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Case Study

Analysis of tactile-kinesthetic stimulation in babies with asphyxia and a nursing care diagnosis of the risk of aspiration in the perinatal unit

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Abstract:
Infants with a low birth weight (LBW) are those born with a weight of less than 2500 grams, and they are predisposed to a range of health complications, including neonatal asphyxia. This condition has been shown to have a detrimental effect on oromotor functions, such as sucking and swallowing. These functions are of crucial importance in the initiation of effective oral feeding. Impairment in these reflexes has been demonstrated to directly influence nutritional intake and may have a detrimental effect on long-term neurological outcomes. The present study was conducted with the objective of examining the effect of tactile–kinesthetic stimulation on improving sucking and swallowing reflexes in low birth weight (LBW) infants who have experienced asphyxia. The Early Feeding Skills (EFS) tool was utilized to assess the infants' development. A qualitative descriptive design with a case study approach was applied over a period of three consecutive days in the Perinatology Unit of RSUD dr. Soebandi Jember. The intervention comprised structured tactile and kinesthetic stimulation, administered twice daily. The findings revealed a progressive improvement in oromotor readiness, with EFS scores increasing from 79.1% on the first day (partial readiness) to 91.7% on both the second and third days (independent feeding readiness with minimal risk). The results of this study indicate that tactile–kinesthetic stimulation is a safe and beneficial nursing intervention to enhance functional feeding readiness in LBW infants with asphyxia. This method has the potential to function as a complementary strategy in neonatal care, with the aim of supporting the recovery of oral feeding abilities and reducing reliance on enteral nutrition.

Keywords:
low birth weight, asphyxia neonatorum, tactile stimulation, sucking behavior, feeding skills

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INTRODUCTION

Infants with low birth weight (LBW) constitute a highly vulnerable neonatal population due to their physiological immaturity and susceptibility to life-threatening complications. Globally, approximately 23% of the four million neonatal deaths each year are attributed to neonatal asphyxia,

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a condition characterised by the failure of newborns to initiate and sustain spontaneous breathing immediately after birth (Krishnan & Padarthi, 2016). The global prevalence of neonatal asphyxia ranges from 2 to 10 cases per 1000 live births, with a higher incidence observed in developing countries (Workineh et al., 2020). In Indonesia, asphyxia continues to contribute significantly to neonatal mortality, particularly among infants with a low birth weight (LBW) for gestational age. The risk of asphyxia for LBW infants is eight times higher than that of term infants (Hucek, 2022).

As demonstrated by reports from the East Java Provincial Health Profile and internal data from RSUD dr. Soebandi Jember, there has been an increase in the number of low birth weight (LBW) infants presenting with respiratory complications caused by asphyxia. A significant proportion of these infants necessitate perinatology care due to impaired oromotor reflexes, particularly in the domains of sucking and swallowing. LBW infants frequently demonstrate underdeveloped neurological and pulmonary systems, rendering them susceptible to complications associated with brainstem dysfunction, which compromises fundamental reflexes necessary for effective oral feeding (Farhatussalihah & Kurniasari, 2024). Such impairments have been shown to increase the risk of aspiration, inadequate nutritional intake, and long-term developmental delays (Lestari, 2024).

It is therefore imperative to acknowledge that fostering oromotor development constitutes a pivotal element in the provision of neonatal care for infants with low birth weight who have experienced asphyxia. Tactile–kinesthetic stimulation has been identified as a promising intervention to enhance oromotor coordination through gentle touch and passive movements that stimulate cranial nerves responsible for sucking, swallowing, and breathing coordination (Juliawan et al., 2023). The clinical findings from RSUP Dr. Kariadi Semarang reported significant improvements in sucking strength, swallowing coordination, oxygen saturation, and cardiac stability among LBW infants who received tactile–kinesthetic stimulation twice daily for 10 minutes, along with notable gains in daily weight and a reduced length of hospitalization (Sihombing et al., 2024). The findings of this study are consistent with those reported in other studies, thereby further substantiating the clinical significance of this intervention (Waty & Elfi, 2025)

A preliminary assessment was conducted on three infants with low birth weight and asphyxia at the Perinatology Unit of RSUD dr. Soebandi Jember. This revealed poorly coordinated sucking and swallowing reflexes, as well as residual breast milk, in the oral cavity following feeding. Following a three-day period involving tactile–kinesthetic stimulation, enhancements were evident in sucking strength, swallowing coordination, and aspiration risk. These findings are consistent with existing evidence that suggests tactile–kinesthetic stimulation is a safe and effective non-pharmacological approach to enhance oromotor function in LBW infants with asphyxia.

It is therefore the aim of the present study to analyse the application of tactile–kinesthetic stimulation on sucking and swallowing reflexes in LBW infants with asphyxia who are diagnosed with a nursing problem of aspiration risk in the Perinatology Unit of RSUD dr. Soebandi Jember.

METHOD

The present study employed a case study design to explore the effects of tactile–kinesthetic stimulation on oromotor reflexes in low birth weight (LBW) infants with neonatal asphyxia. The

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subjects of the research were selected according to inclusion criteria, namely newborns with a birth weight of less than 2500 grams, diagnosed with neonatal asphyxia, and free from major congenital abnormalities affecting respiratory or neurological function (Berhe et al., 2020). The sampling method employed was purposive, with considerations including the infants' clinical stability, the family's readiness, and the availability of intensive neonatal care.

The instruments used for this purpose included a clinical observation sheet for assessing sucking and swallowing reflexes, a pulse oximeter, a digital thermometer, and a standardized tactile–kinesthetic stimulation protocol (Yusniara et al., 2021). The intervention was administered directly in order to evaluate its influence on oromotor performance. Prior to the intervention, an initial assessment was performed to determine the infant's baseline condition. Infants who met the inclusion criteria were administered tactile–kinesthetic stimulation for a period of 10 minutes on two separate occasions throughout each day, over three consecutive days (Juwita et al., 2023).

To maintain article quality, authors should use reporting guidelines. The method should describe the type of research, design, population, and sample, as well as the sampling technique, intervention (if applicable), place and time, instrument, data collection, data analysis, interpretation, and ethical declaration.

The data collection process entailed continuous monitoring of physiological and oromotor responses before, during, and after each stimulation session. Subsequent analysis involved comparing the observational findings across the three intervention days, with the objective of identifying functional improvements. The results were interpreted in a descriptive manner to capture changes in feeding readiness and coordination.

Throughout the study, ethical procedures were scrupulously adhered to. Prior to signing informed consent forms, parents or legal guardians were provided with detailed information about the study's purpose, procedures, and potential benefits. The study was conducted in the Perinatology Unit of RSUD Dr. Soebandi Jember from December 2024 to January 2025. The population of this study comprised all infants with low birth weight (LBW) who had been admitted to the intensive care unit with asphyxia. A total of three infants satisfied the inclusion and exclusion criteria and were therefore selected as study subjects.

RESULT

This section presents the outcomes of the tactile-kinesthetic stimulation implemented for three consecutive days in a preterm infant with asphyxia. The degree of readiness to start feeding was evaluated using the Early Feeding Skills (EFS) instrument. All scores were converted into percentages and interpreted according to the established clinical categories. The data is presented in open-format tables.

Overview of Implementation

The intervention was administered daily at 8:00 a.m. The commencement of each session was initiated with an evaluation of oromotor reflexes. This was followed by the administration of tactile-

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kinesthetic stimulation for approximately 20 minutes. The EFS scores were then classified into clinical categories, as illustrated below.

Table 1. Clinical Interpretation of EFS Scores

No	Percentage Score	Clinical Interpretation
1	21 - 24 (≥ 85%)	Independent feeding readiness with minimal risk
2	15 – 20 (60–84%)	Partial readiness, requiring supportive measures
3	1-14(≥ 60%)	Significant immaturity, requiring alternative nutrition strategies

Daily Implementation Outcome

Day 1: December 23, 2024

Before the intervention, the infant demonstrated weak sucking, unclear swallowing, and limited active movement. After tactile-kinesthetic stimulation, spontaneous movement improved, and the rooting reflex began to appear.

Table 2. Evaluation Scores on Day 1

No	Indicator	Score
1	Active mouth opening when lips are touched	2
2	Initiates sucking immediately once the teat is inserted	2
3	Strength of sucking	1
4	Milk leakage at the lips	2
5	Gurgling/rattling sounds	3
6	Hard swallowing or prominent gulping	3
7	High-pitched yelping sound during swallow-breath transition	3
8	Coughing or choking	3
	Total Score	19

Score Percentage: 79.1%
Clinical Interpretation: Partial feeding readiness, the infant showed early improvement but still required continued stimulation

Day 2: December 24, 2024

The infant demonstrated 3–4 coordinated sucking attempts before the intervention and tolerated OGT feeding without vomiting. Following stimulation, sucking and swallowing coordination improved, with no signs of stress or milk loss.

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Table 3. Evaluation Scores on Day 2

No	Indicator	Score
1	Active mouth opening when lips are touched	2
2	Initiates sucking immediately once the teat is inserted	2
3	Strength of sucking	3
4	Milk leakage at the lips	3
5	Gurgling/rattling sounds	3
6	Hard swallowing or prominent gulping	2
7	High-pitched yelping sound during swallow-breath transition	2
8	Coughing or choking	3
	Total Score	20

Score Percentage: 83.3%
Clinical Interpretation: With minimal risk, the infant demonstrated feeding readiness and required only light monitoring.

Day 3: December 25, 2024

Before stimulation, the sucking and swallowing reflexes appeared stable. The infant was able to perform 3–4 consecutive sucks without losing fluid. After the session, tactile response around the facial and oral area improved further

Table 4. Evaluation Scores on Day 3

No	Indicator	Score
1	Active mouth opening when lips are touched	3
2	Initiates sucking immediately once the teat is inserted	3
3	Strength of sucking	2
4	Milk leakage at the lips	3
5	Gurgling/rattling sounds	3
6	Hard swallowing or prominent gulping	2
7	High-pitched yelping sound during swallow-breath transition	2
8	Coughing or choking	3
	Total Score	21

Score Percentage: 87.5%
Clinical Interpretation: The infant demonstrated independent feeding readiness, and was considered safe to breastfeed directly with light monitoring.

DISCUSSION

The findings of this case study demonstrate a consistent enhancement in oromotor function following three consecutive days of tactile-kinesthetic stimulation in a low-birth-weight infant with moderate asphyxia. The preliminary evaluation indicated an initial level of readiness to feed, as indicated by the infant's weak sucking abilities, uncoordinated swallowing, and instances of feeding intolerance (Saleh Faidah et al., 2019). These characteristics are commonly observed in preterm infants with perinatal asphyxia, as neuromuscular mechanisms responsible for coordinated sucking, swallowing, and breathing are often underdeveloped in this population (Husniyeh et al., 2023)

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The gradual increase in Early Feeding Skills (EFS) scores across the three days demonstrates the effectiveness of tactile-kinesthetic stimulation in facilitating the maturation of feeding reflexes. The enhancement in sucking strength, reduction in milk leakage, absence of gurgling, and stable respiratory parameters suggest enhanced neuromotor coordination (Bahrami et al., 2019). These findings are consistent with those of previous studies, indicating that structured sensory-motor stimulation can promote the earlier development of feeding competence and reduce the risk of aspiration among preterm infants (El Khoury et al., 2018).

The novelty of this study lies in the integration of EFS indicators with nursing outcome criteria, particularly the linkage between EFS scores and the expected outcomes in the Indonesian SLKI framework, such as improved swallowing ability, decreased coughing, and clear airway status. This integration serves to reinforce the clinical relevance of EFS as a comprehensive assessment instrument for assessing aspiration risk, thereby underscoring its importance in routine nursing practice (Hariati et al., 2025). The consistent improvement observed in all eight EFS indicators lends support to the hypothesis that tactile-kinesthetic stimulation is an effective, evidence-based intervention in neonatal care (Hariati et al., 2025).

Beyond the clinical improvement observed, the study's results highlight broader implications for nursing practice. The intervention is characterized by simplicity, non-invasiveness, and feasibility of implementation in perinatology units, thereby constituting a valuable addition to standard care for infants at high risk of feeding difficulties (Rita et al., 2021). The enhancement of oromotor skills in early stages of development has been demonstrated to reduce the probability of aspiration, whilst concomitantly facilitating a more expeditious transition from enteral to oral feeding. This, in turn, contributes to achieving nutritional stability and, by extension, a reduction in the duration of hospitalization (Balci et al., 2023).

This study also serves to reinforce the concept of neuroplasticity, which proposes that repeated, targeted stimulation can enhance the maturation of neural pathways involved in feeding (Hastuti & Juhaeriah, 2016). The consistent upward progression of EFS scores in this case lends support to the theoretical framework, thereby suggesting that sensory-motor stimulation delivers measurable benefits within a short timeframe.

Nevertheless, this study is not without its limitations. The study is limited to a single subject, which restricts the generalizability of the findings. The brevity of the observation period precludes the evaluation of long-term outcomes, including, but not limited to, sustained oral feeding ability and growth parameters (Kaufmann et al., 2022). Furthermore, given that this study was conducted within a controlled clinical environment, it is acknowledged that the results may not be generalizable to settings with limited resources or inconsistent caregiving practices. It is recommended that future research employ larger sample sizes, longer follow-up periods, and controlled comparative designs in order to strengthen the evidence base (Naderifar et al., 2024).

The enhancements observed over the course of three days suggest that tactile-kinesthetic stimulation is a promising intervention for enhancing oromotor function and reducing aspiration risk in low-birth-weight infants with asphyxia. The integration of structured assessment tools, such as the Early Follow-Up System (EFS), with nursing outcome measures increases the clinical applicability of this approach and contributes meaningful evidence to neonatal nursing practice.

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CONCLUSION

The implementation of tactile-kinesthetic stimulation in infants born with a low birth weight (BBLR) who have experienced asphyxiation is undertaken in accordance with the established protocol. The intervention was administered over a period of three days, with each session lasting approximately ten minutes. It encompassed a series of gentle touches and passive movements, executed consistently without any adverse effects. It is demonstrated that throughout the program's duration, all stages can be executed safely and reliably. This finding indicates that the program's implementation in a clinical setting is both feasible and appropriate. The use of the Early Feeding Skills (EFS) instrument in the evaluation process has yielded an improvement in the attained scores with respect to the domains of oromotor function and deglutition. It has been demonstrated that tactile and kinesthetic stimulation is conducive to the development of optimal reflexes related to sucking, swallowing, and breastfeeding. This finding provides a response to the research question of whether tactile-kinesthetic stimulation exerts a positive effect on early feeding in infants born with a low birth weight and who have experienced asphyxiation. It is recommended that the implementation of this intervention be considered as a component of the overall support provided to infants who are at risk, with close monitoring of their clinical responses during each session.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest related to the conduct and publication of this study.

REFERENCES

Bahrami, B., Marofi, M., Farajzadegan, Z., & Barekatain, B. (2019). Validation of the Early Feeding Skills Assessment Scale for the Evaluation of Oral Feeding in Premature Infants. *10*(2). https://doi.org/10.22038/ijn.2018.32322.1451

Balci, N. C., Takci, S., & Seren, H. C. (2023). Improving feeding skills and transition to breastfeeding in early preterm infants: a randomized controlled trial of oromotor intervention. *September*, 1–7. https://doi.org/10.3389/fped.2023.1252254

Berhe, Y. Z., Kebedom, A. G., Gebregziabher, L., Assefa, N. E., Berhe, L. Z., Mohammednur, S. A., Wellay, T., Berihu, G., Welearegay, A. T., & Ahmed, S. (2020). Risk Factors of Birth Asphyxia Among Neonates Ethiopia Risk Factors of Birth Asphyxia Among Neonates Born in Public Hospitals of Tigray , Northern Ethiopia. *9927*. https://doi.org/10.2147/PHMT.S231290

Volume 01 Number 01 (December 2025)
p-ISSN: 0000-0000
e-ISSN: 0000-0000

El Khoury, G., Ramia, E., & Salameh, P. (2018). Misconceptions and Malpractices Toward Antibiotic Use in Childhood Upper Respiratory Tract Infections Among a Cohort of Lebanese Parents. *Evaluation and the Health Professions*, *41*(4), 493–511. https://doi.org/10.1177/0163278716686809

Farhatussalihah, N., & Kurniasari, K. (2024). Induksi Oksitosin Selama Persalinan Berhubungan Dengan Kejadian Asfiksia Pada Neonatus Cukup Bulan. *Jurnal Penelitian Dan Karya Ilmiah Lembaga Penelitian Universitas Trisakti*, 222–229. https://doi.org/10.25105/pdk.v9i1.18407

Hariati, S., Erfina, E., Dwi, A., Febriani, B., Alasiry, E., & Asriaty, A. (2025). *Adaptation and validation of the Indonesian version of the early feeding skill assessment tool for low birth weight infants*. 1–10.

Hastuti, D., & Juhaeriah, J. (2016). Efek Stimulasi Taktil Kinestetik Erhadap Perkembangan Bayi Berat Badan Lahir Rendah. *Jurnal Keperawatan Padjadjaran*, *v4*(n1), 70–78. https://doi.org/10.24198/jkp.v4n1.7

Hucek, M. (2022). Asfixia Event Based On LBW History And Early Children's Fertilizer. *Journal of Applied Nursing and Health*, *4*(2), 272–276. https://doi.org/10.55018/janh.v4i2.111

Husniyeh, M., Susanto, T., & Latifa Aini Susumaningrum. (2023). *Kelimutu Nursing Journal*. *1*(2), 112–128.

Juliawan, N. G., Kristianto, A. K., & Apriastini, N. K. T. (2023). Pengaruh Stimulasi Oromotor Dalam Memperbaiki Refleks Isap Bayi Prematur. *Sari Pediatri*, *24*(5), 341. https://doi.org/10.14238/sp24.5.2023.341-51

Juwita, S., Argaheni, N. B., & Alristina, A. D. (2023). SCOPING REVIEW : APPLICATION OF TACTILE / KINESTHETIC STIMULATION IN PRETERM INFANTS. *11*(1), 65–74.

Kaufmann, M., Seipolt, B., Rüdiger, M., & Mense, L. (2022). Tactile stimulation in very preterm infants and their needs of non-invasive respiratory support. *Frontiers in Pediatrics*, *10*, 1041898. https://doi.org/10.3389/fped.2022.1041898

Krishnan, D. M., & Padarthi, D. S. (2016). A Prospective Study on Intrapartum Risk Factors for Birth Asphyxia. *IOSR Journal of Dental and Medical Sciences*, *15*(09), 04–07. https://doi.org/10.9790/0853-1509120407

Lestari, D. L. (2024). Asfiksia Neonatorum. *Scientific Journal*, *3*(1), 8–15. https://doi.org/10.56260/sciena.v3i1.124

Naderifar, E., Tarameshlu, M., Salehi, R., Ghelichi, L., Bordbar, A., Moradi, N., & Lessen, B. (2024). A Single-Subject Study to Consider the Premature Infant Oral Motor Intervention Combined with Kinesio-Tape in Premature Infants with Feeding Problems. 2024.

Rita H. Pickler, PhD, RN, F., Jareen Meinzen-Derr, PhD, M., Margo Moore, MS, R., Stephanie Sealschott, MS, R., & Karin Tepe, BS, R. (2021). Effect of Tactile Experience During Preterm Infant Feeding on Clinical Outcomes. *69*, 1–17. https://doi.org/10.1097/NNR.0000000000000453.Effect

Saleh Faidah, H., Haseeb, A., Yousuf Lamfon, M., Mohammad Almatrafi, M., Abdullah Almasoudi, I., Cheema, E., Hassan Almalki, W., E Elrggal, M., Mohamed, M. A., Saleem, F., Mansour Al-Gethamy, M., Pervaiz, B., Khan, T. M., & Azmi Hassali, M. (2019). Parents' self-directed practices towards the use of antibiotics for upper respiratory tract infections in Makkah, Saudi Arabia. *BMC Pediatrics*, *19*(1), 1–9. https://doi.org/10.1186/s12887-019-1391-0

Sihombing, J. C. B. R., Mariana, I., Wahyuni, J., Tinambunan, J. S. T., & Siregar, D. N. (2024). Efektivitas Stimulasi Oral Terhadap Peningkatan Reflek Hisap Lemah Pada Bayi Prematur Di RSU Royal Prima Medan. *Holistik Jurnal Kesehatan*, *18*(2), 171–177. https://doi.org/10.33024/hjk.v18i2.133

Waty, E., & Elfi, T. (2025). PENERAPAN ORAL SENSORIMOTOR THERAPY PADA BAYI BARU LAHIR DENGAN BBLR DI RUANG PERINATOLOGI RSUD Dr. T.C HILLERS MAUMERE. *Jurnal Kesehatan Tambusai*, *6*(1), 2684–2689. https://doi.org/10.31004/jkt.v6i1.42043

Workineh, Y., Semachew, A., Ayalew, E., Animaw, W., Tirfie, M., & Birhanu, M. (2020). Prevalence of

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p-ISSN: 0000-0000
e-ISSN: 0000-0000

perinatal asphyxia in East and Central Africa: systematic review and meta-analysis. *Heliyon*, *6*(4). https://doi.org/10.1016/j.heliyon.2020.e03793

Yusniara, Puspita, Y., Purnama, W. indah, & Sari, E. (2021). PENGARUH STIMULASI TAKTIL KINESTATIK TERHADAP PERTUMBUHAN DAN PERKEMBANGAN BAYI RIWAYAT BERAT BADAN LAHIR RENDAH. *9*(2), 16–23.