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ASSESS THE EFFECTIVENESS OF SENSORY NURSING INTERVENTIONS ON NEONATAL REFLEX AND REACTIVITY AMONG PRETERM INFANTS IN SELECTED SETTING, NAGERCOIL, K.K. DISTRICT

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ABSTRACT

Preterm birth is defined as childbirth occurring at less than 37 completed weeks or 259 days of gestation. Preterm birth is a global problem and evidently more than 60 % of preterm births occur in Africa and South Asia. In India preterm births is rising and presently around 21 % of babies were born preterm. Neonatal intensive care unit stimuli may interfere with brain development in premature infants and contribute to developmental delays. Statement of the Problem: A Quasi Experimental Study to Assess the Effectiveness of Sensory Nursing Interventions on Neonatal Reflex and reactivity among Preterm Infants in Selected Setting, Nagercoil, K.K District. A Quantitative Research Approach- Quasi experimental research design was adopted. The study was conducted on 125 each on study and control group. The investigator provided Sensory Nursing Intervention care on study group preterm infants along with routine hospital and control group was obtaining routine hospital care. Both the group was assessed with Modified Neonatal Reflex and Reactivity Scale. The study concludes that the comparison of improvement of neonatal reflex and reactivity between the study and control group subjects revealed the mean differences between the groups on neonatal reflex and reactivity on pretest through posttest 3 are 7.0, 1.2, 2.2 and 3.6 respectively. The differences of means were statistically very highly significant ($P<0.001$).

KEYWORDS: Preterm Infants, Sensory Nursing Intervention, Neonatal Reflex and Reactivity

INTRODUCTION

Preterm birth is defined as childbirth occurring at less than 37 completed weeks or 259 days of gestation. Late pre-term refers to infants born between 34 and 36 weeks of gestation.

An estimation states 15 million babies born worldwide were preterm that is almost one in 10 live births. About one million infants die on each year due to complications of preterm birth. Many preterm survivors face a lifetime disability, including learning disabilities, visual and hearing problems. (WHO, November 2015)

Preterm birth is a global problem and evidently more than 60 % of preterm births occur in Africa and South Asia. On average 12% of babies are born too early in low income countries compared with 9% in higher-income countries. (WHO, 2013)

In India preterm births is rising and presently around 21 % of babies were born preterm. States such as Goa,

Kerala and Manipur have infant and neonatal mortalities similar to that of developed nations, indicating advanced care of premature babies. Annually about 27 million babies were born in India, among them 3.6 million were born premature, of which 303,600 fail survival due to complications. (Indian Foundation of preterm babies, 2014).

The first and foremost of four weeks of neonatal period, is the transition time of infant from uterus to external environment, where the infant is supported entirely by the mother to independent existence. Early physical development during this transitional period includes physical growth, feeding development, brain, neuronal reflex behavior and early sensory capacity.

Preterm infant's neurodevelopment are proactively enhanced by avoidance of overstimulation, stress, pain, isolation, and deprivation. This can be enhanced by supporting the infant's self-regulatory competence through steady availability of reliable, consistent and familiar caregivers who supports the infant's foremost nurturers in initial transitional life.

In the intrauterine environment, rhythmic stimuli are provided by maternal activity, hormonal cycles, auditory, cutaneous and kinesthetic input through the amniotic fluid and sac. One of the common experiences for the fetus is the intermittent, regular exposure to the mother's voice. The maternal voice is minimally distorted and the intonation and melodic contour are identical to the external voice, factors critical for postnatal responsiveness to voice. These stimuli provide support for function and organization for the developing fetus.

Preterm infants have been noted to benefit from massage therapy. Massage therapy using moderate pressure showed weight gained of 31 % to 49% in average. Some studies have also shown length of preterm infants, head circumference and bone mineral density increases with massage therapy.

The rhythmic stimulation of movement and intermittent speech experienced during fetal development continues even after birth. The mother's regulatory role for system organization is significantly different for infants born prematurely than for term infants, because premature infants do not experience extended contact with their mothers early in life. Evidence exists that mother's voice can be an important positive stimulus for premature infants in the neonatal intensive care unit (NICU).

Normal sensory development requires stimulation during periods of rapid brain growth. Neurodevelopment processes evolve with consistent patterns of sensory input. A premature birth represents an abrupt change in experience for the infant's developing nervous system. In the NICU, sensory stimulation is not consistent, patterned or congruent with the types of stimulation that are required for normal neonatal development. Neonatal intensive care unit stimuli may interfere with brain development in premature infants and contribute to developmental delays.

In this study, the researcher decided to find the response of physiological parameter such as Neonatal Reflex and Reactivity of infants after Sensory Nursing Intervention by the mothers towards there preterm infants.

OBJECTIVES

- To assess the pre and post test level of neonatal reflex and reactivity among preterm infants in study and control group.

- To determine the effectiveness of sensory nursing interventions on neonatal reflex and reactivity among preterm infants.
- To associate the level of neonatal reflex and reactivity with their selected demographic variables in study and control group.

RESEARCH HYPOTHESIS

- **H_{01}:** There is significant difference in neonatal reflex and reactivity between pre test and post test in study and control group.
- **H_{02}:** There is significant difference in the neonatal reflex and reactivity among preterm infants between the study and control group.
- **H_{03}:** There is significant association between neonatal reflex and reactivity among preterm infants with demographic variables in study and control group.

METHODOLOGY

Quantitative Research Approach- Quasi experimental research design. The study was conducted at neonatal preterm ICU's at Government Medical College and Hospital, Asaripallam at Kanyakumari District. Necessary ethical approval was obtained. The sample consisted of 250 patients preterm infants between the gestational ages 34 to 36 weeks who fulfil the inclusion criteria were chosen for the study by using non probability convenient sampling technique. The tool used was demographic variable and neonatal parameters on Modified Neonatal Reflex and Reactivity Scale.

Section A

A semi structured interview based questionnaire was included to assess the background variables which consists of items related to demographic data of the mother and child such as; Maternal data (age, mother's educational status, occupation, parity, type of family), Neonatal data further categorized to demographic data (gender of baby, gestational weeks during birth) and Clinical (hemodynamic stability, type of birth, infant weight) data.

Section B

It consists of assessment of neonatal parameters on Modified Neonatal Reflex and Reactivity Scale.

Modified Neonatal Reflex and Reactivity Scale

Modified Neonatal Reflex and Reactivity Scale is with eleven items such as predominant state(pre intervention), consolability, startle, orient to auditory, speed of orient, orient to visual, follow visual stimulus, orient to tactile stimuli, orient to vestibular stimuli, predominant state (post intervention).

Scoring of Modified Neonatal Reflex and Reactivity Scale

The elements of modified neonatal reflex and reactivity scale are scored individually, minimum of score 1 was given for each element and predominant scores higher with high score 6, orient to visual stimulus 4 and other elements with 3 except startle with least high score 2. The total least score was 10 and total highest score was 36.

DATA COLLECTION PROCEDURE

- The ethical clearance of the study setting was obtained.
- Preterm infants who met inclusion criteria were selected through non probability convenient sampling technique in both control group and study group.
- Before approaching parents for informal consent, consent is obtained from the attending neonatologist confirming that the infant is medically stable and the consent was obtained from the mother.
- Control group infants was selected first and concern obtained from the mother, the control group preterm babies were getting routine hospital care during observational period and periodic assessment was done as per the study.
- Following Control Group, Study group infants were identified. A pre test was assessed and following the assessment study group preterm infants received 15 minutes of intervention twice daily for 5 days.
- The sensory nursing intervention was taught to study group preterm infant mothers and procedure was demonstrated. The preterm infant mothers were observed by the researcher while doing the intervention at hospital.
- The preterm infant's mother initiates directed talk through soothing voice (auditory stimulation) to her preterm infant and massages the preterm infant for 10 minutes (tactile stimulation) following massage a 5 minutes of horizontal rocking (vestibular stimulation) was performed. Throughout the 15-minute period, the mother engages eye contact with the preterm infant (visual stimulation).
- If an infant exhibited negative disengagement cues such as hiccoughing, finger play, crying, fussing, or spitting/vomiting during the intervention, that part of the technique was discontinued and the next portion of the technique was attempted.
- Intervention was initiated 1 hour before the next scheduled feeding.
- The parameter, Modified Neonatal Reflex and Reactivity Scale was assessed before and after sensory nursing intervention on Day 1^{st}, 6^{th}, 18^{th} and 30^{th} of procedure.
- Study group preterm infant mothers maintained diary every time after demonstrating sensory nursing intervention and was observed by researcher.
- The study group preterm infant mothers performed sensory nursing intervention till late neonate period (28 days) and maintained daily diary on intervention and progress on babies.
- The day of discharge is noted for both study and control group

Table 1

Age of New Born (in days)	Sensory nursing intervention	
	Morning	Evening

RESULTS

In both study and control groups the maximum proportions (63.2 % and 64.4 %) of mothers were in the age bracket of 25-29 years. Regarding educational status of preterm mothers 37.6% were secondary school and 34.4 % were graduates in study group whereas 45.6% and 48.8 % of preterm mothers had attained secondary and graduates in control group respectively. The house wife / Unemployed were 68.8 % in study group and 88.0 % in control group. In both groups the joint family contributions were 64 % and 76 % respectively. Regarding the parity of mother 64 % and 68 % of subjects were study and control group respectively.

The mean age of mothers in both group were 27.7± 3.3 years and 26.9±3.2 years and were not differed significantly (P>0.05). The assessment mean ages of the two groups were also not significantly different (P>0.05).

The study group subjects had attained 100 % Neonatal Reflex and Reactivity at 4th assessment. Regarding Neonatal Reflex and Reactivity attainment by control group was 30-40 scores in the final assessment.

The improvements of Neonatal Reflex and Reactivity between the two groups were gradually increasing from preterm assessment through post test assessment. At the final assessment all the study group subjects had got 36 score without any deviation. The control group got only 32.4±1.1 scores. The betterment of study group than the control group was credited to the Sensory Nursing Intervention.

All the demographic characteristics of mothers and preterm infants were not associated with Neonatal Reflex and Reactivity in both study and control groups.

The first objective of the study was to assess the pre and post test level of neonatal reflex and reactivity among preterm infants in study and control group.

The parameter, Neonatal Reflex and reactivity were assessed between study and control groups in pre test and post tests.

Table 2: Frequency and Percentage Distribution of Pre and Post Test Level of Neonatal Parameter (Neonatal Reflex and Reactivity) among Preterm Infants in Study Group and Control Group: N= 250

Neonatal Reflex and Reactivity	Study Group as Per Assessment N-125								Control Group as Per Assessment N=125							
	Pretest		Post Test 1		Post Test 2		Post Test 3		Pretest		Post Test 1		Post Test 2		Post Test 3	
Scores	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
10 to 20	117	93.6	0	0	0	0	0	0	118	94.4	12	9.6	0	0	0	0
20 to 30	8	6.4	87	69.6	0	0	0	0	7	5.6	113	90.4	125	100	0	0
30 to 40	0	0	38	30.4	125	100	125	100	0	0	0	0	0	0	125	100

In the above table describes the assessment of Neonatal Reflex and Reactivity. In pre test assessment, both study and control group attained highest score between 10 to 20. Post test assessment showed steep improvement in neonatal

reflex and reactivity in study group preterm infants with 100 % highest score in post test 3. Whereas control group preterm infants attained 100 % highest score in post test 4.

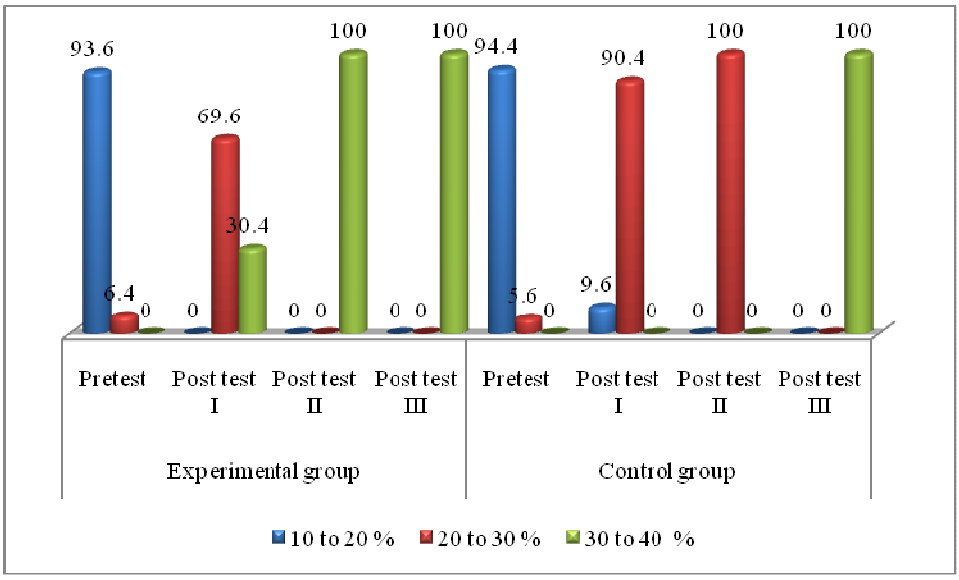

Figure 1: Bar Diagram Depicts Frequency and Percentage Distribution of Pre and Post Test Level of Neonatal Parameter (Neonatal Reflex and Reactivity) among Preterm Infants in Study Group and Control Group

The second objective of the study was to determine the effectiveness of sensory nursing interventions on neonatal reflex and reactivity among preterm infants in study group.

Table 3: Comparison of Neonatal Reflex and Reactivity within the Study Group Preterm Infants N=250

Neonatal Parameter	Time of Assessment	From		TO		Improvement		"t"	df	Significance
		Mean	SD	Mean	SD	Mean	SD			
Modified Neonatal Reflex And Reactivity	Pretest to Post test 1	16.6	2.7	28.9	1.6	12.3	2.5	54.303	124	P<0.001 S = ***
	Post test 1 to Post test 2	28.9	1.6	33.4	1.3	4.5	2.0	24.889	124	P<0.001 S = ***
	Post test 2 to post test 3	33.4	1.3	36.0	0.0	2.6	1.3	22.271	124	P<0.001 S = ***
	Pretest and Post test 3	16.6	2.7	36.0	0.0	19.4	2.7	81.010	124	P<0.001 S = ***

P <0.001= ***very highly significant

The table shows neonatal parameters within the study group. The modified neonatal reflex and reactivity was assessed from pre test assessment through post test 3 assessments. The mean improvements of the neonatal reflex and reactivity from pre test to post test 3 assessments, post test 1 to post test 2 assessments, post test 2 to post test 3 and pre test to post test 3 assessments were 12.3±2.5, 4.5±2.0, 2.6±1.3 and 19.4± 2.7 respectively. The Neonatal Reflex and Reactivity improvements pre test through post test 4 and was statistically very highly significant (P<0.001).

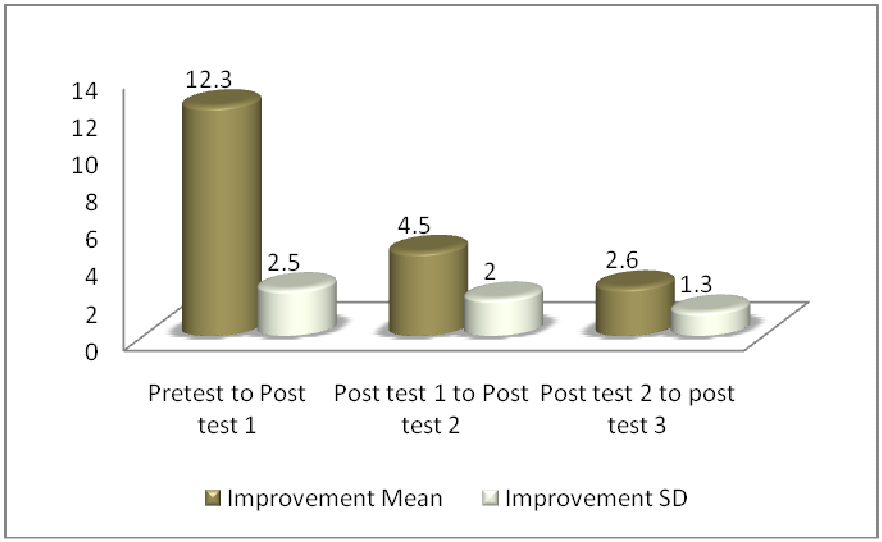

Figure 2: Bar Diagram Depicts Comparison of Neonatal Reflex and Reactivity within the Study Group Preterm Infants

Table 4: Comparison of Mean and Standard Deviation of Neonatal Reflex and Reactivity within the Control Group Preterm Infants. N=250

Neonatal Parameters	Time of Assessment	From		TO		Improvement		"t"	df	Significance
		Mean	SD	Mean	SD	Mean	SD			
Modified Neonatal Reflex And Reactivity	Pretest to Post test 1	16.6	2.4	22.0	2.4	5.4	2.8	21.003	124	P<0.001 s = ***
	Post test 1 to Post test 2	22.0	2.4	27.7	1.0	5.7	2.6	24.678	124	P<0.001 s= ***
	Post test 2 to post test 3	27.7	1.0	32.4	1.1	4.7	1.5	35.464	124	P<0.001 s = ***
	Pretest and Post test 3	16.6	2.4	32.4	1.1	15.8	2.7	65.719	124	P<0.001 s = ***
Feeding Progress	Pretest to Posttest	6.1	1.5	17.0	1.7	10.9	2.3	52.562	124	P<0.001 s = ***

P <0.001= ***very highly significant

The table shows neonatal parameters within control group. The mean improvements of the activities from pre test to post test 2 assessments, post test 2 to post test 3 assessment, post test 3 to post test 4 and pre test to post test 4 assessments were 5.4±2.8, 5.7±2.6, 4.7±1.5 and 15.8± 2.7 respectively. The Neonatal reflex and reactivity improves pre test through post test 4 and pre test to post test 4 assessments were statistically very highly significant (P<0.001).

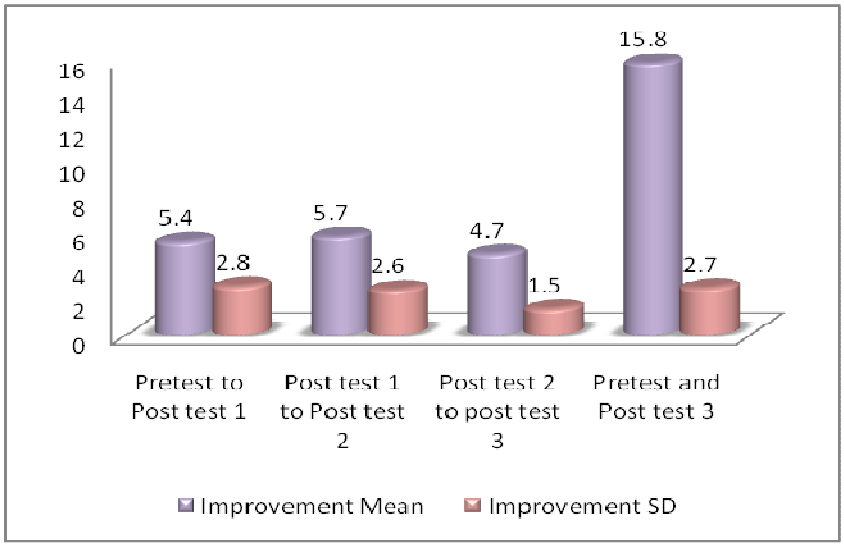

Figure 3: Bar Diagram Depicts Comparison of Neonatal Reflex and Reactivity within the Control Group Preterm Infants

Table 5: Comparison of Mean and Standard Deviation of Selected Neonatal Reflex and Reactivity among Preterm Infants between Study and Control Group. N=250

Neonatal Parameter	Time of Assessment	Study N=125		Control N=125		Difference between improvement	"t"	df	Significance
		Mean	SD	Mean	SD				
Modified Neonatal Reflex And Reactivity	Pretest to Post test 1	12.3	2.5	5.4	2.8	7.0	20.458	248	P<0.001 S = ***
	Post test 1 to Post test 2	4.5	2.0	5.7	2.6	1.2	4.028	248	P<0.001 s = ***
	Post test 2 to post test 3	2.6	1.3	4.7	1.5	2.2	12.249	248	P<0.001 s = ***
	Pretest and Post test 3	19.4	2.7	15.8	2.7	3.6	10.757	248	P<0.001 s = ***

P <0.001= ***very highly significant

The comparison of improvement of neonatal reflex and reactivity between the study and control group subjects revealed the mean differences between the groups on neonatal reflex and reactivity on pretest through posttest 3 are 7.0, 1.2, 2.2 and 3.6 respectively. The differences of means were statistically very highly significant (P<0.001).

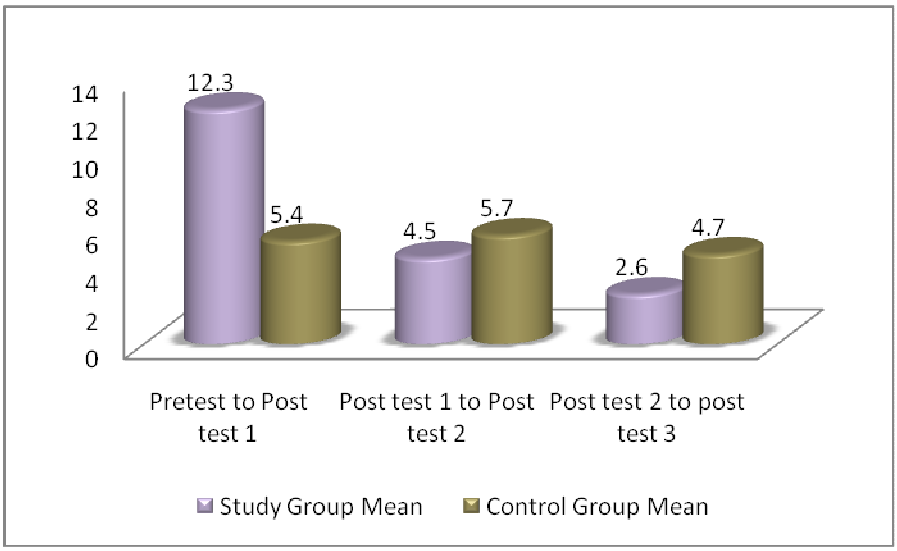

Figure 4: Bar Diagram Depicts Comparison of Mean and Standard Deviation of Selected Neonatal Reflex and Reactivity among Preterm Infants between Study and Control Group

The third objective of the study was to associate the level of neonatal reflex and reactivity with their selected demographic variables in study and control group.

The demographic characteristics of study subjects of study groups were associated with their pre test assessment neonatal statistic and outcome such as age, occupation, education, type of family and parity of mother and gestational age, birth and sex of neonatal.

Table 6: Association between Level of Neonatal Parameters (Neonatal Reflex and Reactivity) with their Selected Demographic Variables in Study and Control Group. N=250

Sl. No	Demographic Variables	Study Group (N =125)				Control Group (N = 125)			
		≤ Med	>Med	Total	Result	≤ Med	>Med	Total	Result
I	**MATERNAL DATA**								
1	**Maternal Age (in yrs)**								
	20-29	47	47	94	$\chi^2 = 0.024$	66	39	105	$\chi^2 = 3.634$
	30-39	16	15	31	df = 1	8	12	20	df = 1
	Total	**63**	**62**	**125**	**P>0.05 s=ns**	**74**	**51**	**125**	**P>0.05 s=ns**
2	**Educational Status**								
	Non Educated	2	0	2	$\chi^2 = 6.633$	-	-	-	$\chi^2 = 0.018$
	Primary school Education	13	20	33	df = 3	4	3	7	df = 2
	Secondary school Education	29	18	47	P>0.05 s=ns	34	23	57	P>0.05 s=ns
	Degree and above Education	19	24	43		36	25	61	
	Total	**63**	**62**	**125**		**74**	**51**	**125**	
3	**Occupation**								
	Skilled	11	11	22	$\chi^2 = 0.708$	7	2	9	$\chi^2 = 6.060$

Table 6: Contd.,									
	Non Skilled	7	10	17	df = 2	6	0	6	df =2
	House wife/ unemployed	45	41	86	P>0.05 s=ns	61	49	110	P<0.05 s=ns
	Total	**63**	**62**	**125**		**74**	**51**	**125**	
4	**Type of Family**								
	Nuclear	22	23	45	$\chi^2 = 0.064$	20	10	30	$\chi^2 = 0.911$
	Joint	41	39	80	df = 1	54	41	95	df = 1
	Total	**63**	**62**	**125**	**P>0.05 s=ns**	**74**	**51**	**125**	**P>0.05 s=ns**
5	**Parity**								
	Primi	42	38	80	$\chi^2 = 0.412$	55	30	85	$\chi^2 = 4.292$
	Second Delivery	19	22	41	df = 2	19	20	39	df =2
	Third (or) above	2	2	4	P>0.05 s=ns	0	1	1	P>0.05 s=ns
	Total	**63**	**62**	**125**		**74**	**51**	**125**	
II	**NEONATAL DATA**								
6	**Gender**								
	(i) Male	27	25	52	$\chi^2 = 0.083$	39	35	74	$\chi^2 = 3.170$
	(i) Female	36	37	73	df = 1	35	16	51	df = 1
	Total	**63**	**62**	**125**	**P>0.05 s=ns**	**74**	**51**	**125**	**P>0.05 s=ns**
7	**Gestational Weeks During Birth**								
	Babies born between 34 to 35 weeks of gestation	25	44	69	$\chi^2 = 0.478$	48	30	78	$\chi^2 = 0.066$
	Babies born between 35 to 36 weeks of gestation	17	39	56	df = 1	30	17	47	df = 1
	Total	**63**	**62**	**125**	**P>0.05 s=ns**	**74**	**51**	**125**	**P>0.05 s=ns**
III	**CLINICAL DATA**								
8	**Type of Birth**								
	Normal vaginal delivery	35	32	67	$\chi^2 = 0.195$	41	26	67	$\chi^2 = 0.238$
	Caesarean Birth	28	30	58	df = 1	33	25	58	df = 1
	Total	**63**	**62**	**125**	**P>0.05 s=ns**	**74**	**51**	**125**	**P>0.05 s=ns**

P <0.001= ***very highly significant, ns = P >0.05- no significant, s = P <0.05-significnt

The table describes the association between demographic variables such ages, education, occupation, parity of preterm infant mothers and their type of family with Neonatal Reflex and Reactivity of preterm infants. Similarly genders, type of birth, gestational week on birth of preterm infants were also been associated with neonatal reflex and reactivity. On pre test assessment there was no significant association mentioned between demographic variable and Neonatal Reflex and Reactivity of preterm infants on both study and control group (P>0.05) were not significant.

CONCLUSIONS

The effectiveness of Sensory Nursing Intervention was analyzed and interpreted by measuring the Neonatal Reflex and Reactivity scores of the babies. The Neonatal Reflex and Reactivity of post test 1st, 2nd and 3rd assessments were

compared with the pre test assessment in study and control groups. The assessments were made on the 1st day, 6th day, 18th day and 30th day. The above statistics were compared within the groups to assess the improvement of Sensory Nursing Intervention and its effectiveness and was also compared between the study and control groups of the respective statistics. The study group subjects had attained cent % Neonatal Reflex and Reactivity at 4th assessment. Regarding Neonatal Reflex and Reactivity attainment by control group was 30-40 scores in the final assessment.

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