the main indicator for the assessments in this age group.

The nonverbal behaviors, such as facial expression, limb activity, grasping, holding, and crying, are considered most reliable and objective, measures of pain than self-reports (Rasha.S *et.al*, 2010). A qualitative study was conducted at the University of Missouri – Kansas City, Missouri, to describe pain behaviors of infants and toddlers, when in acute pain. Study concluded that, there was predictable changes in pain response within infancy and toddlerhood (Mills.N.M, 1999).

Pain is common among children. Pain is the most important single cause leading to temper tantrums and untoward behavioral changes in children (S. Agras. *et.al*, 1999). Pain is a universal complex and subjective experience. Nurses work with in almost all settings and are often associated with people who suffer from pain. For a pediatric nurse, assessing and managing a child with pain is a daily problem. Nurses are not only the agents to carry out the doctor's order, but they are the ones to implement the care, and one who works closely with patient. So the nurses, has to use some interventions to relieve pain and promote comfort in patient (Korpela R. *et.al*, 1999).

One of the most dramatic advances in pediatric nursing is the atraumatic care of children. Atraumatic care is the provision of therapeutic care in setting, by personnel and through the use of interventions that eliminate or minimize psychological and physical distresses experienced by children and their families in health care system (Hockenberry, 2005).

Children of any age, who visit hospital has a frightening feeling. They imagine hospital as a place where they get injections. Injection of any kind can hurt when they happen to see a nurse or a doctor with an injection syringe. The emotional disturbance and fear knows no boundary in children who feel threatened by painful procedure (Winkelstein, 2005).

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Total number of children in the age-group of 0-6 years are 15, 87, 89,287 (158.8 million) in India and in Karnataka it is 6,855,801 (according to 2011 Indian census). In India 77.2% of the rural population and 80% of the urban population are subjected to immunizations¹². However, the children subjected to immunization experience severe to moderate pain. Pain associated with immunizations is source of anxiety and distress for children receiving immunization.

Minimizing pain during childhood vaccination can help to prevent distress, development of needle fears and thereby the health care avoidance behaviors. Plate, Blount, Cohen(1996) reported that childhood memories of “aversive medical events may last for years, and early negative experiences may lead to negative attitudes about, and avoidance of health care experiences” for adults in later life. The non pharmacologic technique helps to draw child’s attention away from noxious stimuli through passively redirecting the subject’s attention or by actively involving the subject in the performance of diversion task (W.T Zempky, 2007).

The non pharmacologic approach is an essential component of pain relief. Non –pharmacological measures was chosen as the primary intervention because it provides a simple approach in reducing pain that has been shown to be effective in a number of settings, it requires little training, and has a number of theoretical sound reasons for why it should work (E . Fernandez, 1986)

Cutaneous stimulation modalities can be clubbed with acupressure to increase its effectiveness in pain management (M.R. D’souza, 2010). Acupressure is an ancient healing art developed in Asia, 5,000 years ago, using the fingers to press key points on the surface of the skin to stimulate the body's natural self-curing abilities. When these points are pressed, they release the muscular tension, and increase the circulation of blood and the body's life force energy (Qi) to promote health and healing. Using these same points as Acupuncture and Traditional Chinese Medicine, Acupressure uses a comfortable range of pressure from gentle to firm. Acupressure is well combined with other forms of body works and energy work therapies like therapeutic touch, healing imagery technique, energy psychology, and massage therapy. Acupressure is a safe, non-toxic, and definitely habit forming. There are literally hundreds of acupuncture points on the body. The large intestine meridian (LI4) is an acupressure point. It is one among the largest analgesic acupressure point, which is the soft, fleshy web between the thumb and forefinger point at the back side of the hand (S.Yang, 2009).

A combination of pharmacological and non-pharmacological interventions can ensure the highest standard of care in the management of pain in children. So the nurses, has to use some interventions to relieve pain and promote comfort in patients (Shiresha B, 2009). A study was conducted at the Department of Psychology, West Virginia University, Morgan town, USA to examine the nurse-directed distraction for reducing infant immunization distress. The Results indicated that infants engaged in distraction and that distraction reduced their behavioral distress. These studies show that children experience behavioral distress to pain while receiving immunization.

OBJECTIVES

1. To determine the effectiveness of ice application on the level of pain, among toddlers in the experimental group.
2. To find the association between the level of pain and the selected demographic variables among toddlers in the experimental and control group.

MATERIALS AND METHOD

A framework is the conceptual underpinning of a study (B.P. Hungler, 1999). A conceptual framework is a network of interrelated concepts that provide a structure for organizing and describing the phenomenon of interest (L.A.Talbot,1995).The conceptual framework of the present study is based on General System theory, which was first introduced in 1968 by Ludwig von Bertalanffy (V.L.Bertalanffy, 2010).

The research design adopted for the study was quasi experimental post-test only design. The study was conducted in selected immunization clinics of Mangalore. The sample comprised of 60 children aged 15-18 months. The sample was selected using convenience sampling technique and assigned to control and experimental groups. The independent variable is introduced into the experimental group but withheld for the control group.

Data was collected using baseline proforma and FLACC Behavioral pain assessment scale. It includes 5 parameters mainly face, leg, activity, cry and consolability. The parameters were categorized according to the responses. The findings were observed and graded correspondingly. The maximum score was 10 and minimum was zero. Each category is scored on a 0 – 2 scale. Interpretation of FLACC score is done by totaling the scores of each sub categories. The pain level is categorized into relaxed and comfortable (0), mild discomfort or pain (1-3), moderate discomfort or pain (4-6) and severe discomfort or pain (7-10) according to the total score of subcategories.

After attaining ethical clearance from the institutional ethics committee and written consent from the study participants, the pre-tested and validated tool was administered to the study samples. As per the inclusion and exclusion criteria, the samples were selected using non-probability convenience sampling technique and assigned into experimental and control group. An interview schedule was conducted to obtain the baseline proforma. After that the child along with the caregiver was taken to the immunization room. The investigator made the parent to sit on the chair comfortably with the child on the lap. The parent was restraining the child. The sample in experimental group was given ice application prior to immunization. The intervention was carried out for the experimental group by application of ice (ice cube wrapped in cotton cloth) over LI-4 acupressure area (between the web of thumb and index finger) five minutes prior to the immunization for 30 seconds duration followed by a rest period of 60 seconds and it was repeated twice. At the end of the time period, the staff nurse in the immunization clinic administered the injection, and the pain level was observed by the investigator during the procedure using FLACC behavioral pain assessment scale. Whereas children in the control group received immunization without ice application and the pain

level was observed during the procedure using FLACC behavioral pain assessment scale. The data was analyzed by using both descriptive and inferential statistics.

RESULT AND DISCUSSION

Table 1 Post test pain scores in experimental and control group.

N=60				
Group	Mean	Median	Mean Percentage	Standard Deviation
Experimental group	3.4	3	34	1.15
Control Group	7.4	7.5	74	0.72

The table (1) shows the mean pain score (3.4 ±1.15) of children who had received ice application prior to immunization was much less than the children who had received immunization without ice application (7.4±0.72).

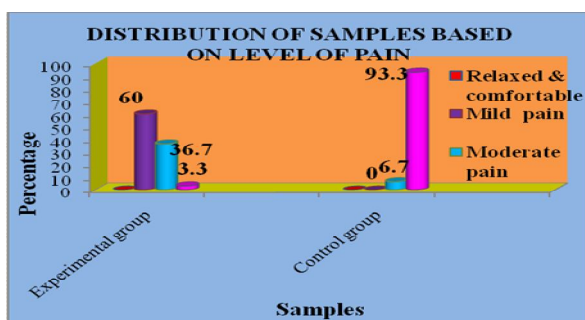


Fig 1 Cylindrical diagram showing the distribution of samples based on level of pain in the experimental and control group.

Fig (1) shows that in the experimental group, 60% of samples experienced mild pain, 36.7% experienced moderate discomfort and 3.3% of samples experienced severe pain during immunization. Whereas in control group, majority of the samples 93.3% experienced severe pain and only 6.7% of the samples experienced moderate pain during the immunizations.

Table 2 Effectiveness of ice application on pain.

N = 60				
Group	Mean	Standard Deviation	Mean Difference	Unpaired 't' test
Control Group	7.4	0.72		
Experimental group	3.4	1.15	4	16.89*

t₍₅₈₎ = 1.67, p<0.05; * Significant

The effectiveness of ice application (table 2) was assessed by comparing the experimental and control group pain score using independent 't' test and the calculated 't' value was 16.89, which was greater than the table value (t=1.67). This showed that there was a high statistical significant difference in the level of pain at p<0.05 level between the experimental and control group of the children.

A true experimental study was conducted, to assess the effectiveness of ice application prior to intramuscular injection in children. Samples were 60 children attending the immunization clinics. Ice application was given for the experimental group for 30 seconds and post assessment of pain was done using the observational checklist and Wong and Backer faces pain scale. The mean of the experimental group

(8.43±1.30) when computed with control group (16.98±1.22) revealed that there was a high statistical difference in level of pain among children between experimental and control group at p<0.05 level of significance (Cohen L.L et.al)

Chi – square test was used to calculate the association between pain score and selected demographic variables. The study findings revealed that there was no statistical significant association between level of pain and selected demographic variables of experimental and control group at p<0.05 level of significance.

A randomized controlled trial was conducted in Hospital of Sick Children, Toronto, Canada, to determine the effects of age, gender and the holding on pain response during immunization. Samples were 106 infants aged 2 to 6 months, who were held either supine (SUP) on the examination table or held (HLD) by a parent during routine immunization in a community pediatric office. The result found that there was no difference between the supine and held infants' duration of cry, facial grimacing on visual analogue scale pain scores. Similarly gender did not affect pain response (A.Taddio. et.al). The main limitation of the study was that it was confined to a specific geographical area. The study findings could be generalized only to the population who fulfilled the criteria in the study. The study used convenience sampling technique, so all the age groups were not equally represented in the study.

The present study highlighted that ice application clubbed with acupressure is a highly significant complimentary alternative method in pain management. Immunization is an important and universal experience for children and ice application is a safe and economical pain management intervention for children receiving immunization. Further research is suggested to determine the effectiveness of ice application among children in reduction of different pains.

CONCLUSION

The present study was conducted to assess the effectiveness of ice application on pain among toddlers receiving immunization in selected immunization clinics. The study revealed that the ice application was effective in minimizing the immunization pain in toddlers. The present study helped the investigator to gain new experiences in meeting the needs as well as to improve her knowledge in pediatric pain management. Hence non pharmacological interventions can be used as a routine adjuvant therapy by the health care professionals for pain management.

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