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"EFFECTIVENESS OF ORAL SUCROSE SOLUTION IN REDUCTION OF PAIN AMONG INFANTS UNDERGOING PAINFUL PROCEDURE AT SELECTED HOSPITALS, ERODE

Dr. Prof: Jamuna rani1, Mrs. M. Gayathri devi2 , Mrs.Saranya.M3

[1.]Principal, Medical Surgical Nursing Department,(affiliated to the Tamilnadu Dr. M.G.R. Medical University, Chennai) Sre sakthimayeil Institute of Nursing and Research (JKK Nattraja Educational Institutions), Namakkal. Tamil Nadu, India.

[2.]Associate Professor, Child Health Nursing Department, (affiliated to the Tamilnadu Dr. M.G.R. Medical University, Chennai) Sre sakthimayeil Institute of Nursing and Research (JKK Nattraja Educational Institutions), Namakkal. Tamil Nadu, India

[3.]M.sc(N) Student, Sre sakthimayeil Institute of Nursing and Research (JKK Nattraja Educational Institutions),(affiliated to the Tamilnadu Dr. M.G.R. Medical University, Chennai) Namakkal. Tamil Nadu, India.

ABSTRACT

Background: A negative impact of pain is a consequence of a normal state of aninfant. pain as 'an unpleasant sensory and emotional experience associated with actualor potential tissue damage, or described in terms of such damage'. The pediatric acutepain experience involves the interaction of physiologic, psychologic, behavioral,
developmental, and situational factors.Non-pharmacological Interventions used to minimise pain . Oral sucrose is a
safe and effective mild analgesic which is effective in decreasing short-term pain anddistress during minor procedures. Small amounts of sweet solutions (oral sucrose) areplaced on the infant's tongue to reduce procedural pain.24% Oral sucrose solution isone of the non-pharmacological measure which is effective in reduction of pain
among infants undergoing intravenous cannulation. This study assessed theeffectiveness of oral sucrose solution in reduction of pain among infants undergoingpainful procedure.

Objectives: The effectiveness of oral sucrose solution in reduction of pain amonginfants undergoing painful procedure.

Design: Quasi experimental –post test only control group design

Setting: Best Children's Hospital and Sudha Mother and Child Care Hospital, Erode.

Sample size: Total sample size was 60.

Sampling technique : The samples were selected by using purposive samplingtechnique.
Methods: Demographic variables were collected and Post test was done for bothexperimental and control group by using FLACC Behavioral infant pain assessmentscale . Then the intervention of Oral sucrose solution was given to the infant. In
control group the existing hospital routine was practiced. Post test was assessed on
FLACC Behavioral infant pain assessment scale for both experimental and control
groups.
Results
The demographic variables age of the infant, Sex, Weight of the infant in kgs,Birth order of the infant, Supporting persons with the infant during Intravenouscannulation ,Numbers of exposure to painful procedure and Infant behavioral statebefore the painful procedurehad shown statistically significant association betweenthe post-test level of pain during Intravenous cannulation among infants with selecteddemographic variables in experimental group.
The demographic variables Sex and Weight of the infant in kgs had shownstatistically significant association between the post-test level of pain duringIntravenous cannulation among infants with selected demographic variables in
control group.The other demographic variables had not shown statistically significant
association between the post-test level of pain during Intravenous cannulation amonginfants with selected demographic variables in control group.
Conclusion
The present study assessed the Effectiveness of oral sucrose solution inreduction of pain among infants undergoing painful procedure at selected hospital,Erode. The result of this study showed that most of the infants in experimental grouphad reduction of pain during intravenous cannulation after administration of oralsucrose.

INTRODUCTION

Children experience pain just as much as adults. Children of all ages experience pain; preterm infants likely experience even more pain than an adult when subjected to same stimulus. Although management of pain has improved over last few decades ,particularly for predictable pain problems (such as postoperative pain),but under estimation and under treatment of pain in children remain problems till now. Untreated pain may have significant and lifelong physiologic and psychological consequences like altered pain sensitivity. **(Parul Datta, 2022)**

Pain is "an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage," and is expanded upon by the addition of six key Notes and the etymology of the word pain for further valuable context. **(IASP, 2020)**

Pain is always a personal experience that is influenced to varying degrees by biological, psychological, and social factors. Pain and nociception are different phenomena. Pain cannot be inferred solely from activity in sensory neurons. Through their life experiences, individuals learn the concept of pain. A person's report of an experience as pain should be respected. Although pain usually serves an adaptive role, it may have adverse effects on function and social and psychological well-being. Verbal description is only one of several behaviors to express pain; inability to communicate does not negate the possibility that a human or a nonhuman animal experiences pain.

Pain is a complex phenomenon, and its management is becoming increasingly recognized as the cornerstone of high-quality patient care . Optimizing the management of pediatric pain has been highlighted as a key healthcare priority by the World Health Organization, and leading pediatric and pain societies . Children experience multiple painful procedures daily when being cared for in hospital and ambulatory settings . With half of all emergency department (ED) visits resulting from painful conditions, and 78% of patients experiencing pain during their ED stay , EDs represent a setting where effective pediatric pain management should be an essential component of care. The most common painful procedures in the ED include venipuncture and intravenous (IV) insertions. **(Kassi Shave, et al., 2018)**

Poorly managed pain from venipuncture and IV insertion procedures can have short-term (e.g., anxiety, avoidance behaviours, and somatic symptoms) and long-term (e.g., increased pain sensitivity, fear, healthcare avoidance as adults) impacts on a child, which can extend and complicate both the procedure and the ED stay .

Physical strategies - Comfort positioning is the sitting upright, rather than the traditional approach of lying on a bed while being physically restrained, has been shown to increase children's comfort during procedures such as IV insertion or vaccination . Sitting upright reduces distress by enhancing children's sense of control. Smaller children may sit on their caregiver's lap . Secure, comforting, or 'hugging' holds serve to assist, rather than restrain, the child . Caregivers can also help support their child with distraction and soothing words while assisting with comfort positioning . Family presence should always be encouraged, while taking caregiver preferences into account. **(Evelyne D Trottier, 2019)**

Infant-focused strategies - Breastfeeding can be a multimodal comfort strategy, simultaneously offering skin-to-skin contact, the comfort of sucking and rocking, and (likely) the transfer of endogenous opiates in breast milk. Breastfeeding reduces procedural pain in newborns receiving heel sticks and venipunctures, as well as cry duration and pain scores during infant immunizations.

Sucrose has been studied at various dosages and concentrations . For painful procedures (e.g., heel lances, venipunctures, intramuscular [IM] injections, immunization), its usefulness has been clearly shown in both preterm and term neonates . For this age group, it has similar effectiveness to breastfeeding for reducing needle pain . Sucrose may also reduce cry duration in infants 1 to 12 months of age , but there is insufficient evidence to support its use beyond 12 months . Recommended dosing varies from 0.5 mL to 2 mL of 24% to 33% sucrose. To be most effective, part of the dose must be given 2 minutes before the procedure and the rest during the procedure . Homemade solutions can be prepared by diluting 5 g of sugar (one restaurant packet) in 10 mL of water . Sucrose reduces composite pain scores by approximately 20% and is most effective when combined with other strategies.

STATEMENT OF THE PROBLEM

Effectiveness of oral sucrose solution in reduction of pain among infants undergoing painful procedure at selected hospital, Erode.

OBJECTIVES OF THE STUDY

1. To assess the level of pain during intravenous cannulation in experimental and control group infants admitted in the selected hospital ,Erode.
2. To evaluate the effectiveness of oral sucrose among infants undergoing painful procedure like intravenous cannulation in experimental and control group.
3. To find out the association between the selected demographic variables and the post test scores of the experimental and control group infants undergoing Intravenous cannulation.

MATERIALS AND METHODS:

DESCRIPTION OF THE TOOL

The tool was organized into two sections.

Section I: Demographic Variables of the Infants.

It consists of the selected demographic variable like age, sex, weight, birth order , supporting person, Numbers of exposure to painful procedure , Infant behavioral state before the painful procedure

Section II: The FLACC Behavioral Pain Scale.

The FLACC behavioral scale consists of five behavioral cues like face, legs, activity, cry and consolability. The maximum score for each cue is 2 and the minimum score is 0. The total score for the scale is 10. The score interpretation is given below in the table.

FLACC pain score	Interpretation
0	Relaxed / comfortable
1-3	Mild discomfort
4-6	Moderate discomfort
7-10	Severe discomfort/pain/both

VALIDITY AND RELIABILITY OF THE TOOL

VALIDITY

The content validity was obtained from five experts, of which three are from the nursing field and two from the medical specialist.

RELIABILITY

Reliability of an instrument is the degree of consistency measures that attribute it is supposed to be measured .Reliability of the tool was estimated in the study of subjects by using Cronbach's Alpha Method. The score obtained were correlated .The overall reliability score obtained was r = 0.87.The tool was found to be reliable.

PROCEDURE FOR DATA COLLECTION

The period of data collection as for about 4weeks. A formal written permission was obtained from hospital to carry out the main study. A total sample of 60 infants undergoing intravenous cannulation whome the inclusion criteria. The sample was selected by non-probability purposive sampling technique,30 samples for experimental group and 30 sample for control group. The investigator had obtained individual informed oral consent from the parents of each infant who were included in the study. The information pertaining to the demographic data was collected. 24% oral sucrose solution was prepared manually by adding 24 gram ordinary sugar with 100 ml of distilled water. Data was collected in the Pediatric Ward. The 24% oral sucrose solution was instilled to 30 samples of the experimental group just before 30 seconds of Intravenous cannulation which was administered for about 2 minutes, whereas 30 samples of the control group was not instilled 24% oral sucrose solution. The pain perception of the experimental group and control group infants were obtained by using the FLACC Behavioral scale and compared with one another to evaluate the pain level over of 5 minutes. The recordings were made in the FLACC scale.

SECTION A: DESCRIPTION OF THE DEMOGRAPHIC VARIABLES AMONG INFANTS IN EXPERIMENTAL AND CONTROL GROUP.

Table - 4.1

Frequency and percentage distribution of demographic variables among infants in experimental and control group

(N=60 (30+30))

S.NO	DEMOGRAPHIC VARIABLES	EXPERIMENTAL GROUP		CONTROL GROUP	
		N	%	N	%
1	**Age of the infant**				
	7 to 8 months	11	36.7	10	33.3
	9 to 10 months	13	43.3	16	53.3
	11 to 12 months	6	20	4	13.4
2	**Sex**				

S.NO	DEMOGRAPHIC VARIABLES	EXPERIMENTAL GROUP		CONTROL GROUP	
		N	%	N	%
	Male	20	66.7	18	60
	Female	10	33.3	12	40
3	**Weight of the infant in kgs**				
	Below 8 kgs	5	16.7	13	43.3
	9 to 10 Kgs	12	40	11	36.7
	11 to 12 Kgs	7	23.3	4	13.3
	Above 12 kgs	6	20	2	6.7
4	**Birth order of the infant**				
	First	13	43.3	9	30
	Second	9	30	13	43.3
	Third	8	26.7	8	26.7
5	**Supporting persons with the infant during Intravenous cannulation**				
	Mother only	11	36.7	16	53.3
	Parents	7	23.3	9	30
	Others	12	40	5	16.7
6	**Numbers of exposure to painful procedure**				
	One time	9	30	19	63.3
	Two time	21	70	11	36.7
7	**Infant behavioral state before the painful procedure**				
	Calm, relaxed	8	26.7	11	36.7
	Distressed, fussy	13	43.3	14	46.7
	Cry	9	30	5	16.6

Table 4.1 shows frequency and percentage distribution of demographic variables among infants in experimental and control group.

❖ Both in experimental 13(43.3%) and control 16(53.3%) group majority of infants were in the age group 9 to 10 months.

❖ Both in experimental 20(66.7%) and control 18(60%) group majority of infants were male.

❖ In experimental group majority of infants Weight 12(40%) were9 to 10 Kgs whereas in control group majority 13(43.3%) were below 8 kgs.

❖ In experimental group majority of infants Birth order 13(43.3%) were First whereas in control group majority 13(43.3%) were Second.

❖ In experimental group majority of infants, Supporting persons with the infant during Intravenous cannulation 12(40%) were others whereas in control group majority 16(53.3%) were Mother only.

❖ In experimental group majority of infants, Numbers of exposure to painful procedure 21(70%) were Two time whereas in control group majority 19(63.3%) were One time.

❖ Both in experimental 13(43.3%) and control 14(46.7%) group majority of infants, behavioral state before the painful procedure were Distressed, fussy.

❖ **SECTION B: ASSESSMENT OF THE LEVEL OF PAIN DURING INTRAVENOUS CANNULATION AMONG INFANTS IN EXPERIMENTAL AND CONTROL GROUP.**

❖ **Table - 4.2**

❖ **Frequency and percentage distribution of the level of pain during Intravenous cannulation among infants in experimental group.**

❖ **(N=30)**

Level of pain	**FREQUENCY (n)**	**PERCENTAGE (%)**
Relaxed / comfortable	0	0
Mild discomfort	18	60
Moderate discomfort	12	40
Severe discomfort/pain/both	0	0
Total	**30**	**100**
Mean±Standard deviation	3.17±1.621	

❖

❖ **Table 4.2** that frequency and percentage distribution of the level of pain during Intravenous cannulation among infants in experimental group.

❖ Majority of infants 18(60%) had mild and 12(40%) had moderate level of pain and the mean and standard deviation the level of pain during Intravenous cannulation among infants is (3.17+1.621) respectively.

❖ **Table - 4.3**

❖ **Frequency and percentage distribution of the level of pain during Intravenous cannulation among infants in control group.**

❖ **(N=30)**

Level of pain	**FREQUENCY (n)**	**PERCENTAGE (%)**
Relaxed / comfortable	0	0
Mild discomfort	6	20
Moderate discomfort	24	80
Severe discomfort/pain/both	0	0
Total	**30**	**100**
Mean±Standard deviation	5.37±1.217	

❖ **Table 4.3** shows that frequency and percentage distribution of level of pain during Intravenous cannulation among infants in control group.

❖ Majority of infants 24(80%) had moderate and 6(20%) had mild level of pain and the mean and standard deviation the level of pain during Intravenous cannulation among infants is (5.37+1.217) respectively.

SECTION C: EVALUATE THE EFFECTIVENESS OF ORAL SUCROSE AMONG INFANTS UNDERGOING PAINFUL PROCEDURE LIKE INTRAVENOUS CANNULATION IN EXPERIMENTAL AND CONTROL GROUP

Table – 4.4

Evaluate the effectiveness of oral sucrose among infants undergoing painful procedure like Intravenous cannulation in experimental and control group

(N=60)

Group	Mean	Standard deviaton	Mean difference	't' value Paired -t test	df	'p' VALUE
Experimental Group	3.17	1.621	2.20	5.94	58	**0.001 *S**
Control Group	5.37	1.217				

**** p < 0.001 highly significant ,NS-Non Significant.**

Table 4.4 shows that, evaluate the effectiveness of oral sucrose among infants undergoing painful procedure like Intravenous cannulation in experimental and control group

The mean score of evaluate the effectiveness of oral sucrose among infants undergoing painful procedure like Intravenous cannulation in experimentalgroup was 3.17+1.621 and the mean score in the control groupwas5.37+1.217. The calculated paired 't' test value of t = 5.94shows statistically highly significant difference of evaluate the effectiveness of oral sucrose among infants undergoing painful procedure like Intravenous cannulation in experimental and control group.

SECTION D: ASSOCIATION BETWEEN THE POST-TEST LEVEL OF PAIN DURING INTRAVENOUS CANNULATION AMONG INFANTS WITH SELECTED DEMOGRAPHIC VARIABLES IN BOTH EXPERIMENTAL AND CONTROL GROUP.

Table 4.5

Association between the post-test level of pain during Intravenous cannulation among infants with selected demographic variables in experimental group.

(N=30)

SL. NO	Demographic variables	EXPERIMENTAL GROUP Post-test level of pain				Chi-square X^2 and P-Value
		MILD		MODERATE		
		N	%	N	%	
1	**Age of the infant**					X^2=26.52 Df=2 p =0.001 *S
	7 to 8 months	0	0	11	91.7	
	9 to 10 months	13	72.2	0	0	
	11 to 12 months	5	27.8	1	8.3	
2	**Sex**					X^2=14.62 Df=1 p =0.005
	Male	9	50	11	91.7	
	Female	9	50	1	8.3	

SL. NO	Demographic variables	EXPERIMENTAL GROUP Post-test level of pain				Chi-square X^2 and P-Value *S
		MILD		MODERATE		
		N	%	N	%	
3	**Weight of the infant in kgs**					
	Below 8 kgs	0	0	5	41.7	X^2=17.84 Df=3 p =0.001 *S
	9 to 10 Kgs	5	27.8	7	58.3	
	11 to 12 Kgs	7	38.9	0	0	
	Above 12 kgs	6	33.3	0	0	
4	**Birth order of the infant**					X^2=19.3 Df=2 p =0.001 *S
	First	2	11.1	11	91.7	
	Second	9	50	0	0	
	Third	7	38.9	1	8.3	
5	**Supporting persons with the infant during Intravenous cannulation**					X^2=26.18 Df=2 p =0.001 *S
	Mother only	0	0	11	91.7	
	Parents	7	38.9	0	0	
	Others	11	61.1	1	8.3	
6	**Numbers of exposure to painful procedure**					X^2=19.28 Df=1 p =0.001 *S
	One time	0	0	9	75	
	Two time	18	100	3	25	
7	**Infant behavioral state before the painful procedure**					X^2=16.68 Df=2 p =0.001 *S
	Calm, relaxed	0	0	8	66.7	
	Distressed, fussy	10	55.6	3	25	
	Cry	8	44.4	1	8.3	

***p < 0.05 significant, * *p < 0.001 Highly significant, NS-Non significant**

Table 4. 5 depicts that the demographic variables**Age of the infant,Sex, Weight of the infant in kgs, Birth order of the infant, Supporting persons with the infant during Intravenous cannulation ,Numbers of exposure to painful procedure and Infant behavioral state before the painful procedure**had shown statistically significant association between the post-test level of pain during Intravenous cannulation among infants with selected demographic variables in experimental group.

Table - 4.6
Association between the post-test level of pain during Intravenous cannulation among infants with selected demographic variables in control group.
(N=30)

SL. NO	Demographic Variables	CONTROL GROUP POST-TEST LEVEL OF PAIN				Chi-square X^2 and P-Value
		MILD		MODERATE		
		N	%	N	%	
1	**Age of the infant**					X^2=11.06 Df=2 p =0.071 NS
	7 to 8 months	0	0	10	41.7	
	9 to 10 months	2	33.3	14	58.3	
	11 to 12 months	4	66.7	0	0	
2	**Sex**					**X^2=13.25 Df=1 p =0.003 *S**
	Male	0	0	18	75	
	Female	6	100	6	25	
3	**Weight of the infant in kgs**					
	Below 8 kgs	0	0	13	54.2	**X^2=12 Df=3 p =0.005 *S**
	9 to 10 Kgs	0	0	11	45.8	
	11 to 12 Kgs	4	66.7	0	0	
	Above 12 kgs	2	33.3	0	0	
4	**Birth order of the infant**					X^2=6.62 Df=2 p =0.089 NS
	First	0	0	9	37.5	
	Second	0	0	13	54.2	
	Third	6	100	2	8.3	
5	**Supporting persons with the infant during Intravenous cannulation**					X^2=6.44 Df=2 p =0.085 NS
	Mother only	0	0	16	66.7	
	Parents	1	16.7	8	33.3	
	Others	5	83.3	0	0	
6	**Numbers of exposure to painful procedure**					X^2=7.95 Df=1 p =0.059 NS
	One time	0	0	19	79.2	
	Two time	6	100	5	20.8	
7	**Infant behavioral state before the painful procedure**					X^2=8.19 Df=2 p =0.068 NS
	Calm, relaxed	0	0	11	45.8	
	Distressed, fussy	1	16.7	13	54.2	
	Cry	5	83.3	0	0	

***p < 0.05 significant, * *p < 0.001 Highly significant, NS-Non significant**

Table 4.9 depicts that the demographic variables**Sex and Weight of the infant in kgs** had shown statistically significant association between the post-test level of pain during Intravenous cannulation among infants with selected demographic variables in control group.

The other demographic variables had not shown statistically significantassociation between the post-test level of pain during Intravenous cannulation among infants with selected demographic variables in control group.

CONCLUSION

The present study assessed the Effectiveness of oral sucrose solution in reduction of pain among infants undergoing painful procedure at selected hospital, Erode. The result of this study showed that most of the infants in experimental group had reduction of pain during intravenous cannulation after administration of oral sucrose.

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