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Effectiveness of auditory, kinesthetic and tactile (AKTS) stimulation on physiological, neurobehavioral parameters among Preterm Babies

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Abstract
Newborns are the most vulnerable population in the world over. Quantitative approach with true experimental design was adopted to effectiveness of auditory, kinesthetic and tactile (akts) stimulation on physiological, neurobehavioral parameters among preterm babies. Randomization had been done in selected study samples of 150 preterm babies.The required 75 experimental group study samples and 75 control group study samples had been selected. Pre test was done to preterm neonates in both the control and experimental groups soon after the selection by using questionnaire to obtain Demographic variables, observational tool to assess the physiological parameters and Morgan's neonatal neurobehavioral Examination Scale on first day of life. Experimental group received interventional package of Auditory Stimulation, Kinesthetic Stimulation and Tactile Stimulation. This interventions were administered for the duration of 30 minutes 3 times a day daily for 10 days. Posttest was done by using same questionnaire on 10th day. The control group received the Routine Hospital Care.Statistical value showed that significant difference between the pre and post test score of physiological and neurobehavioural parameters.

Keywords: Preterm, Physiological, Neurobehaviural

Introduction
Preterm or babies born too early, less than 37 weeks gestation, are particularly at risk. Currently, prematurity is the leading cause of death among children under five around the world, and a leading cause of disability and ill health later in life.
Touch is a primary form of human communication and stimulation programs of various kinds influence long term developmental outcome of premature babies through improved neurophysiologic maturation and growth (Liaw, 2015; Lindrea & Stanton, 2015).
15 million preterm babies each year and rising 1.1 million babies die from preterm complications, 5 to 18 % is the range of preterm birth rates (per 100 live births) across 184 countries of the world. 75 % of deaths of premature babies could be prevented by feasible, cost effective nursing care.
Fostering successful oral feeding in preterm neonates requires consistently high levels of skilled nursing care, which must begin with accurate assessment of feeding readiness and thoughtful progression to full oral feeding (Mcgrath& Braescu, 2004).
Hence, facilitating oral feeding skills and helping preterm newborns transit to full oral feeding are a key focus for the nursing staff of neonatal intensive care units. Nurses can play a vital role on enhancing oral feeding skills through Auditory Stimulation, Kinesthetic Stimulation and Tactile Stimulation during preterm newborn routine care. Henceforth this study will be conducted to examine the effect of interventional package on Physiological, Neurobehavioral parameters among Preterm.

Statement of the problem
A study to assess the effectiveness of Interventional package on physiological, neurobehavioral parameters among Preterm babies admitted in NICU in selected Hospital at Erode

Objective
1. To determine the effectiveness of Interventional package on physiological and neurobehavioral parameters among preterm babies in experimental and control group

Hypotheses
H1: There is a significant difference in effectiveness of Interventional package on physiological and neurobehavioral parameters among preterm babies in experimental and control group
H2: There is a significant association between pre test scores of physiological and neurobehavioral parameters among preterm babies in experimental and control group and their demographic variables

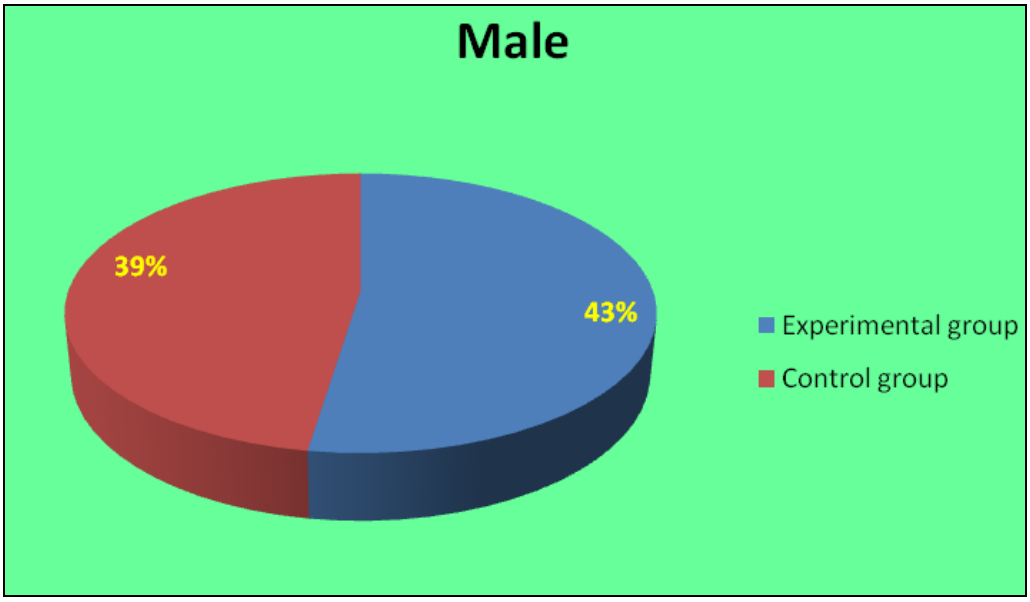
Methodology
The research approach adopted was an quantitative approach with true experimental design. In this study, all the preterm neonates who got admission in NICU who fulfilled the inclusion criteria were selected. Randomization had been done in selected study samples of 150 preterm babies.
Initially tossing a coin had been done to select the first study sample group allocation. Head had been assigned to the experimental group and Tail had been assigned to control group. Since head came while tossing the coin, first study sample was randomly allocated to the experimental group and the subsequent second study sample was allocated to the control group simultaneously. This alternate random assignment of study subjects was continued till the required sample size of 150 was reached. Thus the required 75

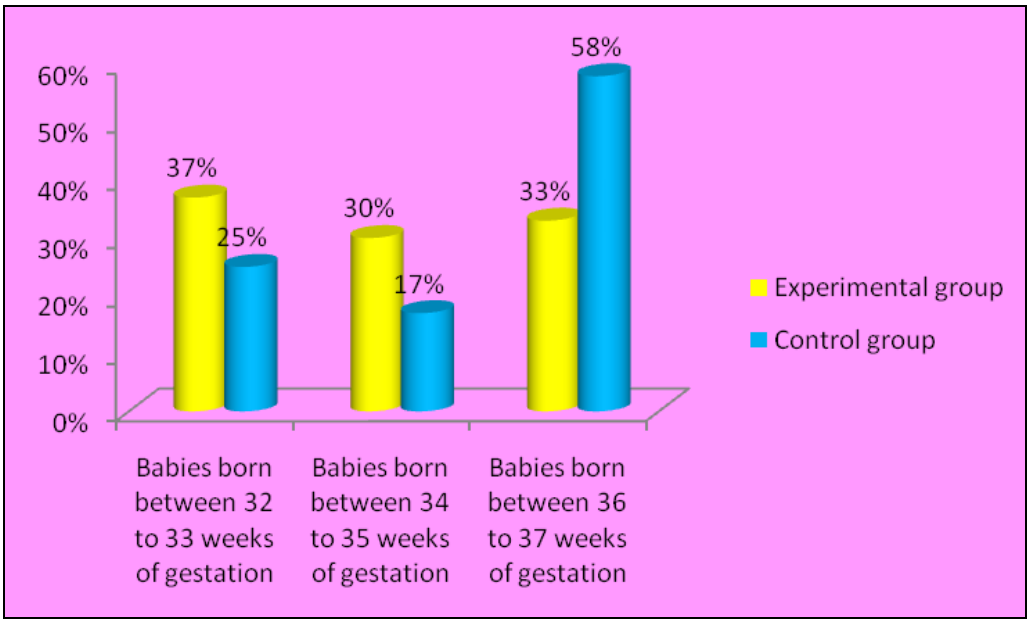
experimental group study samples and 75 control group study samples had been selected.

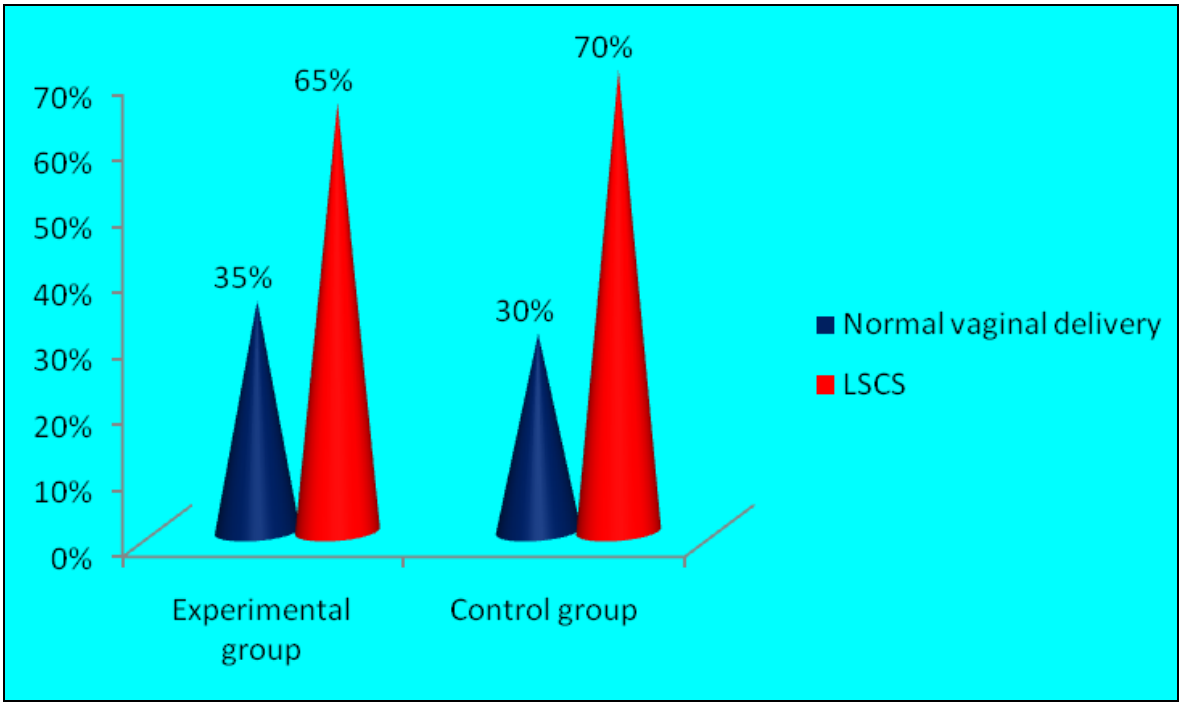
Pre test was done to preterm neonates in both the control and experimental groups soon after the selection by using questionnaire to obtain Demographic variables, observational tool to assess the physiological parameters and Morgan's neonatal neurobehavioral Examination Scale on first day of life. Experimental group received interventional package of Auditory Stimulation, Kinesthetic Stimulation and Tactile Stimulation.This interventions were administered for the duration of 30 minutes 3 times a day daily for 10 days. Posttest was done by using same questionnaire on 10th day. The control group received the Routine Hospital Care.

Results and Discussion

Demographic Variables (Newborn)		Experimental group		Control group	
		Frequency	%	Frequency	%
Gender	Male	32	43	29	39
	Female	43	57	46	61
Gestational Age at Birth	Babies born between 32 to 33 weeks of gestation	28	37	19	25
	b. Babies born between 34 to 35 weeks of gestation	22	30	13	17
	c. Babies born between 36 to 37 weeks of gestation	25	33	38	58
Mode of Delivery	Normal Vaginal Delivery	26	35	22	30
	LSCS	49	65	53	70
Birth Order	a) 1stbaby	42	56	38	50
	b) 2ndBaby	21	28	26	35
	c) 3rdBaby	12	14	11	15







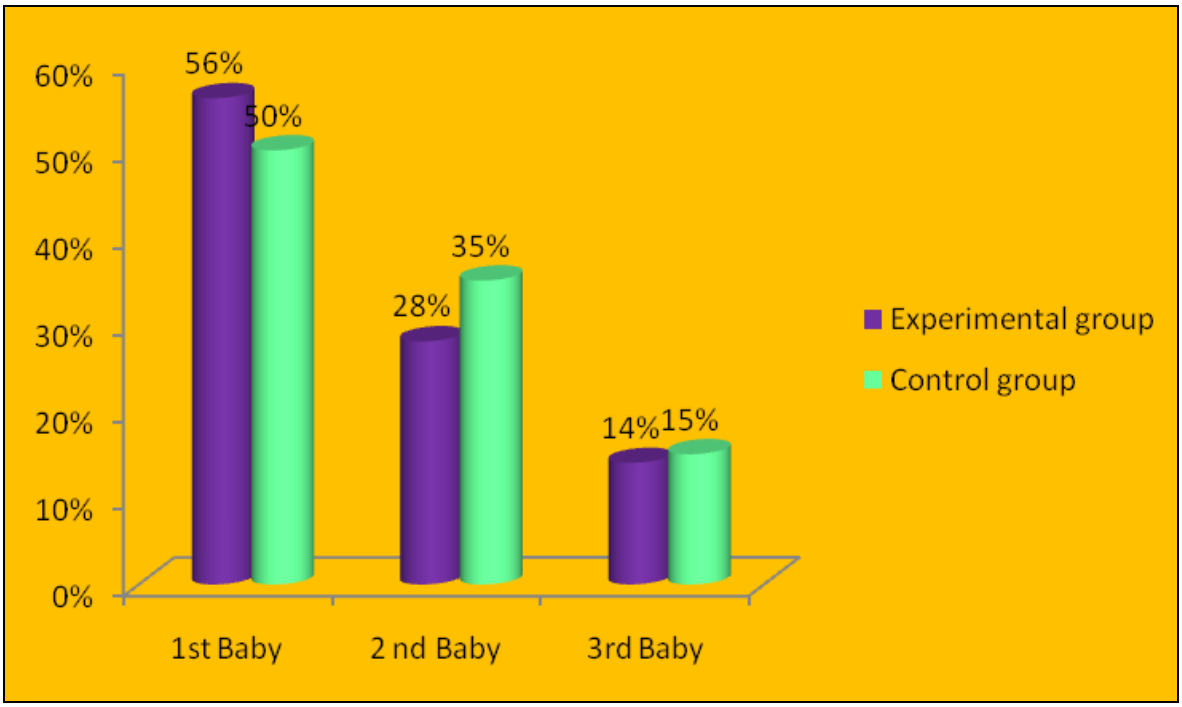
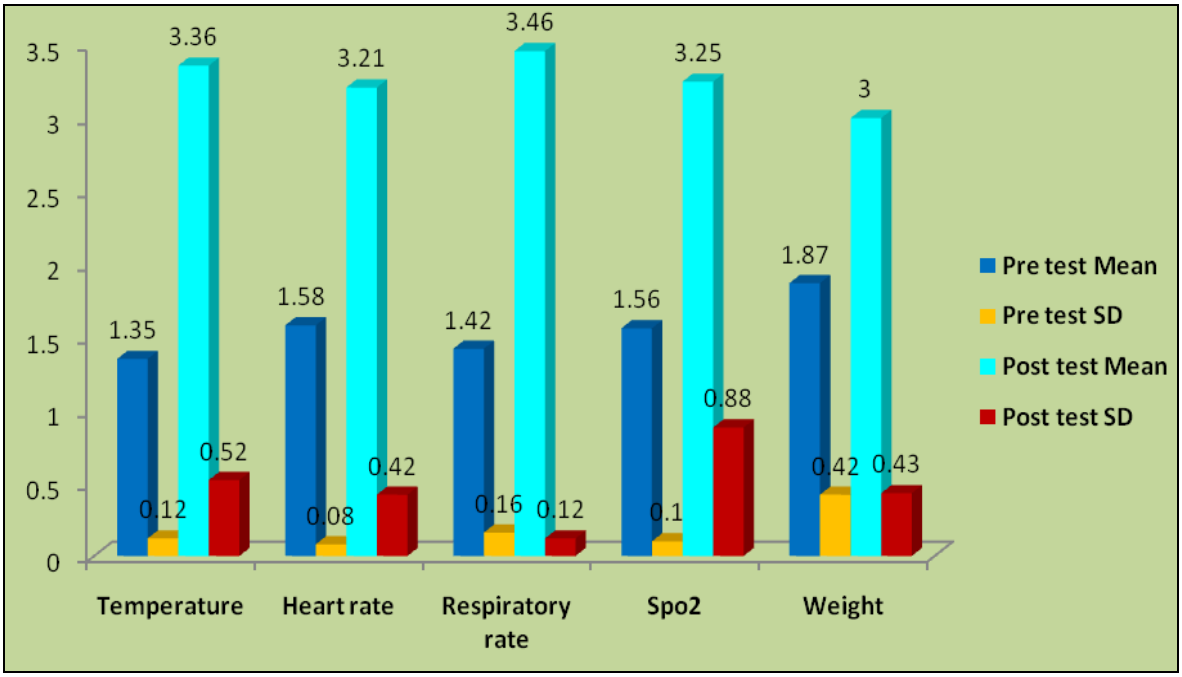


Table 1: Comparison of mean, SD, mean% of pretest and posttest level of Physiological parameters among experimental and control group.

Physiological parameters	Max scores	Experimental Group						Control Group						Difference in Mean percentage
		Pretest			Posttest			Pretest			Posttest			
		Mean	SD	Mean %	Mean	SD	Mean %	Mean	SD	Mean %	Mean	SD	Mean %	
Temperature (F)	4	1.35	0.12	34	3.36	0.52	84	1.85	0.12	46	2.8	0.52	70	14
Heart Rate (per min)	4	1.58	0.08	40	3.21	0.42	80	1.96	0.87	49	2.91	0.75	73	13
Respiratory Rate (per min)	4	1.42	0.16	36	3.46	0.12	86	1.52	0.11	38	3.01	0.57	75	9
Spo2	4	1.56	0.10	39	3.25	0.88	81	1.47	0.12	37	2.8	0.52	70	11
Weight	4	1.87	0.42	47	3.00	0.43	75	1.51	0.52	38	2.4	0.91	60	15
Total	20	7.52	1.88	38	17.2	0.99	86	6.52	0.26	33	12.1	1.22	61	25

Table 1 shows that, The total mean score in experimental group improved in posttest (17.2) compared to pre test mean score (7.52)

Experimental group



Control group

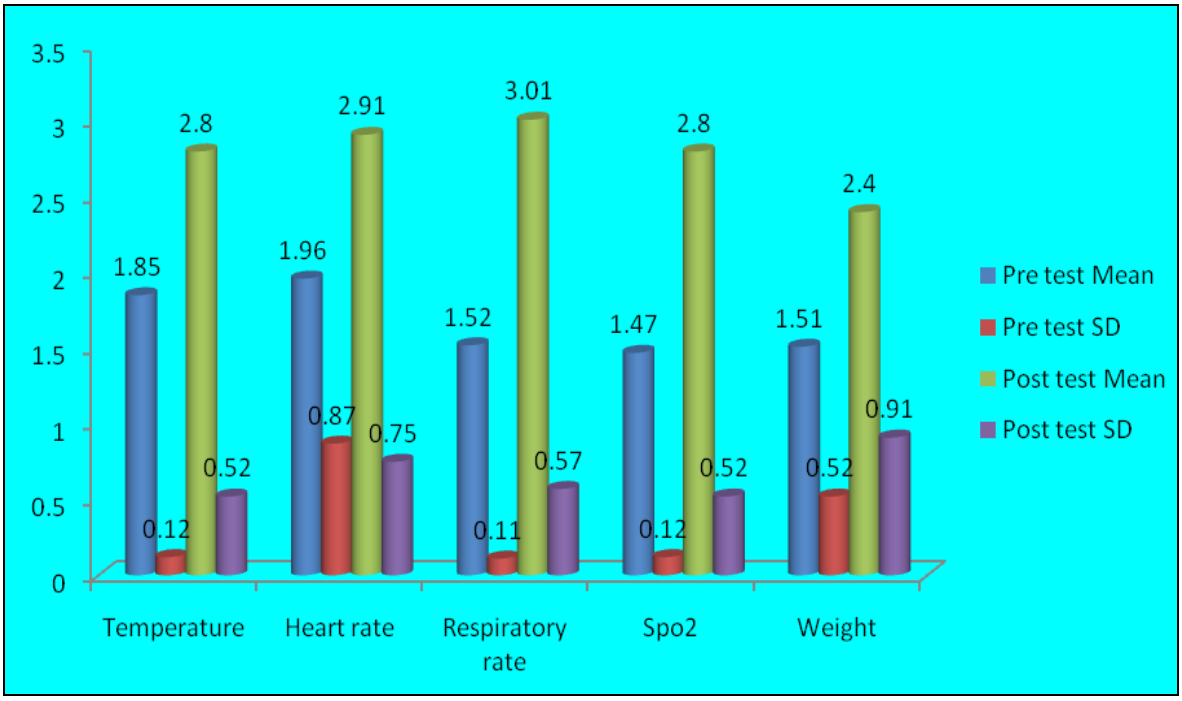
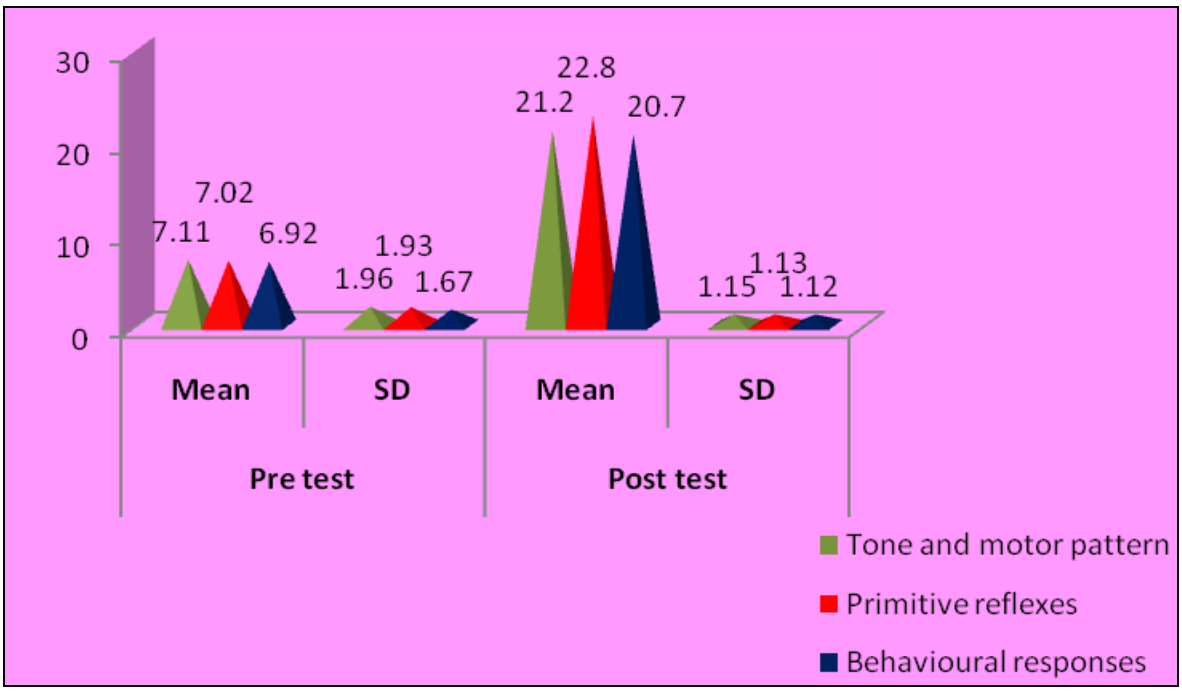


Table 2: Comparison of mean, SD, mean% of pretest and posttest level of Neuro behavioural Parameters among experimental and control group.

Neuro behavioural Parameters	Max scores	Experimental Group						Control Group						Difference in mean %
		Pretest			Posttest			Pretest			Posttest			
		Mean	SD	Mean %	Mean	SD	Mean %	Mean	SD	Mean %	Mean	SD	Mean %	
Tone and motor pattern	27	7.11	1.96	26	21.2	1.15	79	8.03	1.03	29	14.9	0.09	55	24
Primitive reflexes	27	7.02	1.93	26	22.8	1.13	84	7.44	1.44	28	15.2	0.19	56	32
Behavioural responses	27	6.92	1.67	26	20.7	1.12	77	7.83	0.83	29	16.3	0.33	60	17
Total	81	16.8	1.54	20	63.8	1.15	79	14.7	1.07	18	42.6	0.46	53	26

Table 2 shows that, The total mean score in experimental group improved in posttest (63.8) compared to pre test mean score(16.8).

Experimental group



Control group

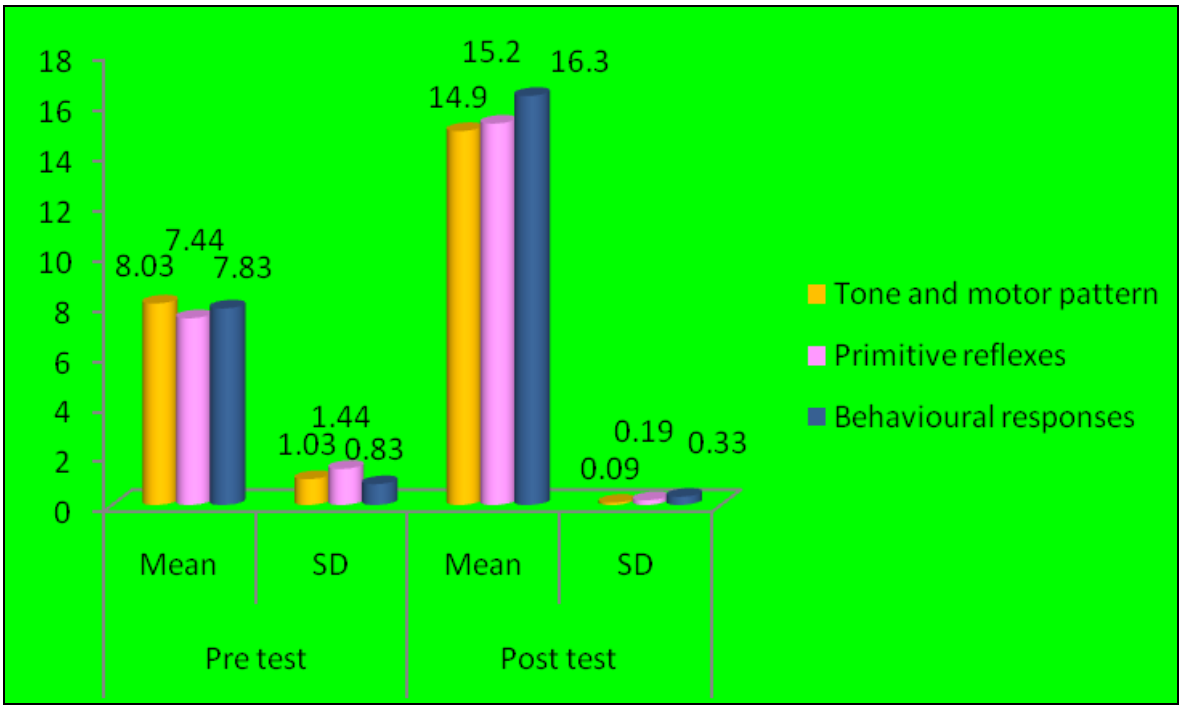


Table 3: Paired t test value of pre and post test scores of Physiological parameters among experimental and control group.

Physiological parameters	Experiment group	Control group	Table value	Level of significance P < 0. 005
Temperature (F)	10.11	5.21	2.64	Significant
Heart Rate (per min)	11.02	5.18	2.64	Significant
Respiratory Rate (per min)	12.92	6.77	2.64	Significant
Spo2	11.78	5.38	2.64	Significant
Weight	10.65	6.14	2.64	Significant
Total	14.55	6.49	2.64	Significant

Table 3 shows that, The Paired t- test value of level of Physiological parameters among experimental group showed statistical significance(t=14.55) than the control group (6.49).

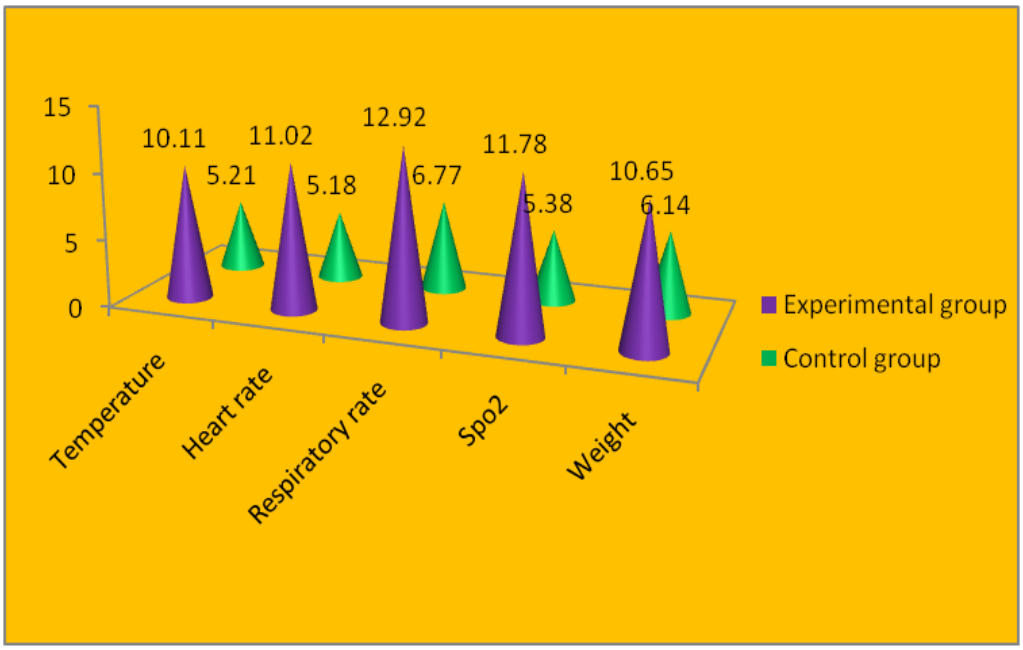


Table 4: Paired t test value of pre and post test scores of neuro behavioural parameters among experimental and control group.

Preterm Babies	Experiment group	Control group	Table value	Level of significance P < 0. 005
Tone and motor pattern	10.11	5.14	2.64	Significant
Primitive reflexes	11.02	6.77	2.64	Significant
Behavioural responses	10.92	5.38	2.64	Significant
Total	14.78	5.18	2.64	Significant

Table 4 shows that, The Paired t- test value of Neuro behavioural parameters among experimental group showed statistical significance(t=14.78) than the control group (5.18).

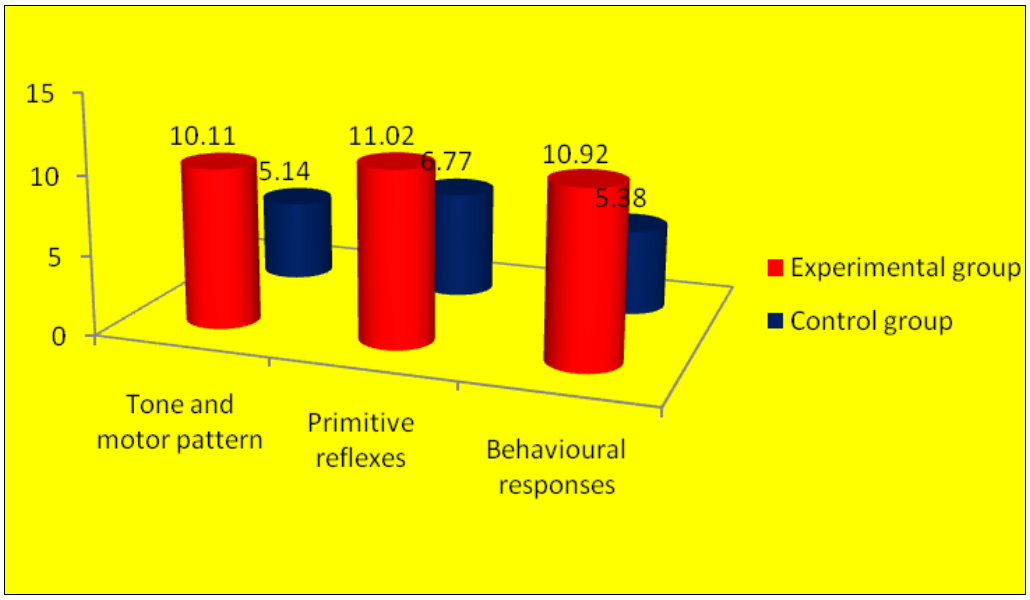


Table 5: Effectiveness of interventional package on level of Physiological & Neuro behavioural parameters between experimental and control group.

Preterm Babies	Physiological Parameters			Neuro behavioural parameters		
	Unpaired 't' test value	Table value	Level of significance	Unpaired 't' test value	Table value	Level of significance P < 0. 005
Experimental Group	9.42	2.87	Significant	5.01	2.87	Significant
Control Group						

Table 5 shows that, The UnPaired t- test value of Physiological parameters (9.42) and Neuro behavioural parameters (5.01) showed statistical significance. Hence the research hypothesis was accepted.

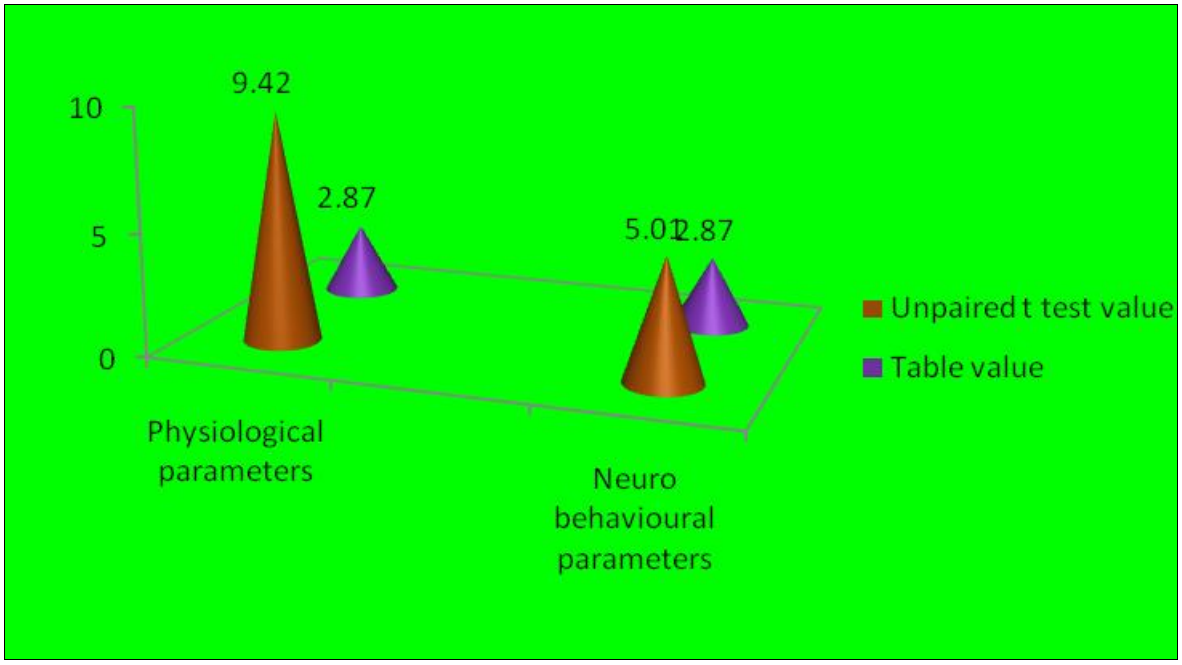


Table 6: Association between posttest levels of Physiological and Neuro behavioral parameters and selected demographic variables in experimental group.

Demographic variables	DF	Chi-square value		Table value	Level of significance P < 0. 005
		Physiological	Neuro behavioral		
Age	1	5.0	5.48	3.84	Significant
Educational status	2	2.27	1.45	5.99	Not Significant
Occupation	1	0.33	1.59	3.84	Not Significant
Type of family	1	2.86	1.85	3.84	Not Significant
Parity	2	1.66	2.01	5.99	Not Significant
Gender	1	1.40	1.86	3.84	Not Significant
Gestational age at birth	2	6.48	6.05	5.99	Significant
Mode of Delivery	1	4.56	5.02	3.84	Significant
Birth order	1	2.27	1.73	3.84	Not Significant

Table 6 shows that, There was a significant association found between the posttest levels of physiologic and neurobehavioural parameters with their demographic variables of age, gestational age at birth and mode of delivery in experimental group.

Table 7: Association between posttest levels of Physiological and Neuro behavioral parameters and selected demographic variables in control group.

Demographic variables	DF	Chi-square value		Table value	Level of significance P < 0. 005
		Physiological	Neuro behavioral		
Age	1	4.82	4.91	3.84	**Significant**
Educational status	2	0.26	1.27	5.99	Not Significant
Occupation	1	0.21	1.72	3.84	Not Significant
Type of family	1	0.42	0.95	3.84	Not Significant
Parity	2	0.44	1.52	5.99	Not Significant
Gender	1	0.40	2.10	3.84	Not Significant
Gestational age at birth	2	6.23	6.12	5.99	Significant
Mode of Delivery	1	0.26	1.02	3.84	Not Significant
Birth order	1	0.21	0.85	3.84	Not Significant

Table 7 shows that, There was a significant association found between the posttest levels of physiologic and neurobehavioural parameters with their demographic variables of age and mode of delivery in control group.

Conclusion

In experimental group 83 % were 25-30 years, 40% had secondary Education, 56 % mothers were house wife, about type of family 57 % were nuclear family and 65 % mothers were primi mothers.

In control group 79 % were 25-30 years, 51% had secondary Education, 84 % mothers were house wife, about type of family 61 % were nuclear family and 69 % mothers were primi mothers.

In experimental group 57 % were female, 37% were born between 32-33weeks, 65 % mothers were underwent LSCS, and about birth order 56 % were first birth. In control group 61 % were female, 58% were born between 36-37weeks, 70 % mothers were underwent LSCS, and about birth order 50 % were first birth.

The Paired t- test value of level of Physiological parameters among experimental group showed statistical significance(t=14.55) than the control group (6.49). The Paired t- test value of Neuro behavioural parameters among

experimental group showed statistical significance(t=14.78) than the control group (5.18).The UnPaired t- test value of Physiological parameters (9.42) and Neuro behavioural parameters (5.01) showed statistical significance. Hence the research hypothesis was accepted.

Recommendations

1. The study can be extended to assess the growth and development of children who received Tactile and Kinesthetic stimulation
2. Stimulation is a cost effective therapeutic technique it should be encouraged in all community especially rural poor pre term babies.
3. Health education about massage & music therapies should be given to NICUnurses, village health nurses, Auxiliary nurse midwife in order to promote these therapies as a routine care in the management of preterm neonates & low birth weight babies.
4. Effect of stimulation by the mothers on stress reduction among mothers of preterm neonates.
5. Effect of different types of neonatal stimulations on different age groups

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