EVALUATING THE BENEFITS OF PRE FEEDING STIMULATION ON FEEDING PARAMETERS AMONG PRETERM NEWBORN – A PILOT STUDY REPORT

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ABSTRACT The preterm newborns are born with poor feeding skills which are most important for growth and developments. The intervention to enhance the feeding skills helps for the good physical and mental health. The complex factorial design was used to compare the effectiveness of pre feeding oral stimulation, pre feeding tactile/kinesthetic, and pre feeding Multi oral–tactile/kinesthetic stimulations on feeding parameters among preterm in experimental group I, II and III. The newborn babies between 28-34 weeks of gestational age and admitted to neonatal intensive care unit who were vitally stable included for study. The 32 samples were randomized to one of four groups by Sequentially Numbered Opaque Sealed envelopes method. The results indicate that the experimental group III newborn shows more effectiveness in all feeding parameters and feeding skill than the other experimental and control groups.

Introduction

Preterm are born with special needs and they seek the special attention of parents, care givers and health care professionals for their development. Feeding is a most important aspect of development. The prematurity makes the newborn to most vulnerable for feeding and emotional problems. Establishing the breast feeding as early as possible helps the newborn to develop necessary skills, bonding. Most of the premature newborns are having poor feeding habits due to immature neuro muscular coordination and poor sucking reflex

In 2005 almost 12.9 million preterm births occurs worldwide. Among this 85 % of preterm births occurs on developing countries and 7.4% occurs in developed countries. [9]. The increased burden of preterm births in developing countries is one of the significant problems in health care, education and social services across the globe. [9,10]. In India between 1990-2010 the rate of preterm birth is 12.95% for 27,200,000 live births. Among these the preterm deaths with complications were 303,600. [4]. The recent statistics by Indian profile of preterm and low birth weight prevention and care states among 3,341,00 preterm babies around 361,600 under five mortalities is due to complications of preterm birth. [10].

According to born to soon; the global action report on preterm birth, the country level estimates around 184 leading countries shows that the preterm birth is the primary cause of neonatal mortality and second leading cause for under five mortalities.[4]. The major inequalities in survival rate of preterm newborn between developed and developing countries. The survival rate of preterm with 32 weeks of gestational age in developing countries is very less whereas in developed countries is almost equal to the survival rate of term neonate. [9].

The early interventional strategies for efficient preterm care in order to raise the survival rate and to prevent the associated short and long term morbidity of preterm birth must be an primary aim of an research in intensive care of newborn. [1].

A simple oral stimulation can give major benefits. [2,3,1]. The oromotor stimulations addition to Non Nutritive Sucking can be applicable and more beneficial treatments in stable preterm infants and highly effective for improving the feeding rates. [1,5,6,7]. The tactile stimulations helps to stimulate the nerve innervations in Suck Central Pattern Generators (sCPG) centre which helps for maturation of Suck Swallow Respiration co-ordination. [3,7]. Comparing to single oral stimulations the combination of multiple prefeeding stimulations gives more benefits in improving feeding skills and feeding performance of preterm. [3].

The nurses and other health care members should take initiation to give strong evidence for stimulation of sCPG centre. The NICU management protocols should consider the interventions to stimulate the sCPG centre. [6,8].

The researcher aimed to evaluate the various prefeeding stimulation programs on feeding of preterm newborns

Methodology

This was a randomized controlled **complex factorial research design** which includes 3 experimental and one control group, conducted in NICU at CK Hospital Erode over three months. The main objective of this study was to Compare the effectiveness of pre feeding oral stimulation, prefeeding tactile/kinesthetic, and prefeeding Multi oral–tactile/kinesthetic stimulations on feeding parameters among preterm in experimental group I, II and III. The study was approved by the Institutional ethical committee, Saveetha University. The newborn babies between 28-34 weeks of gestational age and admitted to neonatal intensive care unit who were vitally stable included for study.

The 32 samples were randomized to one of four groups by SNOSE (Sequentially Numbered Opaque Sealed envelopes) method after obtaining written informed consent from parents. The concealment of random allocation was achieved by SNOSE that were opened by the researcher after allocation. For experimental group I the 10 mintutes of pre feeding oral stimulations which includes 5 minutes of perioral, 3 minutes of intra oral, 2 minutes of non-nutritive sucking with pacifier, thrice a day for 10 days was rovided. For Experimental Group II the 10 minutes of tactile/kinesthetic stimulations which includes 3 minutes of tactile stimulation, 4 minutes of kinesthetic stimulation followed by 3 minutes of tactile stimulation, thrice a day for 10 days was provided. For Experimental group III the 3 minutes of prefeeding oral stimulations, 2 minutes of tactile, 2 minutes of kinesthetic stimulation followed by 3 minutes of prefeeding oral stimulations, thrice a day for 10 days was provided. For Control group the routine hospital care was provided. The researcher was responsible for the implementation of all the interventions with strict infection control protocols according the hospital policy and privacy was provided to blind the health care workers and care takers.

The outcome measures: 2 observational tools were used

1. Observational tool on feeding variables which includes Sucking frequency (sucks/min), Mean volume ingested per suck (ml/suck), Feeding duration (min), Intake rate (ml/min), Percentage of prescribed volume Ingested (%),The length of transition period
2. Scale for Oral Feeding Skill which has scores ranges from 1 -20

Results

Table 1. Mean and standard deviation of post test scores at the end of the 10th day

(N=32)

Feeding parameters	Mean (Standard Deviation)			
	Experimental Group I (n=8)	Experimental Group II (n=8)	Experimental Group III (n=8)	Control group (n=8)
Sucking frequency (sucks/min)	15.88 (±2.35)	14.75(±0.89)	18.38 (±1.7)	14.5 (±1.84)
Total Volume ingested per feeding	30.13(± 2.75)	24.38(±2.4)	35.88(± 1.25)	23(± 2.33)

Mean volume ingested per suck (ml/suck)	1.95 (± 0.46)	1.65 (±0.14)	1.96 (±0.16)	1.61 (±0.24)
Feeding duration (min)	14.5 (±2)	14.75 (±1.96)	13.75 (±1.35)	15.75 (±1.9)
Intake rate (ml/min)	2.1 (±0.4)	1.7 (± 0.42)	2.6 (±0.26)	1.5 (±0.46)
The length of transition period	13.63 (± 2.4)	16.4 (±2.9)	12.13 (±1.9)	23.5 (±2.9)

The above table shows that the calculated mean and Standard deviation of feeding parameters at the end of 10[Th] day. The calculated mean shows that the multi oral and Tactile/kinesthetic stimulation was most effective treatment measures.

Table 2. Analysis of variance table for one way ANOVA of sucking frequency (sucks/min) (There are 4 samples having in all 32 items)

Source of variation	Sum of Squares	Degrees of freedom	Mean Square	F ratio
Between samples	75.25	3	25.08	7.957
Within samples	88.26	28	3.152	

The above table shows that the calculated value of F for sucking frequency is 7.957 which is more than the table value of 2.95 at 5% level of significance with degree of freedom v1 = 3 and v2 = 28. This analysis supports the research hypothesis of that there is significant difference between the means of all four groups

Table 3. Analysis of variance table for one way ANOVA of Total Volume ingested per feeding (There are 4 samples having in all 32 items)

Source of variation	Sum of Squares	Degrees of freedom	Mean Square	F ratio
Between samples	461.25	3	153.75	30.4
Within samples	141.635	28	5.058	

The above table shows that the calculated value of F for total volume ingested per feeding is 30.4 which is more than the table value of 2.95 at 5% level of significance with degree of freedom v1 = 3 and v2 = 28. This analysis supports the research hypothesis of that there is significant difference between the means of all four groups

Table 4. Analysis of variance table for one way ANOVA of Mean volume ingested per suck (ml/suck) (There are 4 samples having in all 32 items)

Source of variation	Sum of Squares	Degrees of freedom	Mean Square	F ratio
Between samples	0.426	3	0.142	1.82
Within samples	2.19	28	0.078	

The above table shows that the calculated value of F for mean volume ingested per suck is 1.82 which is less than the table value of 2.95 at 5% level of significance with degree of freedom v1 = 3 and v2 = 28 hence could have arisen due to chance. This analysis supports the null hypothesis of that there is no significant difference between the means of all four groups. So the researcher concluded that the difference in mean volume ingested per suck is insignificant and is just matter of chance.

Table 5. Analysis of variance table for one way ANOVA of Feeding duration (min) (There are 4 samples having in all 32 items)

Source of variation	Sum of Squares	Degrees of freedom	Mean Square	F ratio
Between samples	53	3	17.67	24.25
Within samples	20.4	28	0.728	

The above table shows that the calculated value of F for feeding duration is 24.25 which is more than the table value of 2.95 at 5% level of significance with degree of freedom v1 = 3 and v2 = 28. This

analysis supports the research hypothesis of that there is significant difference between the means of all four groups

Table 6. Analysis of variance table for one way ANOVA of Intake rate (ml/min) (There are 4 samples having in all 32 items)

| Source of variation	Sum of Squares	Degrees of freedom	Mean Square	F ratio
Between samples	14.87	3	4.957	5.659
Within samples	24.53	28	0.876	

The above table shows that the calculated value of F for intake rate is 5.659 which is more than the table value of 2.95 at 5% level of significance with degree of freedom v1 = 3 and v2 = 28. This analysis supports the research hypothesis of that there is significant difference between the means of all four groups

Table 7. Analysis of variance table for one way ANOVA of the length of transition period (There are 4 samples having in all 32 items)

Source of variation	Sum of Squares	Degrees of freedom	Mean Square	F ratio
Between samples	80.6	3	26.87	9.84
Within samples	76.32	28	2.73	

The above table shows that the calculated value of F for length of transition period is 9.84 which is more than the table value of 2.95 at 5% level of significance with degree of freedom v1 = 3 and v2 = 28. This analysis supports the research hypothesis of that there is significant difference between the means of all four groups

Figure 1. The bar diagram shows the percentage distribution of end post test scores of the preterm newborn based level of feeding skills
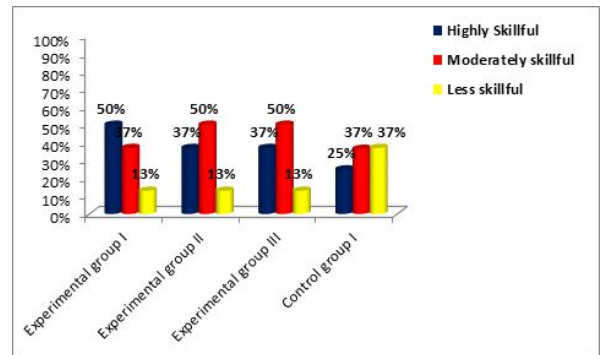
The bar diagram shows that the experimental group III newborns were highly skilful in feeding than the other groups and also shows that the Experimental group I and II newborns were skillful than the control group newborns.

Discussion

The many researchers conducted research on effectiveness of pre feeding oral stimulations with different durations after initiation of oral feedings. The researcher explored the cumulative effect of multi pre feeding stimulations which includes oral, tactile/kinesthetic and oral +tactile/kinesthetic stimulations before feeding and for control one group observed with hospital routine care. The results indicate that the experimental group III newborn shows more effectiveness in all feeding parameters and feeding skill than the other experimental and control groups. The apparent difference in the effectiveness could be the stimulation of oro motor neurons and also enhanced nerve innervations to Suck Central Pattern Generators (sCPG).

The study has two main limitations. The foremost limitation was small sample size, is because of short study duration which will be rectified in main thesis. The second limitation was the researcher performed the interventions for all three experimental groups, even other health care team members blind to the treatment groups the researcher was not blind.

Conflict of interest: None

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