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"A Study To Assess The Efffectiveness Of Oral Sucrose As Analgesia For Pain Relief Among Pre-Trem And Trem Neonates Undergoing Intravenous Cannunation In Nicu At Selected Hospital Visakhapatnam."

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Abstract: Worldwide, premature birth is the primary cause of death in children under five. In most countries, data is showing rising preterm birth rates. Healthcare for children especially focuses on managing the pain for their well-being. Nurses strive to reduce both the physical and emotional pain experienced by children. The use of pain control for neonates undergoing painful procedures is still limited. However according to recent reports, neonates at NICU experience a lots of painful procedures a day, most of which are still performed without effective pain control measures as demonstrated by recent surveys. Oral sucrose is safe and suitable for reducing pain from a single event. It is also a mild pain reliever, effective in decreasing short-term pain and discomfort during minor procedures. This study included 20 participants in the experimental group and 20 in the control group, selected using a purposive sampling method. We used a modified FLACC scale to assess pain in pre-term and term neonates. Nearly all neonates in both groups were between 0-10 days old. We found a significant link between a mother's education level and post-test pain relief during intravenous cannulation, with mother education being associated with effective post-test pain relief in the experimental group at a p value of 0.012.

There were individual associations with gestational age in weeks for post-test pain level in the experimental group. The mean pain level in the experimental group was 8.03±0.91, and in the control group it was 11.63±1.17. Post-test mean pain scores were significantly higher in pre-term and term neonates during intravenous cannulation in the control group.

Oral sucrose administration as pain relief reduced post-test pain levels compared to normal routine measures in the control group. The calculated student 't' test showed a statistically significant difference between the post-test pain levels in the groups with a t value of 4.261 at a p value <0.001. The results support the retention of the research hypothesis H1, but imply that education level of the mother might not have been properly homogenous among groups after adjusting the overall grouping's homogeneity with excepted results.

I. INTRODUCTION

The international association for the study of pain (IASP) "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage". [1]
Sucrose is the chemical name for table sugar and consist of a combination of glucose and fructose and is usually obtained from sugar cane or sugar beets. Oral sucrose is safe and effective for reducing procedural pain from a single event. [2]

During their first few months, babies' senses become more refined as they form their initial relationships with primary caregivers through attachment. The rapid developments in this period make the first year of life a crucial time. Oral sucrose has been found to safely and effectively reduce pain caused by a single event. A mild pain reliever, oral sucrose, can decrease short-term pain and distress during minor procedures when a small amount of a sweet solution is applied to the neonate's tongue. Oral sucrose administration is clinically indicated for the reduction of procedural pain and distress in infants 0-18 months at RCH. [2]

Effective pain management benefits children not only by reducing pain but also by enhancing the quality of their life. Pain management societies recommend treatments aimed at minimizing pain. Oral sucrose administration is a highly effective method to reduce pain experienced by infants during procedures. [3]

Oral sucrose is a pain relief option for young infants due to its affordability, short duration, non-sedative effects, ease of administration, and low risk. [4]

Nurses are often tied to people in distress and work closely with patients who suffer from pain, especially infants, on a daily basis, doing more than just carrying out medical orders. [5]

Various non-medication pain relief methods have proven successful for some children and specific procedures. These methods are simple to learn and should be used whenever possible to allow the child some control over their pain. Techniques such as distraction, muscle relaxation, and guided imagery can be easily taught and used with young children. [6]

3.1Population and Sample

In the present study, the population includes children in the age group of 0-28 days pre-term and term neonates at the selected hospital, Visakhapatnam.

The sample size for the study includes 40 pre-term and term neonates (20 samples for experimental and 20 samples for control group) and the sample size for the pilot study is 4.

3.2 Data and Sources of Data

For this study data were collected from the available and relatable sources, data and information from books, journals which were published and non-published research studies and attempted was to review literature through internet (sites: MEDLAR, PUBMED and MEOLINE) research.

The relevant reviewed of literature for the present study is organized and presented under as follows headings-

- Literature relevant to oral sucrose as analgesic to reduce pain.
- Literature relevant to non-pharmacological intervention for pain relief in neonates.
- Assessment scales for pain.

I .RESEARCH METHODOLOGY :

The quantitative approach was adopted to accomplish the objectives of the study. Non probability convenient sampling technique was used to select 40 pre-term and term neonates (20 samples for experimental and 20 samples for control group).

The data was collected using following description of tool:

Section I description of demographic variables

Demographic variables including age, gender, weight and mode of delivery.

Section II pain score

Face, legs, activity, cry, Consolability scale (FLACC) was used for infants to assess pain. The parameter included facial expression, cry, body movement, activity, Consolability, which were as per the pain scale and the score was interpreted as follows:

Scoring procedure

Table 1: scoring procedure for assessing the level of pain

Observations	SCORE		
	SCORE 2	SCORE 1	SCORE 0
Facial expression	2	1	0
Body movement	2	1	0
Cry	2	1	0
Activity	2	1	0
Consolability	2	1	0

Each response was given a score of zero, one, two and three according to the level of pain as no pain, mild, moderate and severe pain respectively. The total score was 10. The total score for each infants was calculated and interpreted as follows:

Table 2: interpretation of score procedure

Levels of pain	Score
Relaxed and comfortable	0
Mild discomfort	1-3
Moderate pain	4-6
Severe discomfort/pain	7-10

3.4Statistical tools and econometric models

Data analysis was planned to include descriptive and inferential statistics. The following finding for analysis was developed with the opinion of the experts based on the objectives of the study:-

Section I: Frequency and percentage distribution of demographic variables of pre-tern and term neonates in the experimental and control.
Section II: Frequency and percentage distribution of post-test level of pain among per-term and term neonates in the experimental and control group.
Section III: Effectiveness of oral sucrose as analgesia for pain relief among pre-term and term neonates during IV between the experimental and control.
Section IV: Association of post-test of pain among of pre-term and term neonates during intravenous with their selected demographic variables in the control.
Section V: Association of post-test level of pain among of pre-term and term neonates during intravenous cannulation with their selected demographic variable in the control group.

I. RESULT AND DISCUSSION

SECTION -1: Frequency and percentage distribution of demographic variables of pre-term and term neonates in the experimental group.

It deals with demographic data which consists of 9 items to collect the sample characteristics, which includes age of the neonates, gestational age in weeks, education of the mother, occupation of the mother, types of the family, weight of the baby, mode of delivery, types of procedure and size of the needle

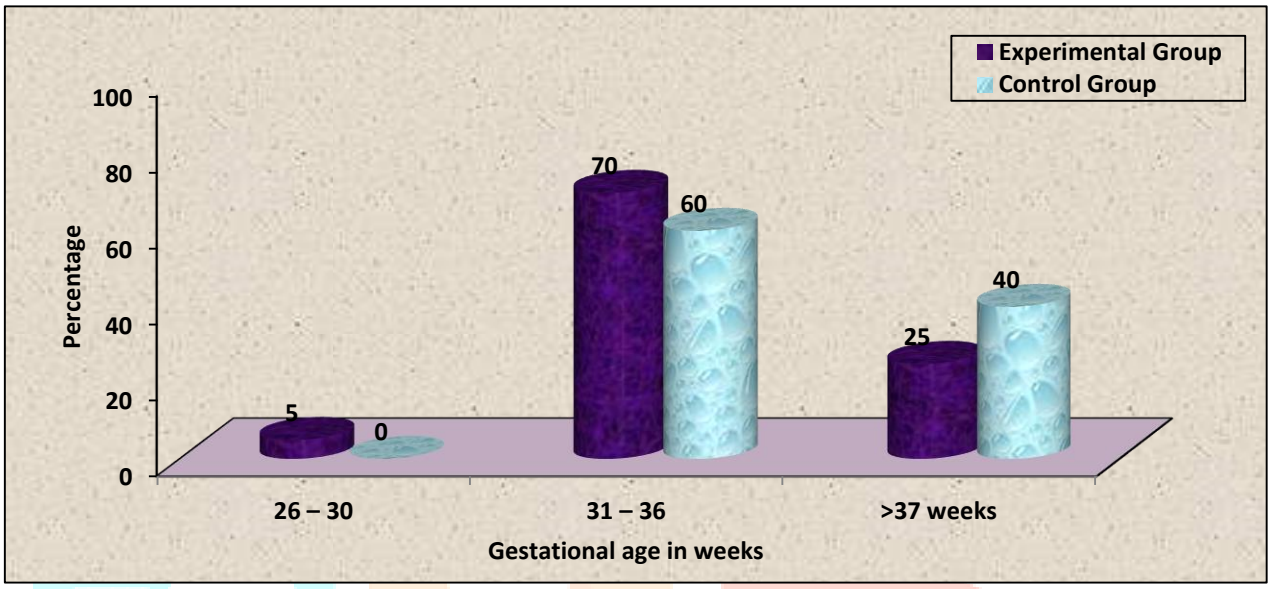

Figure 1: percentage distribution of gestation age in weeks among pre=term and term neonates in the experimental and control group.

Figure 1: Indicates that out of the total samples maximum 14 (70%) were of gestational age in week 31-36 weeks, 5 (25%) were of gestational age in weeks, 1 (5%) were of gestational age in weeks.

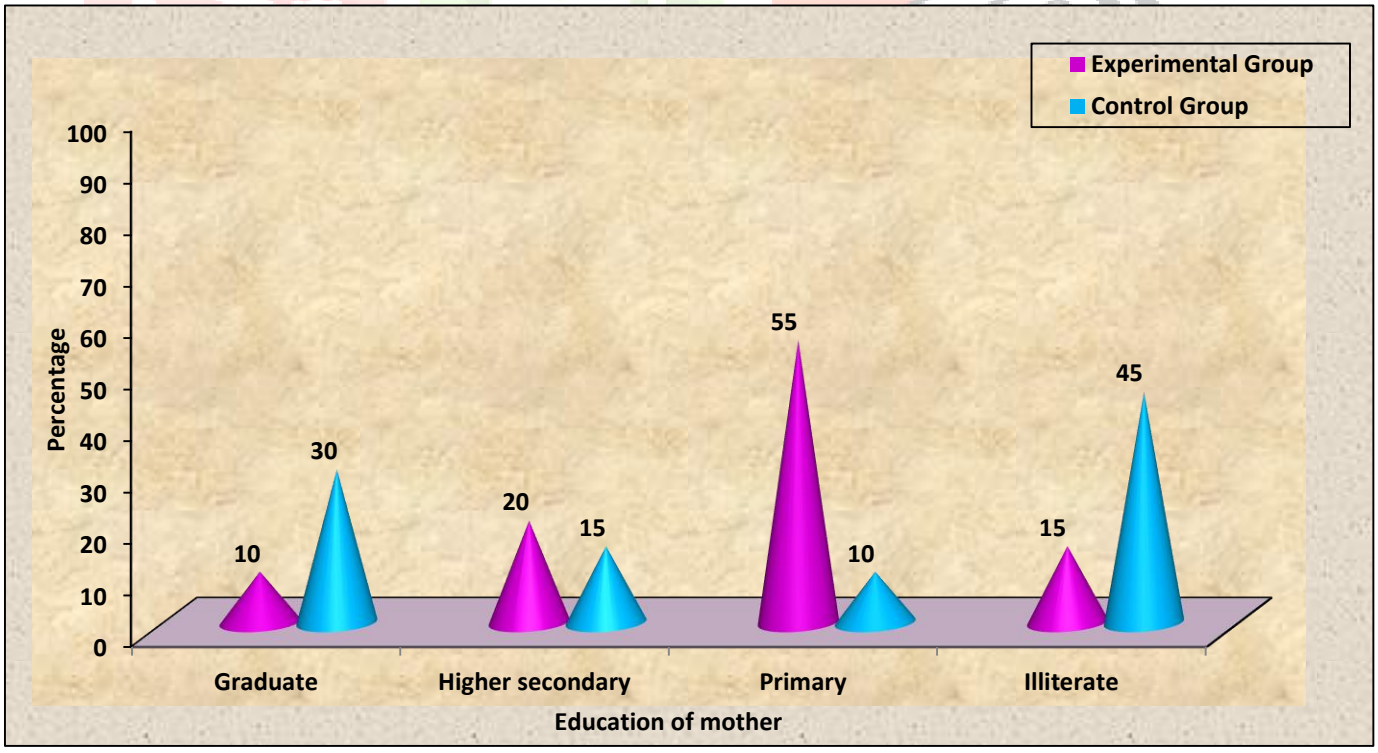

Figure 2: percentage distribution of education of mother among pre-term and term neonates in the experimental and control group.

Figure 2: Indicates that out of the total samples the maximum 11 (55%) were primary education, 13(65%) 0f the mothers were unemployed.

SECTION-II: Frequency and percentage distribution of post-test of pain among pre-term and term neonates in the experimental and control group.

This section deals with the analysis and interpretation of the data in terms of pain perception after the intervention while giving intravenous cannulation among pre-term and term neonates in experimental group oral solution was administered 2 minutes prior.

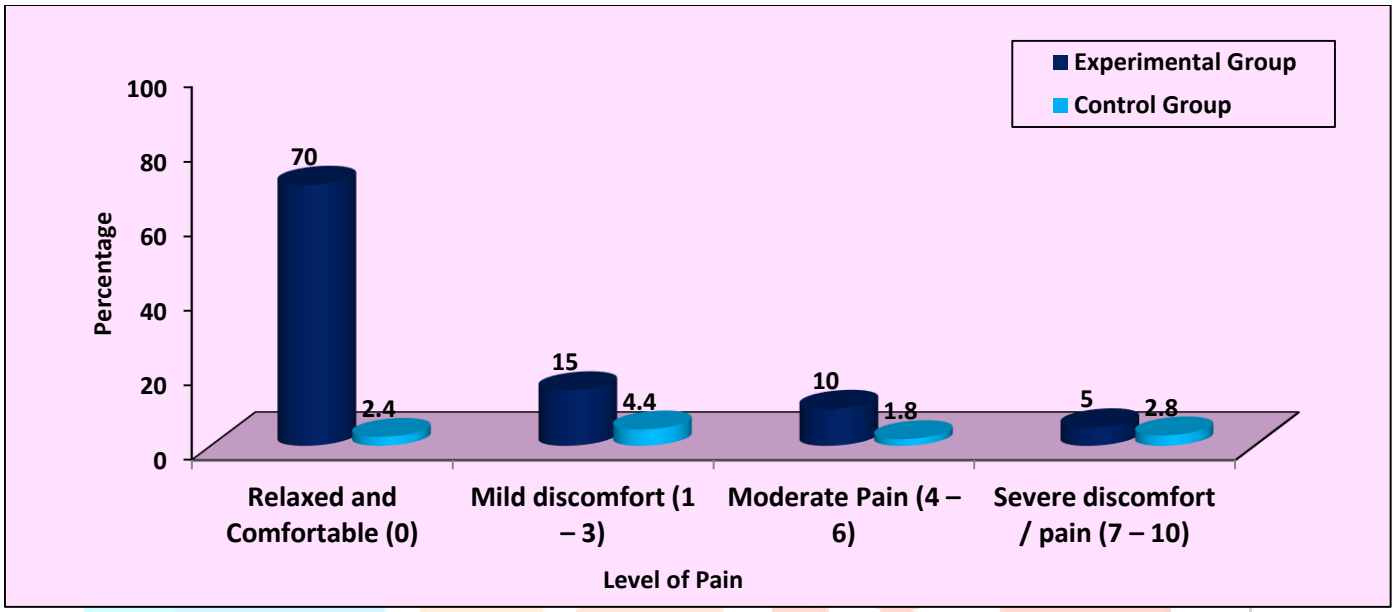

Figure 3: Percentage distribution of post-test level of pain among pre-term and term neonates in the experimental and control group.

Figure 3: Indicates that out of the total samples, maximum 14(70%) of pre-term and term were relaxed and comfort, 3(15%) had mild discomfort, 2(10%) had moderate pain and 1(5%) had sever discomfort or pain respectively 2(10%) were relaxed and comfortable.

SECTION-III: Effectiveness of oral sucrose as analgesia for pain relief among pre-term and term neonates during intravenous cannulation between the experimental and control group.

n = 40(20+20)

Pain	Mean	S.D	Mean Difference & %	Student Independent 't' test value
Experimental Group	**1.05**	**2.26**	**3.55 (35.5%)**	**t=4.261 p=0.0001, S*****
Control Group	**4.60**	**2.96**		

***p<0.001, S – Significant

The table 1 shows that post test mean score of pain among pre-term and term neonates during intravenous cannulation in the experimental was 1.05±2.26 and the post test mean score of pain in the control group was 4.60±2.96. The mean difference was 3.55 and the mean difference percentage was 35.5%. The calculated student independent 't' test value of t=4.261 was found to be statistically significant at p<0.0001 level which clearly infers there was significant difference in the post test level of pain between the groups in which the oral sucrose as analgesia for pain relief administered to the pre-term and tern neonates was found to be

effective in reducing the level of pain and discomfort than the pre-term and term neonates in the control group who had underwent normal hospital routine measures.

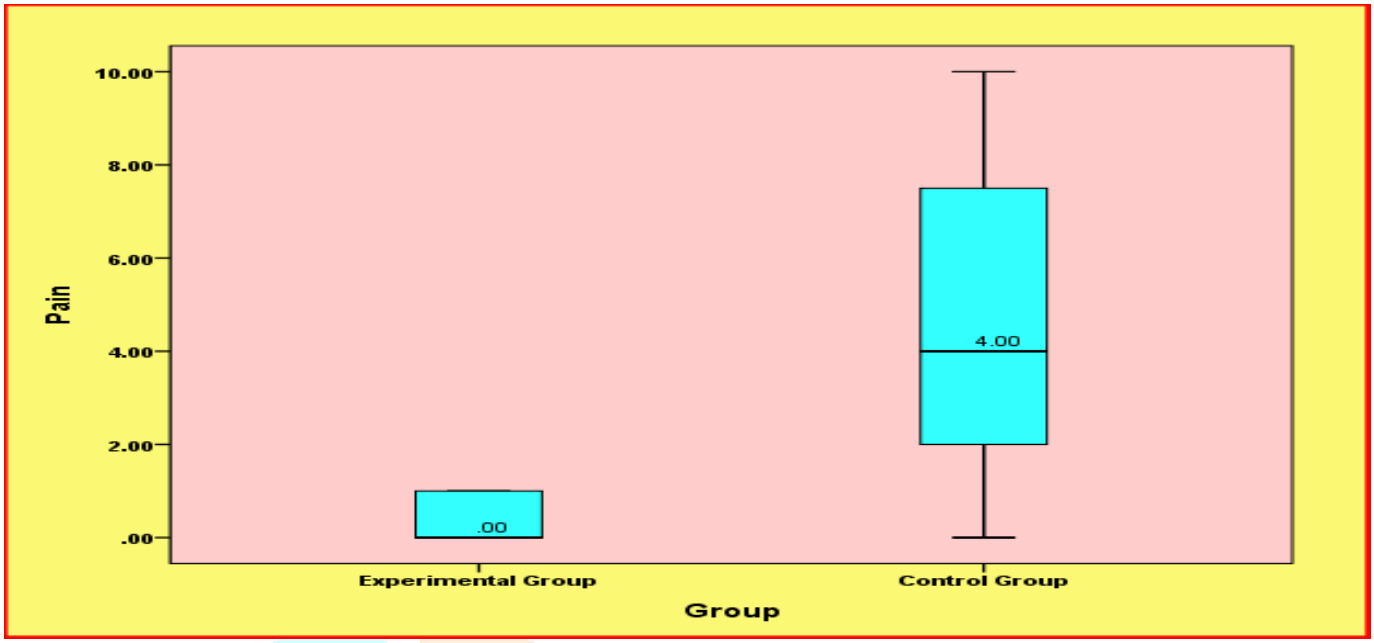

Figure 5: Boxplot showing the effectiveness of oral sucrose as analgesia for pain relief among pre-term and tern neonates during intravenous cannulation.

Figure 5: Indicates that out of the total sample, the median: experimental = 0 and control group = 4.0

SECTION-IV:

Table 2: Association of the post-test level of pain among of pre-term and term neonates during intravenous cannulation with their selected demographic variables in the experimental group.

n = 20

Demographic Variables	Relaxed		Mild		Moderate		Severe		Chi-Square & p-value
	F	%	F	%	F	%	F	%	
Age of the neonate									χ^2=3.165 d.f=3 p=0.367 N.S
0 days	7	35.0	1	5.0	0	0	1	5.0	
1 – 10 days	7	35.0	2	10.0	2	10.0	0	0	
10 – 20 days	-	-	-	-	-	-	-	-	
20 – 28 days	-	-	-	-	-	-	-	-	
Gender									χ^2=3.829 d.f=3 p=0.280 N.S
Male	5	25.0	1	5.0	2	10.0	0	0	
Female	9	45.0	2	10.0	0	0	1	5.0	
Gestational age in weeks									χ^2=20.871 d.f=6 p=0.002 S**
26 – 30	0	0	0	0	0	0	1	5.0	
31 – 36	10	50.0	2	10.0	2	10.0	0	0	
>37 weeks	4	20.0	1	5.0	0	0	0	0	
Education of mother									χ^2=4.253 d.f=9
Graduate	2	10.0	0	0	0	0	0	0	

Demographic Variables	Relaxed		Mild		Moderate		Severe		Chi-Square & p-value
	F	%	F	%	F	%	F	%	
Higher secondary	2	10.0	1	5.0	1	5.0	0	0	p=0.894 N.S
Primary	7	35.0	2	10.0	1	5.0	1	5.0	
Illiterate	3	15.0	0	0	0	0	0	0	
Occupation of mother									χ^2=2.941 d.f=3 p=0.401 N.S
Professional	5	25.0	2	10.0	0	0	0	0	
Unemployed	9	45.0	1	5.0	2	10.0	1	5.0	
Type of family									χ^2=2.937 d.f=3 p=0.402 N.S
Nuclear	6	30.0	1	5.0	0	0	1	5.0	
Joint	8	40.0	2	10.0	2	10.0	0	0	
Weight of the baby									χ^2=10.324 d.f=6 p=0.112 N.S
<2 kg	5	25.0	1	5.0	0	0	0	0	
2 – 3 kg	9	45.0	2	10.0	1	5.0	1	5.0	
3 – 4 kg	0	0	0	0	1	5.0	0	0	
Mode of delivery									χ^2=2.275 d.f=3 p=0.517 N.S
Vaginal birth	1	5.0	1	5.0	0	0	0	0	
Caesarean section	13	65.0	2	10.0	2	10.0	1	5.0	
Forceps									
Type of procedure									-
Blood sample collection	-	-	-	-	-	-	-	-	
I/V cannula insertion	14	70.0	3	15.0	2	10.0	1	5.0	
I/V injection	-	-	-	-	-	-	-	-	
Size of the needle									χ^2=5.965 d.f=3 p=0.113 N.S
28 gauge	0	0	1	5.0	0	0	0	0	
26 gauge	14	70.0	2	10.0	2	10.0	1	5.0	
24 gauge	-	-	-	-	-	-	-	-	

****p<0.01, S – Significant, N.S – Not Significant**

The data represent in table 2 shows that the demographic variable gestational age in weeks (χ^2=20.871, p=0.002) had shown statistically significant association with post test level of pain among of preterm and tern neonates during intravenous cannulation in the experimental group at p<0.01 level and the other demographic variables had not shown statistically significant association with post test level of pain among of preterm and term neonates during intravenous cannulation in the experimental group.

SECTION -V:

TABLE 3: Association of post-test level of pain among of pre-term and term neonates during intravenous cannulation with their selected demographic variable in the control group.

N=20

Demographic Variables	Relaxed		Mild		Moderate		Severe		Chi-Square & p-value
	F	%	F	%	F	%	F	%	
Age of the neonate									χ^2=10.278 d.f=6 p=0.113 N.S
0 days	2	10.0	1	5.0	4	20.0	2	10.0	
1 – 10 days	0	0	5	25.0	1	5.0	2	10.0	
10 – 20 days	0	0	0	0	1	5.0	2	10.0	
20 – 28 days	-	-	-	-	-	-	-	-	
Gender									χ^2=0.000 d.f=3 p=1.000 N.S
Male	1	5.0	3	15.0	3	15.0	3	15.0	
Female	1	5.0	3	15.0	3	15.0	3	15.0	
Gestational age in weeks									χ^2=4.722 d.f=3 p=0.193 N.S
26 – 30	-	-	-	-	-	-	-	-	
31 – 36	2	10.0	3	15.0	5	25.0	2	10.0	
>37 weeks	0	0	3	15.0	1	5.0	4	20.0	
Education of mother									χ^2=21.111 d.f=9 p=0.012 S*
Graduate	0	0	4	20.0	0	0	2	10.0	
Higher secondary	2	10.0	0	0	1	5.0	0	0	
Primary	0	0	1	5.0	1	5.0	0	0	
Illiterate	0	0	1	5.0	4	20.0	4	20.0	
Occupation of mother									χ^2=7.302 d.f=3 p=0.063 N.S
Professional	0	0	4	20.0	0	0	2	10.0	
Unemployed	2	10.0	2	10.0	6	30.0	4	20.0	
Type of family									χ^2=4.127 d.f=3 p=0.248 N.S
Nuclear	1	5.0	2	10.0	0	0	3	15.0	
Joint	1	5.0	4	20.0	6	30.0	3	15.0	
Weight of the baby									χ^2=9.017 d.f=6 p=0.173 N.S
<2 kg	0	0	0	0	3	15.0	1	5.0	
2 – 3 kg	1	5.0	6	30.0	2	10.0	4	20.0	
3 – 4 kg	1	5.0	0	0	1	5.0	1	5.0	
Mode of delivery									χ^2=4.095 d.f=6 p=0.664 N.S
Vaginal birth	0	0	1	5.0	2	10.0	2	10.0	
Caesarean section	2	10.0	5	25.0	3	15.0	4	20.0	
Forceps	0	0	0	0	1	5.0	0	0	
Type of procedure									-
Blood sample collection	-	-	-	-	-	-	-	-	
I/V cannula insertion	2	10.0	6	30.0	6	30.0	6	30.0	
I/V injection	-	-	-	-	-	-	-	-	

Demographic Variables	Relaxed		Mild		Moderate		Severe		Chi-Square & p-value
	F	%	F	%	F	%	F	%	
Size of the needle									
28 gauge	-	-	-	-	-	-	-	-	-
26 gauge	2	10.0	6	30.0	6	30.0	6	30.0	
24 gauge	-	-	-	-	-	-	-	-	

***p<0.05, S – Significant, N.S – Not Significant**

The data represent in table 3 shows that the demographic variable education of mother (χ^2=21.111, p=0.012) had shown statistically significant association with post test level of pain among of the pre-tern and term neonates during intravenous cannulation in the control group at p<0.05 level and the other demographic variables had not shown statistically association with post test of pain among of pre-tern and term neonates during intravenous cannulation in the control group.

DISCUSSION

Giving newborns a small amount of sugar before medical procedures helps make the pain less intense. This study aims to assess the effectiveness of oral sucrose as analgesia for pain relief among pre-term and term neonates undergoing intravenous cannulation in NICU at selected hospital Visakhapatnam

The administration of oral sucrose was effective in the reduction of pain relief among per-term and term neonates during intravenous cannulation. Majority 14(70%) of per-term and term neonates in experimental group experienced mild pain after administering oral sucrose solution, whereas majority 6(30%) of the pre-term and term neonates in control group had mild, moderate and severe discomfort or pain respectively. So oral sucrose should be used as supportive therapy for pain relief among per-term and term neonates undergoing intravenous cannulation.

The following objectives and hypothesis have been in relation to the study's finding:

The level of pain during intravenous cannulation among pre-term and term neonates.

To pre-term and tern neonates in experimental group oral solution was administered. As a result, among experimental group the majority of per-term and term neonates were relaxed and comfort, only few had mild discomfort and very small had sever discomfort or pain.

Determine the effectiveness of oral sucrose as analgesia for pain relief among per-term and term neonates during intravenous cannulation.

The findings in this study indicated that pain perception was comfortably less with oral sucrose solution than with usual procedure among pre-term and term neonates. So, oral sucrose solution prior to intravenous cannulation was effective in reducing pain perception among pre-term and term neonates. A similar study was conducted by Stevens a study was conducted on sucrose for analgesia in newborn infants undergoing painful procedures. Oral Sucrose is effective for reducing procedural pain from single events such as heel lance, venipuncture, intramuscular injections and others procedures among both preterm and term infants. No serious side effects has been documented with this intervention. (B et al., 2016) [..]

Association between post test score of pain among pre-term and term neonates with demographic variable.

The findings in this study indicated that the association between the score of post test and their demographic variable was inferred that there was no significant association between post test pain perception and selected demographic. So the administration of oral sucrose was independently effective in reducing pain perception among pre-term and term neonates during intravenous cannulation.

II. ACKNOWLEDGMENT

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