

Review Article

An evidence based review on effect of oral motor therapy on feeding in preterm infants

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ABSTRACT

Present study was done to know the effect of Oral Motor Therapy on preterm infants for feeding and related issues. Most preterm infants have low body weight, immature brain development, sucking and swallowing problems, and decreased oral motor ability, which affects infants' growth and normal development. Oral Motor Therapies are used to increase functional strength and control of movement for feeding, to promote the onset of oral feeding, and to improve oral feeding performance. The study started with the search articles on Google Scholar, ResearchGate, Cochrane and PubMed with keywords in range of year 2012-2023. 250 articles were found from the sources. 46 articles were studied which were related to aim of the study. From all of them 10 articles were selected on the basis of inclusion criteria. All the articles suggested improvement in all the post intervention outcomes which showed clinical significance of the Oral Motor Therapy. The study hereby concluded that Oral Motor Therapy is useful in preterm infants for feeding initiation and progression, weight gain as well as in dysphagia rehabilitation and reduced hospital stay..

Keywords: Oral motor therapy, Preterm infant, Feeding, Dysphagia

INTRODUCTION

Preterm infant is the one who get birth before 37 gestation weeks.¹ Prematurity is associated with an increased risk of long-term health and neurodevelopmental problems.² An estimated 15 million neonates are born preterm, more than 60% of them in Africa and South Asian regions every year. India has the greatest number of preterm births.³

Factors associated for preterm birth are mother's age, such as pregnancy in adolescence or above 35 years of age; to the pregnancy, such as a short interval between conceptions, multiple gestations, elective cesarean sections, labor induction, chronic gestational diseases, and infections, as well as socioeconomic and nutritional

conditions; and those associated to the fetus, such as genetic diseases.⁴

Preterm infants experience problems in eating foods with new textures, may be sensitive to them, and refuse to eat. In addition, long-term use of endo-tracheal tube or nasogastric tube for feeding can be the main cause of the later sensory problems in preterm infants.⁵

Oral motor therapy is beneficial for oral feeding in preterm infants. Oral motor therapy is defined as sensory stimulation of the lips, jaw, tongue, soft palate, pharynx, larynx and respiratory muscles. Oral motor therapy affects oropharyngeal mechanism in order to improve its functions. Oral motor therapy can shorten the transition time from gavage feeding to full oral feeding and

improve oral feeding efficiency.⁶ Oral motor interventions show promise for enhancing feeding and swallowing in preterm infants.⁷

There are so many evidences available which were conducted to know the effect of oral motor therapy in preterm infant. By this review, evidence will be added to existing knowledge about all effects of oral motor therapy by reviewing multiple studies held on preterm infants.

METHODS

Sources

Search for the article were carried out by using keyword like oral motor therapy, preterm infant, feeding, dysphagia, non-nutritive sucking and neonates in databases like Google scholar, PubMed, ResearchGate, Cochrane from 2012 to 2023. The search was limited to journals published in English. 250 articles were obtained from the search and 204 were excluded directly on the

basis of aim of the study. 10 articles from remain 46 were included in the study on the basis of inclusion and exclusion criteria. Figure 1 shows flowchart of the methodology.

Study selection criteria

All the articles were given level of evidence from I to IV. Published articles were included in the study after meeting inclusion and exclusion criteria.

Inclusion criteria

Article published from 2012 to 2023. RCT, interventional study, case study and age of preterm infant between 26 to 34 week are included.

Exclusion criteria

Systemic review and meta analysis study and associated neurological conditions to preterm infant are excluded.

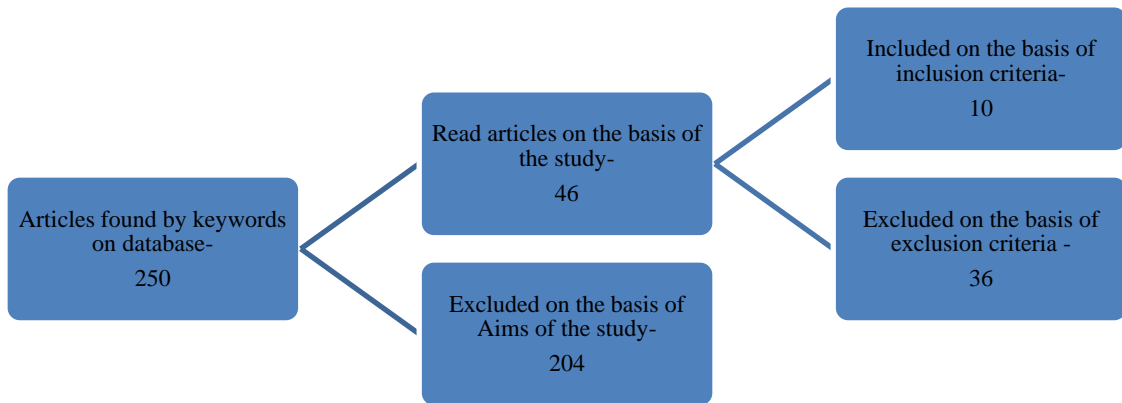


Figure 1: Flowchart of methodology.

Data extraction

Level of evidence, study objectives and descriptive data of the preterm infant was extracted from the articles.

Level of evidences was given as following: level I is RCTs, level II is nonrandomized controlled trials, case control trials, level III is pretest posttest design, cross sectional designs, level IV is single subject design, case series and level V is case reports, narrative literature reviews.

RESULTS

10 articles were reviewed from the database on the basis of inclusion criteria of the present study. 4 studies were having level of evidence I, 4 studies were having level of evidence II and 2 studies were having level of evidence III. The result of the study is given in Table 1.

DISCUSSION

Nassar et al took 60 participants and divided them in 2 groups. 30 participants were there in control group and 30 participants in Study group. Oral intervention was given to only study group. Study intervention of 15 minute for 2 weeks was given and outcome measures were taken. There was no difference in rooting effort and latch efforts. but staying latched sucking effort, longest sucking burst were improved. Weight of the participants was increased. Percentage of Breast feeding by preterm increased, mills intake increased, and a hospital stay also decreased. The oral feeding time was reduced due to pre feeding oral stimulation aided upward movement of the jaw, reducing the effort required by the newborn to suck from a bottle so the oral feeding duration was reduced.⁸

Table 1: Result of review of literature.

| Author, year of publication | Participants, method and outcome measures | Result | Conclusion | Evidence and scoring |
|--|---|---|---|------------------------|
| Hanna Mohamed Ibrahim Nassar et al (2021)⁸ | 60 infant, 15 min (12 oral motor stimulation and 3 non-nutritive sucking), 7 days, preterm infant breastfeeding behaviour scale, medical records | Statistical difference showed improvement b/w pre and post outcome measures | Intervention is useful for feeding improvement in preterm infant | Level of evidence: III |
| Xiao-Li Li et al (2019)⁹ | 5 infant, preterm infant oral motor intervention (PIOMI) 5 min, 14 days, preterm infant oral feeding readiness assessment scale (POFRAS scale) and infanib (infant neurological intervention batteries) | higher feeding efficiency, shorter independent feeding | PIOMI promoted oral feeding ability and prognosis of preterm infants | Level of evidence: II |
| Hadiseh Ghomi et al (2019)¹⁰ | 30 infant, PIOMI for 5 min. 10 days length of hospital stay | Early oral feeding, and shorter hospital Stay in PIOMI group | PIOMI is fruitful as a oral rehabilitation for preterm infant for | Level of evidence: I |
| Nasrin Mahmoodi et al (2019)¹¹ | 10 infants, PIOMI for 5 min POFRAS scale | Significant improvement in oral feeding onset and hospital stay | Early onset of oral feeding and decrease hospital stay | Level of evidence: II |
| Hanaa Tharwat Mohamed El-Shahat et al (2018)¹² | 60 infant, prefeeding oral stimulation technique for 3 day, personal data and early feeding skills likert scale | higher mean milk intake, total score of early feeding skills improved | started oral feeding early, received higher mean milk intake and had less mean milk leakage | Level of evidence: III |
| Pareshkumar A. Thakkar et al (2018)¹³ | 102 infant, PIOMI for 5 min, performance and initiation of feeding | Hospital stay, weight and feeding performance improved in control | Intervention is helpful to improve all outcomes. | Level of evidence: I |
| Karan Arora et al (2018)¹⁴ | 30 infant , PIOMI, 7 days, NOMAS | Significant increase in weight gain, earlier independent feeding | Intervention improve oral motor skill and independent feeding time | Level of evidence: I |
| Faezeh Asadollahpour et al (2015)¹⁵ | 32 infant, pre feeding oral stimulation Vs non nutritive sucking (NNS) Weight of infant | Weight gain in NNS | NNS: weight gain more Both improve oral feeding skill and weight gain | Level of evidence: II |
| Tian-chan lyu et al (2014)¹⁶ | 63 infant, 15 min total oral stimulation+ non nutritive sucking, Weight and volume of milk consumed | Feeding initiation and efficiency improve, Weight and hospital Stay same | Early oral stimulation beneficial to pt. | Level of evidence: I |
| Yan-lin liu et al (2012)¹⁷ | 68 infant, 5 strengthening ex. of sucking move. And PT Time for independent oral feeding | Significant improvement in feeding volume, weight and hospital stay | Improves feeding performance, hospital stay | Level of evidence: II |

Li et al studied on 151 premature infant after giving 14 days of PIOMI treatment for 15 minutes. Oral feeding ability and neuromotor development were evaluated by POFRA scale and Infant Neurological International Battery Scale. Result concluded that intervention group had better scores in all the outcomes like higher efficacy feeding efficiency, shorter transition time from assisted oral feeding to independent oral feeding, and lower body weight were increased. It is because it promotes Swallow reflex and co-ordination of sucking Swallowing - respiration. It also enhances sensitivity of oral muscles, improves oral power and action, and activates sucking reflex thereby improving nutritive sucking. It can stimulate production and secretion of Saliva, which helps swallowing.⁹

Ghomi et al studied effect on Premature infant oral motor intervention. 30 participants divided in two groups randomly. 15 min of PIOMI intervention was given for 10 days. Interventional group reached independent oral feeding earlier than control group and also had less number of hospital staying days. It may be due to that oral stimulation can be effective in neuronal myelination and oral motor development for preterm infants.¹⁰

Mahmoodi et al studied effect of oral motor intervention on 40 preterm infant. Intervention group received 15 min of PIOMI for 7 days and outcomes were measured by premature oral feeding readiness assessment scale in terms of timing, initiation of oral feeding and hospitalization duration. After 7 days of intervention all outcomes were improved in interventional group.¹¹

Tharwat et al studied on 60 preterm infant about the effect of pre feeding oral stimulation technique on reaching full oral feeding in preterm newborn. The study revealed that majority from control group received higher milk intake than control group on 3rd day. Milk leakage was less in experimental group and time taken for oral feeding was also less. This result may be due to time progressed and by the repetition of pre feeding oral stimulation the infant's net leakage was beneficially affected where the compression applied to the tissues of cheeks, upper and lower lips improved lip range of motion, increased cheek and jaw stability and promoted lip seal on the nipple so decreased net leakage from both sides of the mouth.¹²

Thakkar et al studied on oral feeding performance and weight gain in preterm by taking 102 preterm neonates and divided them in 2 groups. Control group and interventional group. Intervention was given twice a day for 5 min each session. Outcomes like feeding performance, shorter transition to independent oral feeding, weight gain and shorter length of hospital stay was improved. This is because oral motor stimulation has the potential to change the behavioural state of the infant lowering to handling their activity and this change in behavioural state could be identified by stimulation the caregivers. Oral motor stimulation can change the

behavioural state of an infant to a quick alert state ready for feeding.¹³

Arora et al took 30 preterm infants and PIOMI or sham intervention interventional and control group. NOMAS (neonatal oral motor assessment scale) was taken after 7 days of treatment. It concluded that intervention group reached to independent feeding earlier than control group and weight gain was achieved and oral motor skill was improved.¹⁴

Asadollahpour et al studied pre feeding oral stimulation and non-nutritive sucking effect on preterm infants. 32 preterm infants were taken into the study. They were divided into 3 groups. One group received pre feeding oral stimulation program another group received non-nutritive sucking and third group received sham treatment. All of them received respected treatments for 10 days and after that outcomes were measured. They concluded that non-nutritive sucking and pre feeding oral motor stimulation both were beneficial for hospital stay duration, weight gain and independent oral feeding. NNS was more effective for weight gain.¹⁵

Lyu et al divided 72 participants by randomization in control group and interventional group 15 min of total oral motor intervention program was given to experimental group once a day. Wright and milk consumed by the preterm infant was taken as primary outcome. Improvements were there in all outcomes. It may be due to, oral motor therapy strengthens the oral muscles which improves sucking skill and oral feeding performance. It stimulates maturation of central as well as peripheral neural structures and will help in oral feeding performance improvement which may further lead to weight gain and reduced hospital stay.¹⁶

Liu et al, took 68 participants in study, 19 male infant was taken for intervention a rest 34 was taken retrospectively as the control group. They concluded after intervention that oral motor therapy can improve feeding performance in very low birth weight preterm infants, shorter the hospital stay.¹⁷

All the study mentioned here having beneficial effect of the oral motor therapy in preterm infants. None of them are having any side effects. All the study conducted for the oral motor performance improved all the outcomes.

It has a limitation that it doesn't include the systematic review and meta analytic studies. Future studies can be done by including all types of study for better knowledge.

CONCLUSION

The present study concluded after review the articles that oral motor therapy is beneficial for weight gain, improving oral skills and oral performance, Increase milk intake by independent oral feeding, reducing the milk leakage, reducing the hospital stay and shorter the

transition time from tube feeding to independent oral feeding. None of them showed any adverse effect or negative results. So we can conclude that oral motor therapy is beneficial for preterm infants.

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REFERENCES

1. Chung EH, Chou J, Brown KA. Neurodevelopmental outcomes of preterm infants: a recent literature review. *Translational pediatrics*. 2020;9(Suppl 1):S3.
2. Cheong JL, Burnett AC, Treyvaud K, Spittle AJ. Early environment and long-term outcomes of preterm infants. *Journal of Neural Transmission*. 2020;127:1-8.
3. Blencowe H, Cousens S, Oestergaard M. National, regional and worldwide estimates of preterm birth. *Lancet*. 2012;379:2162–72.
4. Victora JD, Silveira MF, Tonial CT, Victora CG, Barros FC, Horta BL, et al. Prevalence, mortality and risk factors associated with very low birth weight preterm infants: an analysis of 33 years. *Jornal de Pediatria*. 2020;96:327-32.
5. Ghomi H, Yadegari F, Soleimani F, Knoll BL, Noroozi M, Mazouri A. The effects of premature infant oral motor intervention (PIOMI) on oral feeding of preterm infants: A randomized clinical trial. *International journal of pediatric otorhinolaryngology*. 2019;120:202-9.
6. Lyu TC, Zhang YX, Hu XJ, Cao Y, Ren P, Wang YJ. The effect of an early oral stimulation program on oral feeding of preterm infants. *International journal of nursing sciences*. 2014;1(1):42-7.
7. Greene Z, O'Donnell CP, Walshe M. Oral stimulation techniques in preterm infants—International research challenges. *Journal of Neonatal Nursing*. 2013;19(4):168-74.
8. Nassar MIH, Helmy AA, Ayed MAM. Effect of oral stimulation technique application on promoting feeding among preterm infants. *Egyptian Journal of Nursing and Health Sciences*. 2021;2(2):298-316.
9. Li XL, Liu Y, Liu M, Yang CY, Yang QZ. Early premature infant oral motor intervention improved oral feeding and prognosis by promoting neurodevelopment. *American journal of perinatology*. 2020;37(06):626-32.
10. Ghomi H, Yadegari F, Soleimani F, Knoll BL, Noroozi M, Mazouri A. The effects of premature infant oral motor intervention (PIOMI) on oral feeding of preterm infants: A randomized clinical trial. *International journal of pediatric otorhinolaryngology*. 2019;120:202-9.
11. Mahmoodi N, Knoll BL, Keykha R, Jalalodini A, Ghaljaei F. The effect of oral motor intervention on oral feeding readiness and feeding progression in preterm infants. *Iranian Journal of Neonatology*. 2019;10(3):25.
12. El-Shahat HT, Elsamman GA, Mohamed A, Elwahab A, Mohamed MF. Effect of prefeeding oral stimulation technique on reaching to full oral feeding in preterm newborn in neonatal intensive care units in Ismalia city. *IOSR Journal of Nursing and Health Science*. 2018;7(4):50-8.
13. Thakkar PA, Rohit HR, Ranjan Das R, Thakkar UP, Singh A. Effect of oral stimulation on feeding performance and weight gain in preterm neonates: a randomised controlled trial. *Paediatrics and international child health*. 2018;38(3):181-6.
14. Arora K, Goel S, Manerkar S, Konde N, Panchal H, Hegde D, et al. Prefeeding oromotor stimulation program for improving oromotor function in preterm infants—A randomized controlled trial. *Indian pediatrics*. 2018;55:675-8.
15. Asadollahpour F, Yadegari F, Soleimani F, Khalesi N. The effects of non-nutritive sucking and pre-feeding oral stimulation on time to achieve independent oral feeding for preterm infants. *Iranian journal of pediatrics*. 2015;25(3):69.
16. Lyu TC, Zhang YX, Hu XJ, Cao Y, Ren P, Wang YJ. The effect of an early oral stimulation program on oral feeding of preterm infants. *International journal of nursing sciences*. 2014;1(1):42-7.
17. Liu YL, Chen YL, Cheng I, Lin MI, Jow GM, Mu SC. Early oral-motor management on feeding performance in premature neonates. *Journal of the Formosan Medical Association*. 2013;112(3):161-4.

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