



## Effectiveness of the premature infant oral motor intervention on oral feeding among preterm infants in tertiary care hospital.

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### Contributorship statement-

DC is the primary investigator who conceptualized the research idea, collected the data and conceptualized the data. Also, she has reviewed the literature. SS helps in manuscript writing and editing. AB edited manuscript. The manuscript was reviewed by all co-authors for language use, data analysis. And interpretation.

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### ABSTRACT

Preterm infants organ and muscular strength is not strong as much as term infants having. Preterm infants having irregular suck swallow and breathing pattern which is problematic for maintaining effective breastfeeding. Premature infant oral motor intervention (PIOMI) is a 5-minute oral motor intervention to strengthens and develops feeding mechanisms. The aim of this study to assess the effect of premature infant oral motor intervention on oral feeding progression among preterm infants. The study was conducted from 1/3/2022 to 7/5/2022 to investigate the impact of Premature Infant Oral Motor on oral feeding among preterm infants. A quasi-experimental non-randomized control group design included premature infants in the neonatology unit of King George's Medical University, Lucknow, U.P. India. Purposive random



sampling used to assign into interventional and control group, each containing 27 infants. The PIOMI was administered to interventional group two times in a day for 7 consecutive days and the control group infant received routine care. Bristol Breastfeeding Assessment Tool (BBAT) was used to assess feeding pattern. Results showed: The findings depict that the mean of post-interventional test score of experimental group (6.62) was higher than the mean of post-interventional score of control group (4.48). There was association between gestational week at birth with the pre-interventional level of feeding performance. In conclusions: The premature infant oral motor intervention was effective in improving oral feeding of preterm infants.

**Key-words:** Premature infant oral motor intervention, feeding progression, Bristol Breastfeeding Assessment Tool, preterm infants.

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## INTRODUCTION

Approximately fifteen million babies are born preterm (before thirty-seven weeks) worldwide, indicating a global preterm birth rate of about 11%. Preterm birth is a prominent cause of death among children (i.e., is one million), accounting for 18% of all fatalities among children under the age of five years and up to 35% of all deaths among newborns (aged twenty-eight days) among them.<sup>1</sup>

In India, 3.6 million babies are born preterm out of a total of twenty-seven million babies born each year, and over 300,000 of these preterm babies die each year as a result of complications. With the highest number of preterm births and the highest number of preterm deaths in the world, India accounts for 25% of all preterm deaths worldwide. Despite great attempts to provide new preventative strategies, it continues to play a significant role in newborn and infant mortality. The effects of Pre-Term births extend beyond the early infancy with substantial long-term consequences in late childhood and adult life.<sup>2</sup>

Preterm infants, by nature of their limited gestation, remain at risk for problems related to feeding, neurodevelopment, thermoregulation and various other

problems. Although infants demonstrate some sucking and swallowing activities before birth, coordination of these mechanisms does not occur until approximately 32 to 34 weeks of gestation, and they are not fully synchronized until 36 to 37 weeks. Initial sucking is not accompanied by swallowing, and esophageal contractions are uncoordinated.<sup>3</sup>

Premature Infant Oral Motor Intervention is a five minutes oral motor intervention using a pinky finger in and around the mouth of preterm infants. Preterm infants have impaired oral motor control due to poorer muscle tone around the mouth, decreased sensation, decreased lip strength and lip seal, decreased tongue strength, and reduced sucking strength and endurance.<sup>[3]</sup> Premature Infant Oral Motor Intervention purpose is to reduce feeding difficulties.

The purpose of this study is to evaluate the effectiveness of premature infant oral motor intervention on oral feeding of preterm infants after 7 days of intervention.

## MATERIALS AND METHODS

The study was conducted in neonatology unit of King George's Medical University, Lucknow, Uttar Pradesh. In the proposed study, a quasi-experimental non-randomized control group design was adopted in order to



achieve the objectives.

Purposive sampling technique was used to select preterm infants and total 54 sample were selected (27 in each experimental and control group).

The Bristol Breastfeeding Assessment Tool (BBAT) which is a standardized tool used for the assessment of feeding status of preterm. This tool consists of 4 items i.e., is positioning, attachment, sucking and swallowing. The categorization score was formed by the principal investigator and validity was obtained from experts from various field like medical faculties, nursing faculties, statistician suggestion obtained from experts was incorporated in the final preparation of the tools. Score 0-2 indicates poor, 3-5 indicates moderate and 6-8 indicates good feeding status. Structured demographic variables questionnaire was used to determine association between pre-interventional level of feeding performance with selected demographic variables. The reliability of tool was established by Cronbach's alpha method. The reliability was found to be 0.84 which indicates tool is reliable.

The study was conducted after getting clearance from the Institutional Ethical Committee via reference no. 2156/Ethics/2022, this study was done on preterm infants. An informed consent was taken from the parents of preterm infants. The institutional and/or national research committee's ethical requirements were followed in all techniques used in studies involving human subjects. The purpose of the study was explained to the parents of preterm infants. After getting the consent the researcher assessed the pre-interventional data in both study and control

group by using a Bristol Breastfeeding Assessment Tool.

After the assessment researcher have performed Premature Infant Oral Motor Intervention (PIOMI) two times a day for 7 consecutive days along with routine care for the experimental group and for the control group routine care is provided. PIOMI consists of eight steps that are cheek c-stretch, lip roll, lip curl/ lip stretch, gum massage, lateral borders of tongue/cheek, midblade of tongue/palate, elicit a suck, support for non-nutritive sucking. On 7<sup>th</sup> day of intervention, post intervention data were collected from both the experimental and control group by using Bristol Breastfeeding Assessment Tool.

Paired T test was done to analyse if there is any difference in the mean score of pre and post interventional within the experimental and control group. Unpaired T test was used to analyse if there is mean difference in the mean score of post-interventional between interventional and control group. Tests of associations were performed by Chi square test. A  $p$  value  $<0.05$  was considered significant.

## RESULTS

### Demographic characteristics of the mother and preterm infants

The study finding shows that in both the study and control group most of the mother were in the age group 21-30 years, majority of mother were graduate or having higher education and their family income between 5001- 10000 rupees per month. Mammoth of mother got delivered in government hospital and having first child and they were residence of urban area. In experimental group most of women delivered their child



through LSCS mode but in control group majority of women having normal vaginal delivery. Most of the child born between 30-33 weeks of gestation and their weight between 1000-1500 gram. Preponderance number of infant were male in both study and control group. [Table 1]

#### **Comparison of pre-interventional and post-interventional assessment score within the experimental and control group**

The study shows that in the experimental group the mean post-interventional test score 6.62 appears to be greater than the mean pre-interventional test score 2. The computed 't' value 't' (26) 20.36,  $p < 0.05$  shows that there was a significant difference between pre-interventional score and post-interventional score. This specify that the premature infant oral motor intervention was effective for the improvement of oral feeding among preterm infant.

In the control group table depicts that the mean post-interventional test score 4.48 more than the mean pre-interventional test score 1.93. The computed 't' value 't' (26) 12.64,  $p < 0.05$  shows that there was a significant difference between pre-interventional score and post-interventional score. [Table 2]

#### **Comparison of the difference in the feeding performance in experimental and control group.**

The study shows that post -interventional test score of experimental group mean value was  $6.62 \pm SD$  was 1.00 and control group mean value was  $4.48 \pm SD$  1.12. The calculated 't' value was 7.64 and p value is 2.01 which was significant at the level of significance 0.05. [Table 3]

#### **The association between pre-interventional level of feeding performance of**

#### **experimental group with selected mother and child related variable.**

The study depicts that chi-square ( $\chi^2$ ) value obtained for the association of pre-interventional level of feeding performance with gestation of week at birth was 6.75 and the p value is 5.99 which is significant at the level of 0.05. [Table 4].

#### **DISCUSSION**

The proposed study assessed the efficacy of an intervention, conducted in neonatology unit of government hospital of Lucknow, India aimed to early initiation of oral feeding among preterm infants. The premature infant oral motor intervention was effective for improvement of oral feeding. This finding is accordance with the study conducted by Anchu S.S in Nagercoil, which revealed that Oral stimulation improved feeding performance in preterm newborns.<sup>[4]</sup> A similar systemic review and meta-analysis was conducted by Chen D, Yang Z et al. The result of the study disclosed that oral motor intervention could effectively reduce the transition time to full oral feeds and length of stay as well as feeding efficiency and weight gain.<sup>[5]</sup> Likewise Brenda S. assess the effect of premature infant oral motor intervention on feeding progression and length of stay in preterm infants and the result revealed that PIOMI recipients transitioned from their initial oral feeding to entire oral feedings five days earlier than controls ( $P = .043$ ) and were discharged 2.6 days earlier than controls.<sup>[6]</sup> Thus, the present study findings concluded that the premature infant oral motor intervention is very effective in improving oral feeding among preterm. However, this intervention should be involved in routine care of preterm infant.



**OPINION AND PERSPECTIVE**

The Premature Infant Oral Motor Intervention is a very effective intervention for the premature infant. This intervention helps to early initiation of oral feeding which will be one of the contributing factor for establishing good health and remain healthy. The future recommendation related to study are:

- A similar study may be conducted with maximum time and extended days which may yield more reliable results.
- Randomization can be done to control cofounding variables.

- A similar study may be conducted to assess the knowledge and practice of nurses on Premature Infant Oral Motor Intervention (PIOMI) for the implementation of this technique in routine care of preterm infants.

**Ethical approval:** This study involves human participants and was approved by the Institutional Ethics committee with Ref. Code: VIII- PGTSC-IIC/P9.

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**List of abbreviation**

Abbreviation	Definition
PIOMI	Premature Infant Oral Motor Intervention is a 5-minute technique this technique consists of 8 steps in which facial and oral structure are stimulated at a given time.
BBAT	Bristol Breastfeeding Assessment Tool is the standardized tool to assess the oral feeding status.

**Table 1: Distribution of participants based on demographic variables in both experimental and control group.**

S.N O.	Demographical data	n=54			
		Experimental group n <sub>1</sub> =27		Control group n <sub>2</sub> =27	
		F	%	f	%
<b>Mothers Related Variables</b>					
1.	<b>Mother's age</b>				
	a) < 20 years	0	0	0	0
	b) 21-30 years	20	74.1	19	70.4
	c) 31-40 years	4	14.8	5	18.5
	d) 40 years and above	3	11.1	3	11.1
2.	<b>Mother's education</b>				
	a) Basic education	7	25.9	9	33.3
	b) Matriculation/10 <sup>th</sup>	4	14.8	4	14.8



	c) Higher secondary/12 <sup>th</sup>	4	14.8	4	14.8
	d) Graduate and above	12	44.5	10	37.1
3.	<b>Family income (per month)</b>				
	a) <5000	3	11.1	4	14.8
	b) 5001-10,000	10	37.1	11	40.7
	c) 10,001-15000	4	14.8	7	25.9
	d) 15,001 and above	10	37.1	5	18.6
4.	<b>Place of delivery</b>				
	a) Home	0	0	0	0
	b) Nursing home	0	0	5	18.6
	c) Private hospital	0	0	7	25.9
	d) Government hospital	27	100	15	55.5
5.	<b>Mode of delivery</b>				
	a) LSCS	14	51.9	12	44.5
	b) Assisted delivery	0	0	0	0
	c) Normal	13	48.1	15	55.5
6.	<b>Birth order</b>				
	a) First	18	66.7	15	55.5
	b) Second	6	22.2	10	37.1
	c) Third	3	11.1	2	7.4
	d) Fourth and above	0	0	0	0
7.	<b>Place of residence</b>				
	a) Urban	19	70.4	14	51.9
	b) Rural	8	29.6	13	48.1
	<b>Child's related variables</b>				
1.	<b>Gestation weeks at birth</b>				
	a) < 26 weeks	0	0	1	3.7
	b) 26-29 weeks	6	22.2	6	22.2
	c) 30-33 weeks	12	44.4	17	63.0
	d) 34-37 weeks	9	33.4	3	11.1
2.	<b>Birth weight</b>				
	a) 500-1000 g	2	7.4	5	18.5
	b) 1000-1500 g	15	55.6	11	40.7
	c) 1500- 2000 g	8	29.6	10	37.1
	d) 2000-2500 g	2	7.4	1	3.7
3.	<b>Sex of the baby</b>				
	a) Male	17	62.9	16	59.3
	b) Female	10	37.1	11	40.7

**Table 2: Comparison of pre-interventional and post-interventional assessment score within the experimental and control group**

Days	Experimental group (n <sub>1</sub> =27)		Control group (n <sub>2</sub> =27)		Paired t-test	
	Mean	SD	Mean	SD	Experimental group	Control group
	Pre-intervention (Day 1)	2	0.83	1.93	1.17	20.36
Post-intervention (Day 7)	6.62	1.00	4.48	1.12		

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**Table 3: Comparison of the difference in the feeding performance in experimental and control group.**

Days Difference in the feeding performance	Mean	SD	Unpaired t-test	
Experimental group	6.62	1.00		
Control group	4.48	1.12		7.64*

Designation: \* 't' (52) 2.01, p< 0.05

**Table 4: The association between pre-interventional level of feeding performance of experimental group with selected mother and child related variable.**

S. N O.	Demographical Variables	Poor oral feeding	Moderate oral feeding	Good oral feeding	DF	χ <sup>2</sup> value	P value (0.05)
<b>Mothers Related Variables</b>							
1.	<b>Mother's age</b>						
	a) < 20 years	0	0	0			
	b) 21-30 years	14	6	0	2	1.65	5.99
	c) 31-40 years	4	0	0			
	d) 40 years and above	2	1	0			
2.	<b>Mother's education</b>						
	a) Basic education	4	3	0			
	b) Matriculation/10 <sup>t</sup>	3	1	0	3	1.52	7.82





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c) Higher secondary/12<sup>th</sup> 4 0 0

d) Graduate and above 9 3 0

### 3. Family income

a) <5000 1 2 0

b) 5001-10,000 8 2 0 **3 2.96 7.82**

c) 10,001-15000 3 1 0

d) 15,001 and above 8 2 0

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### 4. Place of delivery

a) Home 0 0 0

b) Nursing home 0 0 0 **3 0 7.82**

c) Private hospital 0 0 0

d) Government hospital 20 7 0

### 5. Mode of delivery

a) LSCS 10 4 0

b) Assisted delivery 0 0 0 **1 0.11 3.84**

c) Normal 10 3 0

### 6. Birth order

a) First 13 5 0

b) Second 5 1 0 **2 2.86 5.99**

c) Third 2 1 0

d) Fourth and above 0 0 0

### 7. Place of residence

a) Urban 14 5 0 **1 0.01 3.84**

b) Rural 6 2 0

### Child's related variables

#### 1. Gestation weeks at birth

a) < 26 weeks 0 0 0

b) 26-29 weeks 6 0 0

c) 30-33 weeks 10 2 0 **2 6.75\* 5.99**

d) 34-37 weeks 4 5 0

#### 2. Birth weight

a) 500-1000 g 2 0 0

b) 1001-1500 g 11 4 0 **3 1.31 7.82**





c) 1501- 2000 g	6	2	0			
d) 2001-2500 g	1	1	0			
<b>3. Sex of the baby</b>						
a) Male	12	2	0	<b>1</b>	<b>2.05</b>	<b>3.84</b>
b) Female	8	5	0			

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