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Effect of Oromotor Stimulation on Breastfeeding Performance Administrated by Therapist versus Trained Mother's in Preterm Infants

Dr. Sabiya Pathan (PT)[1], Dr. Chaitali Shah (PT)[2]

[1]College of Physiotherapy, S. S. G. Hospital, Vadodara, Gujarat, India

[2]Visiting Lecturer Neuromuscular disorder), College of Physiotherapy, S. S. G. Hospital, Vadodara, Gujarat, India

Abstract: ***Objective: The study evaluated the effectiveness of involving Mother's of preterm infants to administer oromotor stimulation therapy by training them during their hospitalization period. Design: A prospective Randomized controlled Study Participants: 200 Moderate to late preterm infants (32 - 36 Gestational weeks) on palladai or Gavage feeding were divided by randomly allocated ICU and KMC units to Control Group A (n=100) and Interventional Group B (n=100). Methods: Mothers in interventional group were trained to administer an oromotor stimulation therapy to their infants after a training period of a week. In control Group, same was administered by the therapist. Outcome measures of Preterm infant Breastfeeding performance and Total number of transition day to full breastfeeding were recorded and assessed. Results: The Control Group A showed more early transition to full breast feeds and early development of latching on breastfeeding behaviour as compared to Group B (p - value: <0.0001) Both groups showed significant difference in overall outcome measures. Conclusion: As a measure of Developmental Support Care for preterm infants, training mother's to administer Oromotor stimulation can improve feeding performance where the no. of preterm infants are higher then no. of therapist available in India. Paying more attention to till training mothers, Therapist should treat the infants and always motivate mothers to get trained.***

Keywords: Exercise to improve sucking reflex in preterm infants, Exercise to improve nutritive component of premature infants, Exercise for mother's to improve breastfeeding of their preemies, Exercise for Preterm infant' aurosal behaviour, Oromotor stimulation, Preterm infants, Training mothers, Breastfeeding performance

1. Introduction

Global estimates show approximately 10.6% of births are preterm out of which 13.61% preterm birth rate is in India [1, 2]. According to Dr. Pierre Budin, 3 major problems faced by preterm infants are Infections, Asthma and Feeding problems. Feeding problems are caused by underdeveloped oromotor skills and incoordination between Sucking, Swallowing and Breathing (SSwB) [3, 4, 5, 6] Oral feeding is a complex task that depends on central patterns generated by brain stem, actively influenced by chemosensory and oral tactile input [7]. Safe and successful feeding implies that infant is at minimal risk of aspiration and has achieved coordinated SSwB.

Oromotor stimulation is manipulative action of lips, jaws, tongue and soft palate before feeding to improve preterm infant's sucking and feeding which reduces transition time to oral feeds, duration of hospital stay and accelerates weight gain [8, 9, 10]

Oromotor stimulation enhances sucking which has two components:

1) Suction - negative pressure used to draw milk in mouth
2) Expression - compression of nipples/bottle by tongue to eject milk. Mature sucking is rhythmic alteration of suction and expression while immature sucking shows only expression. But suction component is important to latch on breast/bottle.

Developmentally Supportive Care (DSC) aims to maintain intimate connection between parent and infant. It has greater impact on neurobehaviour in preterm infants. [11] Kangaroo mother care is a component of DSC which reduces parental stress, enhances parental bonding and better infant out coming [12]. High quality of care by mothers may partially reverse the adverse effects of stress exposure on infants experience in NICU [13].

Mother's close bond and touch is known to be facilitate better results in earlier possible way and in a developing country like India, with low numbers of caregivers available involving parents into infants treatment session have already proven effective.

Hence the present study involves the mother of infant in their physical therapy sessions. To know the exact outcomes on breastfeeding behavior, the mothers are trained to give the Physiotherapy protocol mainly focusing on Oral stimulation and are reviewed.

The goal of the study is to know that Is there any difference in breastfeeding behaviour by Oromotor stimulation when given by therapist and Trained Mother.

2. Methods

Design and Participants: This study is a Randomized Controlled study. An experimental group of infants who received an oral motor intervention by their mothers were compared to Group of infants who received the same from the therapist. Inclusion criteria ([14] were 1) moderate to late preterm infants with gestational age between 32 - 36 weeks 2) on Gavage or Palladai feeding 3) Hemodynamically

stable 4) Mother's having Knowledge of Hindi/Gujarati language for the ease of communication. The exclusion criteria were 1) Inability to undergo Intervention 2) Infants fulfilling inclusion criteria but subsequently underwent surgery or developed serious illness diagnosed by pediatrician 3) Known Congenital/Chromosomal disease 4) After being trained if mother refuses to participate 5) If Mother is known case of postpartum depression/psychosis. From June 2021 - April 2022, 200 infants and their mothers who met the inclusion criteria were consented and recruited for the study. Out of 230 infants, 100 in each group completed the intervention and were included in Analysis. Demographic characteristics of infants in both groups are presented in Table 1. Approval was obtained by Institutional Ethics Committee for Biomedical and Health Research (IECBHR), Medical college no. IECBHR/82 - 2021 and SSG Hospital, Baroda.

Outcome measures: Preterm infant Breastfeeding behaviour scale (PIBBS) and total no. of days to transition to full breast feeds was noted. PIBBS once after breastfeeding initiated was take, then on 3rd and 5th day of initiation.

Descriptions: It was developed by Nyqvist et al. [(15)] in 1996. It is validated to assess breastfeeding maturation. Six components are assessed by PIBBS as follows: a) Rooting b) Areolar grasp c) Latch, Maintaining latch d) Sucking e) Longest sucking burst f) Swallowing. It requires 5 - 10 minutes to administer. Total Score: __/20. Reliability [(15, 16)] Inter rater reliability between two observer was 83% - 90%. Kappa value range is 0.68 to 0.84 It is validated to use as outcome measures in preterm infants.

Procedures: Randomization for sampling was done using envelops method. Having NICU, EMNICU, KMC units at Rukmani building and at Pediatrics' Department, S. S. G. Hospital, Vadodara. This method for randomization is used to avoid any baised feeling by infant's mother. Using Randomized envelop methods, it was allocated as:

Group A: NICU and KMC unit at Pediatrics'Department. Preterm Infants were treated by Therapist for Oromotor stimulation.
Group B: EMNICU and KMC unit at Rukmani Unit. Consented Mother's were trained to treat infants for Oromotor stimulation

After the allocation of the infant, the parents were explained about the Intervention their child will receive and proper handling and care was explained.

Mother's of this group were consented and train to provide Oromotor stimulation to infant. Mother's of Infants fulfilling inclusion criteria in EMNICU and KMC Unit were explained about the study and their role. Mothers were explained about advantages of Intervention, demonstration of procedure with explanation of each steps. Intervention was given by the physiotherapist on first day, along with Mother's training and Education. Mothers were given a week of practice and feedback was taken, till they were confident of doing independently. Mothers refusing to participate after training were excluded from study.

The oromotor stimulation was used as described by Fucile and colleagues.

Oromotor stimulation is a Neuromuscular Facilitation technique to stimulate and activate Perioral and Intraoral muscles and helps to develop control over it. It has been effective to increase latch and consecutive sucks. Overall nutrition components is corrected by using it.

Perioral Stimulation [(17)]

1) **Cheeks**: Gently tap the cheeks with the index finger (8 each check). Stroke the check with the index finger from the base of the nose toward the ear, then return back to the corner of the lips (8x each cheek). Repeat on the other side.
2) **Lips**: then reverse (4x each lip). Place the index and the middle fingers on the middle of upper lip (lower lip) and quickly, but gently, stretch outward (8x each lip). Gently stroke the area around the lips in a circular way, from the comer toward the center and to the other corner.

Intraoral Stimulation

1) Gums: Rub the upper gum with gentle, but firm pressure from the center toward the back and return to the center for each side using a sterile gauze piece (4x each side of the gum). Repeat the procedure on the lower gum.
2) Tongue: Place a sterile gauze piece on the tongue and gently stroke forward, combining with downward pressure (8x) (If the infant displays tongue protrusion, only downward pressure is administered.). Total duration is of five minutes.

Following protocol also consist of MASSAGE and KINESTHETIC EXERCISE to infants of both the groups along with Chest physiotherapy to needed infants by therapist.

3. Results

Statistical Analysis
Data analysis was done using MedCalc statistical software Version 18.2.1 (trial version); Microsoft word and Excel have been used to generate graphs and tables.

Table 1: Baseline Characteristics

Characteristics	Group A Mean (SD)	Group B Mean (SD)	P Value
Age (Days)	10.03 (6.23)	10.51 (9.64)	1.000
Birth Weight (KG)	2.07 (0.38)	2.48 (3.4)	1.000
Maturity (Weeks)	34.34 (1.43)	34.69 (1.30)	1.000
PIBBS ON 1ST Day	5.74 (0.82)	6.42 (0.72)	0.166

Both the groups were found to be homogeneous and therefore comparable.

Intra - Group Comparision
Paired t test was used to compare the values of breastfeeding behavior (PIBBS).

Table 2: Comparison of pre - post intervention on breast feeding behaviour

	Group A		Group B	
	Pre score	Post score	Pre score	Post score
N	100	100	100	100
Mean	5.74	15.77	6.42	13.33
SD	0.832	2.004	0.723	0.788
Mean Difference	10.033		6.9100	
T Value	47.36		75.68	
f Value	<0.0001		<0.0001	

The p–value obtained is <0.0001. Thus there is significant difference in breastfeeding behavior in both groups at 99% confidence interval.

Inter Group Comparision

Table 3: Independent t - test for comparing PIBBS score and No. of Transition Days in both groups

	PIBBS Score		Transition Days	
	Group A	Group B	Group A	Group B
N	100	100	100	100
Mean	15.77	13.33	2.78	4.52
SD	2.0144	0.7921	0.628	0.741
Mean Difference	2.44		1.74	
T Value	11.27		17.84	
P Value	<0.0001		<0.0001	

Mean Difference of PIBBS score is 2.44 at p - value <0.0001 and Mean Difference of Transition Days is 1.74 at p value <0.0001.

Limitations

Follow up of all patients was not done, hence long term effects was not evaluated. Education status of mother's was not considered and it's role was not evaluated. Feasibility of mother's performing the Intervention was not formally measured. Qualitative aspects of mother's perception of her role as a co therapist was not studied.

4. Discussion

In present study, Oromotor stimulation Intervention using PIBBS Score for assessing Breastfeeding behaviour was given for 5 days in two groups: Group A: OMS administered by Therapist and Group B: OMS administered by Trained Mother. There is significant difference in breastfeeding behaviour of both groups but more significance is observed in Group A. With oral stimulation advanced nutritive sucking skills resulted in both the groups. These improvements may be due to the direct sensorimotor input to the oral musculoskeletal system involved in sucking. This supports the motion that the development of sucking is not only an inborn conditioned reflex dependent upon neurophysiological maturation, but that it can also be enhanced with practice. The inability to feed orally is one of the most frequent reasons for delayed hospital discharge of preterm infants.

DSC Intervention comprises several Interventions aiming to facilitate infant to cope up environmental demands and also to modulate the sensory experiences as a result of early exposure to same for overall development (Physical, Cognitive, Social and Emotional) of newborn. In a developing countries like India, affordability, low accessibility higher tertiary care center, lack of insurance coverage, lacking technology and limited no. of caregivers involving Parent Education and Involvement was found effective for managing the Infant development.

Possible Reasons for significant results in both groups may be as follows:

- Oromotor stimulation beings Neuromuscular Facilitation technique works on principle on Manual contact and Stretch of muscle with based on motor control and motor learning theories.
- Manual contact/Touch with firm contact stimulates the underlying muscle to develop tactile and kinesthetic perception and aid the muscles ability to contract.
- Stretch stimulus facilitates muscle contractions along with facilitation of associated synergistic muscles.

In preterm muscles, the facial (oral) muscles are underdeveloped. OMS increase their muscle bulk as well as proper contractions needed for Suckling. For suckling, proper pressure is generated by coordination movements of cheeks, lips and tongue.

Possible reasons for more significant results in Group A (OMS administered by Therapist) may be due to:

In Group B (OMS administered by Trained Mother), mother's reduced motivation for Involvement in therapy, mother's own post - partum pain and distress, inadequate attention to fact knowledge for Intervention.

Significant results in Group B can be seen when OMS was administered by mothers under supervision with needed psychological and emotional support to mother. Oral motor stimulation when performed by the mother, has the potential to facilitate this emotional closeness, since it involves an intense interaction of recognizing and responding to cues can also be reason for significant results.

Hima b. John et al study suggested that there is no significant differences in breastfeeding behaviour when OMS administered by mothers with sample size N=20, 10 in Interventional (Trained Mother) group and 10 in Control (Therapist) group.

Here large sample size and wide factors of mother's own concern, fears, pain and understanding of their role in therapy can be reason for more significant difference in Group A (OMS administered by Therapist).

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