

Nursing management of ineffective breathing pattern in a preterm neonate with asphyxia: A case study

Rika*, Siti Arifah

Universitas Aisyiyah Yogyakarta

Corresponding author: *Email: rikarika0087@gmail.com

Abstract

Background: Neonatal asphyxia can impair spontaneous breathing, particularly in premature infants with immature respiratory systems.

Purpose: This case study described nursing management of an ineffective breathing pattern in a preterm neonate with a documented medical diagnosis of asphyxia.

Method: A descriptive case study was conducted using the nursing process. Data were obtained through clinical observation, physical examination, medical record review, and communication with the family and healthcare professionals. The infant's clinical course was evaluated from December 1 to 3, 2025. Written informed consent for publication was obtained from the parent or legal guardian.

Results: The neonate was born at 33 weeks of gestation, weighing 1,890 g, and required continuous positive airway pressure (CPAP). The medical record documented neonatal asphyxia and low birth weight. Recorded CPAP settings included an FiO₂ of 30% and a PEEP of 7 cmH₂O during part of the observation period; respiratory support was subsequently documented as nasal cannula oxygen at 1 L/minute. By December 3, the respiratory rate was 50 breaths/minute, oxygen saturation was 99%, and chest retractions were absent during one observation period. Temperature increased to 36.6°C after incubator adjustment, while nutritional monitoring remained necessary.

Conclusion: Selected respiratory and temperature parameters improved during the three-day observation period. However, the infant continued to require respiratory support, and nutritional adequacy had not been established. The case describes clinical progress and does not establish the independent effectiveness of specific nursing interventions.

Keywords: Asphyxia; Ineffective Breathing Pattern; Neonatal Nursing; Nursing Care; Prematurity.

INTRODUCTION

Neonatal asphyxia is a serious condition that may impair respiratory adaptation after birth and requires prompt medical and nursing assessment. Clinical findings such as weak respiratory effort, changes in skin color, and reduced neurological responses should be interpreted alongside the infant's medical history, examination, and documented investigations. Nursing care supports respiratory stability and the prevention of further complications (Dwiputra et al., 2025).

Respiratory instability in a preterm neonate may be associated with both the documented medical diagnosis of asphyxia and physiological immaturity of the lungs and respiratory control mechanisms. Findings such as an abnormal respiratory rate,

increased work of breathing, and chest retractions require repeated assessment. In this case, ineffective breathing pattern was treated as a nursing diagnosis, while asphyxia remained the medical diagnosis documented in the medical record. This distinction avoids attributing all respiratory abnormalities exclusively to one cause (Najib & Suminar, 2025).

Care for newborns with asphyxia focuses not only on oxygen supplementation but also on comprehensive physiological stabilization. Oxygen therapy has been shown to help reduce respiratory distress scores when administered according to clinical indications and under close monitoring. A combination of nursing interventions, including proper positioning and oxygen saturation monitoring, can

improve ventilation effectiveness. In perinatal care, oxygen therapy is often combined with other supportive interventions to maintain neonatal stability. A systematic nursing approach enables nurses to respond promptly to changes in the infant's condition. The effectiveness of oxygen therapy in newborns with asphyxia has been reported to improve respiratory parameters during a 3 × 24-hour period of intensive care (Manisa et al., 2024).

Asphyxia in premature infants with low birth weight is often accompanied by impaired thermoregulation. An infant weighing 1,890 grams has limited fat reserves and is therefore susceptible to a decrease in body temperature. Hypothermia increases respiratory workload and metabolic demands. Incubators are used to maintain a stable body temperature; however, temperature fluctuations may still occur. This condition demonstrates the close relationship between respiratory disturbances and temperature instability. Nursing studies have reported that newborns with asphyxia frequently experience multiple concurrent problems that interact and affect their respiratory and physiological conditions (Dwiputra et al., 2025).

In addition to respiratory disturbances, newborns with asphyxia may experience nutritional problems due to increased metabolic demands. Weak sucking reflexes can prevent infants from meeting their nutritional requirements through oral feeding. Intravenous nutrition or feeding through an orogastric tube (OGT) may be considered to prevent energy deficits, depending on the infant's clinical condition. Inadequate nutrition can delay tissue recovery and compromise the immune system. Nurses play an important role in monitoring feeding tolerance and signs of gastrointestinal disturbances. Nutritional deficits frequently occur alongside ineffective breathing patterns in newborns with neonatal asphyxia (Oktaviani et al., 2022).

Nursing care for newborns with asphyxia requires strong clinical skills and rapid decision-making. Small changes in oxygen saturation or respiratory rate may indicate clinical deterioration. Nurses must be able to integrate subjective and objective assessment data when determining intervention priorities. Accurate documentation supports continuity of care between nursing shifts. Every nursing intervention aims to preserve the infant's life and support successful physiological adaptation. This approach is consistent with the application of nursing care for patients with

asphyxia and ineffective breathing patterns described in recent nursing literature (Dwiputra et al., 2025).

Neonatal asphyxia often causes anxiety among family members who see their infants receiving intensive care. Nurses serve as the primary link between the medical team and the patient's family. Clear communication helps families understand the infant's condition without increasing their emotional distress. Emotional support from nurses also contributes to the overall quality of care. Family involvement can further help create a supportive environment for the infant. These roles have been described in various neonatal nursing case reports involving asphyxia (Najib & Suminar, 2025).

Nursing interventions must be tailored to the infant's clinical condition and response to therapy. Not all infants respond similarly to oxygen therapy or ventilation. Adjustments to the fraction of inspired oxygen (FiO₂) and positive end-expiratory pressure (PEEP) require close monitoring to prevent complications. Nurses are responsible for observing signs of respiratory fatigue and changes in the infant's behavior. Appropriate clinical decision-making helps prevent further deterioration. This approach is consistent with nursing practices reported in the care of newborns with asphyxia in neonatal intensive care units (NICUs) (Manisa et al., 2024).

Neonatal asphyxia may also have long-term effects on infant growth and development. Neurological impairments may occur when hypoxia persists for an extended period. Preventing further injury is a primary goal during the acute phase of care. Continuous nursing care helps minimize the risk of long-term sequelae. Monitoring reflexes and activity levels is an essential component of clinical evaluation. These concerns are frequently discussed in neonatal nursing case reports involving asphyxia (Arinandika et al., 2025).

RESEARCH METHOD

This study used a descriptive case study design based on the nursing process. The case was managed in the An-Ni'mah Ward at PKU Muhammadiyah Hospital, Yogyakarta, Indonesia. Nursing assessment began on December 1, 2025, and clinical evaluation continued through December 3, 2025. The subject was a preterm neonate born at 33 weeks of gestation, with a birth weight of 1,890 g. Neonatal asphyxia and low birth weight were documented as medical diagnoses in the medical

Rika*, Siti Arifah

Universitas Aisyiyah Yogyakarta

Corresponding author: *Email: rikarika0087@gmail.com

DOI: <https://doi.org/10.56922/mchc.v5i7.16>

record. The infant required respiratory support after delivery. The maternal record indicated cesarean delivery because of complete placenta previa and a history of bleeding during pregnancy.

Data were obtained through direct clinical observation, physical examination, medical record review, and communication with the infant's family and healthcare professionals. The assessment covered respiratory rate, respiratory effort, chest retractions, oxygen saturation, prescribed respiratory support and settings, body temperature, nutritional intake, fluid balance, elimination, infection risk, and relevant clinical history. Treatment and respiratory-support changes were described according to the available clinical documentation.

The nursing process comprised assessment, identification of nursing problems, care planning, intervention, and evaluation. Clinical responses were documented using the Subjective, Objective, Assessment, and Plan (SOAP) approach. Evaluation focused on respiratory status, temperature regulation, nutritional intake, and signs of infection. Ethical approval was obtained from the Research Ethics Committee of the Faculty of Health Sciences, Universitas 'Aisyiyah Yogyakarta, Indonesia (Approval No. 5234/KEP-UNISA/II/2025). Written informed consent for publication of this case report and relevant clinical information was obtained from the infant's parent or legal guardian and documented. The infant's anonymity was maintained throughout the report.

RESEARCH RESULTS

Clinical Assessment

The infant was born at 33 weeks of gestation with a birth weight of 1,890 g. The medical record documented neonatal asphyxia and low birth weight. Initial assessment identified respiratory instability requiring CPAP, chest retractions, temperature instability, inadequate nutritional intake, and risk of infection associated with prematurity and invasive devices.

Assessment component	Clinical findings	Nursing implications
Gestational age	33 weeks	Increased vulnerability associated with prematurity
Birth weight	1.890 g	Low birth weight
Respiratory status	CPAP support and chest retractions	Ineffective breathing pattern requiring close monitoring
Temperature regulation	Recorded temperature as low as 35°C	Need for thermal support and temperature monitoring
Nutrition	Immature feeding reflexes; nutritional support required	Inadequate nutritional intake
Infection risk	Intravenous access, orogastric tube, and umbilical catheterization documented	Need for infection prevention and surveillance
Blood gas analysis	pH 7.172, PaO ₂ 66 mmHg, HCO ₃ 16.6 mmol/L, base excess -12 mmol/L	Acid-base disturbance requiring clinical assessment
Electrolytes	Sodium 134 mmol/L; total calcium 8.5 mg/dL	Abnormal values requiring clinical correlation and monitoring

The recorded Apgar scores were 3 at one minute, 4 at two minutes, and 5 at three minutes. Initial findings included weak respiratory effort, reduced muscle tone, and pale or cyanotic skin. Respiratory support was initiated following delivery. These findings are reported as documented clinical observations and are not used alone to determine the relative contribution of asphyxia and prematurity to the respiratory condition.

Blood gas analysis showed pH 7.172, PaO₂ 66 mmHg, bicarbonate 16.6 mmol/L, and base excess -12 mmol/L. These findings indicated acidemia with a metabolic component and required interpretation alongside the clinical

Rika*, Siti Arifah

Universitas Aisyiyah Yogyakarta

Corresponding author: *Email: rikarika0087@gmail.com

DOI: <https://doi.org/10.56922/mchc.v5i7.16>

examination and respiratory-support conditions. They do not, in isolation, establish the cause of the respiratory abnormalities.

The arterial blood gas findings indicated acidemia, with a low bicarbonate concentration and negative base excess suggesting a metabolic component. These results required interpretation alongside the respiratory examination and other clinical findings. The documented oxygenation values were obtained while the infant was receiving respiratory support; therefore, they should not be interpreted independently of the treatment conditions.

Nursing Problem Identification and Prioritization

Respiratory care included regular assessment of respiratory rate, respiratory effort, chest retractions, oxygen saturation, and prescribed respiratory support. CPAP settings documented during part of the observation period included an FiO_2 of 30% and a PEEP of 7 cmH_2O . The record subsequently documented nasal cannula oxygen at 1 L/minute. The precise timing and sequence of CPAP-setting changes and transition to nasal cannula should be reported in accordance with the original clinical record; no undocumented time or setting is inferred here.

Nursing problem	Supporting findings	Priority
Ineffective breathing pattern	CPAP requirement, chest retractions, and respiratory instability	First
Temperature instability	Recorded low body temperature and need for incubator support	Second
Inadequate nutritional intake	Immature feeding reflexes and need for intravenous nutritional support	Third
Risk of infection	Prematurity and use of invasive devices	Fourth

The prioritization reflected the immediate need to maintain respiratory stability, followed by thermal regulation and support for other physiological requirements. The infant's clinical condition required reassessment because the severity of each problem could change during hospitalization.

Nursing Care Planning and Implementation

Nursing interventions were developed according to the identified problems and the infant's clinical condition.

Nursing problem	Main interventions	Evaluation indicators
Ineffective breathing pattern	Monitor respiratory rate, respiratory effort, chest movement, oxygen saturation, and prescribed respiratory support; maintain appropriate positioning	Respiratory rate, chest retractions, oxygen saturation, and respiratory support requirements
Temperature instability	Monitor body temperature and maintain an appropriate thermal environment using an incubator	Body temperature and clinical signs of thermal instability
Inadequate nutritional intake	Monitor prescribed intravenous fluids and nutritional support, feeding tolerance, body weight, and elimination; support breast milk administration when clinically appropriate	Feeding volume, tolerance, weight trend, and fluid balance

Rika*, Siti Arifah

Universitas Aisyiyah Yogyakarta

Corresponding author: *Email: rikarika0087@gmail.com

DOI: <https://doi.org/10.56922/mchc.v5i7.16>

Risk of infection	Apply aseptic techniques, assess invasive-device sites, and monitor clinical signs of infection	Clinical observations and relevant laboratory findings
-------------------	---	--

Respiratory care included regular monitoring of respiratory rate and chest retractions, assessment of oxygen saturation, and maintenance of prescribed CPAP settings. The documented settings included an FiO_2 of 30% and a PEEP of 7 cmH_2O during part of the observation period. Respiratory support was subsequently documented as nasal cannula oxygen at 1 L/minute. The exact timing and clinical criteria for this transition should be confirmed against the original medical record.

Thermal management involved incubator care and repeated temperature measurements. Incubator settings were adjusted according to the documented clinical response. Nutritional management included intravenous fluid support and, by the final evaluation, administration of colostrum at 2.5 mL every three hours. Infection prevention measures included aseptic handling of invasive devices and observation for signs of infection.

Evaluation of Nursing Care

The infant's clinical responses were evaluated over three days, from December 1 to December 3, 2025. Respiratory findings fluctuated during the observation period, and respiratory support remained necessary at the final documented evaluation.

Parameter	December 1, 2025	December 2, 2025	December 3, 2025
Respiratory rate	60 breaths/minute	65 breaths/minute in the recorded morning evaluation	50 breaths/minute
Oxygen saturation	99–100%	100%	99%
Chest retractions	Present	Present	Absent during one observation period
Respiratory support	CPAP documented	CPAP documented	Nasal cannula at 1 L/minute documented
Body temperature	36.7°C in the documented afternoon evaluation	36.2°C	Increased from 35.7°C to 36.6°C after incubator adjustment

On December 1, 2025, the infant was documented as receiving CPAP, with chest retractions and a respiratory rate of 60 breaths/minute. Oxygen saturation was 99–100% during support. On December 2, the respiratory rate increased to 65 breaths/minute, and chest retractions persisted while oxygen saturation was recorded at 100%. CPAP remained documented as the respiratory support.

On December 3, 2025, the respiratory rate was 50 breaths/minute, and chest retractions were absent during one observation period. Oxygen saturation was 99% while the infant was receiving nasal cannula oxygen at 1 L/minute. These findings indicate improvement in selected respiratory parameters but do not establish complete resolution of the ineffective breathing pattern.

Temperature evaluation also showed a fluctuating response. On December 3, the body temperature increased from 35.7°C to 36.6°C following an adjustment of the incubator setting from 33.5°C to 34°C. This improvement was consistent with a favorable response to thermal support, although continued temperature monitoring remained necessary.

Nutritional concerns persisted throughout the observation period. The infant's recorded weight remained 1,890 g, with no documented weight gain during the three days. By December 3, the infant had begun receiving colostrum at 2.5 mL every three hours. This represented the initiation of enteral feeding but did not establish that nutritional requirements had been fully met.

Rika*, Siti Arifah

Universitas Aisyiyah Yogyakarta

Corresponding author: *Email: rikarika0087@gmail.com

DOI: <https://doi.org/10.56922/mchc.v5i7.16>

No clinical signs of infection were reported during the evaluation period. However, the absence of documented signs over three days does not establish that the risk of infection had been eliminated. Continued surveillance and infection prevention remained appropriate because of prematurity and the use of invasive devices.

Overall, the evaluation indicated improvement in selected respiratory and temperature parameters, while nutritional management and monitoring of respiratory status, fluid balance, and infection risk remained necessary.

DISCUSSION

An ineffective breathing pattern is a nursing diagnosis describing an abnormal respiratory pattern that may compromise ventilation (Putri et al., 2024). Neonatal asphyxia is a medical diagnosis associated with impaired adaptation to breathing after birth (Sari, 2020). In this case, asphyxia was documented in the medical record; the nursing diagnosis of ineffective breathing pattern was based on the infant's respiratory findings and need for respiratory support.

Respiratory abnormalities in preterm neonates may reflect multiple clinical factors. Immaturity of the respiratory system is common among low-birth-weight infants and may contribute to respiratory instability (Efendi et al., 2019). Prematurity may also be associated with respiratory distress syndrome, including in infants with immature surfactant production (Ministry of Health of the Republic of Indonesia, 2023). Therefore, the respiratory findings in this case should be interpreted in the context of both prematurity and the documented diagnosis of asphyxia. The available findings do not establish that asphyxia alone caused all respiratory abnormalities.

Previous studies have described respiratory morbidity among term and preterm neonates and have discussed the clinical assessment of respiratory distress (Raha et al., 2022; Al Riyami et al., 2020). Such literature provides context for neonatal respiratory monitoring, but population-level findings cannot determine the specific cause of respiratory abnormalities in an individual infant. In this case, the recorded respiratory rate, chest retractions, oxygen saturation, and type of respiratory support were used to describe the clinical course. care unit (NICU) are among the most commonly observed neonatal complications (Al Riyami et al., 2020).

Preterm birth is defined as a live birth occurring before 37 completed weeks of gestation (Walani, 2020). Complications during labor have a significant influence on the incidence of preterm birth and may arise from maternal, fetal, placental, and other factors (Utami et al., 2018). Complications during pregnancy can lead to maternal and neonatal emergencies, which, if left untreated, may result in maternal or fetal death. Emergency care requires appropriate, accurate, and prompt intervention to prevent death and disability (Sulfianti et al., 2022).

Obstetric complications are also contributing factors to neonatal asphyxia. They may reduce blood flow to the placenta, resulting in an imbalance between oxygen and nutrient supply and the fetus's metabolic requirements. Consequently, oxygen transport decreases, and the fetus may not receive adequate oxygen to meet its needs (Fanny, 2015). Preterm delivery results in the birth of a premature infant, who faces various risks and complications due to organ immaturity. One of the complications experienced by premature infants is asphyxia, which may be associated with immature lung development (Kosim, 2016).

CONCLUSION

Nursing management of a preterm neonate with a documented medical diagnosis of asphyxia and the nursing diagnosis of ineffective breathing pattern included respiratory monitoring, management of prescribed respiratory support, thermal regulation, nutritional support, and infection prevention. During the three-day observation period, the respiratory rate decreased to 50 breaths/minute, oxygen saturation was 99%, and chest retractions were absent during one observation period. Body temperature increased to 36.6°C after incubator adjustment.

Despite these changes, the infant continued to require respiratory support, and nutritional adequacy had not been established. This single case describes clinical progress during nursing care but does not demonstrate the independent effectiveness of specific interventions. Continued individualized assessment and multidisciplinary neonatal care remained necessary.

REFERENCES

- Al Riyami, N., Al Hadhrami, A., Al Lawati, T., Pillai, S., Abdellatif, M., & Jaju, S. (2020). Respiratory

Rika*, Siti Arifah

Universitas Aisyiyah Yogyakarta

Corresponding author: *Email: rikarika0087@gmail.com

DOI: <https://doi.org/10.56922/mchc.v5i7.16>

- distress syndrome in neonates delivered at term-gestation by elective cesarean section at tertiary care hospital in Oman. *Oman Medical Journal*, 2020(35), e133.
- Arinandika, K. N., Indarwati, F., & Winarni, W. (2025). Pengaruh Holistic Comfort Care terhadap Parameter Fisiologis Pasien Neonatus dengan Asfiksia di Ruang NICU: Studi Kasus. *Jurnal Pustaka Keperawatan (Pusat Akses kajian Keperawatan)*, 4(1), 5-10.
- Dwiputra, A. H., Arifah, S., & Al Farisi, M. F. (2025). Aplikasi Asuhan Keperawatan Pasien Asfiksia dengan Pola Nafas Tidak Efektif: Nursing Care Application for Patients with Asphyxia with Ineffective Breathing Patterns. *Jurnal Keperawatan Bunda Delima*, 7(2), 270-276.
- Effendi, D., Sari, D., Riyantini, Y., Novardian, N., Anggur, D., & Lestari, P. (2019). Pemberian posisi (positioning) dan nesting pada bayi prematur: evaluasi implementasi perawatan di neonatal intensive care unit (NICU). *Jurnal Keperawatan Indonesia*, 22(3), 169-181.
- Fanny, F. (2015). Sectio caesarea sebagai faktor risiko kejadian asfiksia neonatorum. *Majority*, 4(3), 57-61.
- Kosim, M. S. (2016). Gawat darurat neonatus pada persalinan preterm. *Sari Pediatri*, 7(4), 225-31.
- Manisa, J. C., Kihi-Kihi, Y., Masanae, J., Kusuma, S. D., Yullianti, E. E., & Astuti, P. F. (2024). Penerapan terapi oksigen dan pijat bayi pada pasien asfiksia di ruang perinatologi. *Journal of Nursing*, 1(1), 16-21.
- Ministry of Health of the Republic of Indonesia. (2023). Mengenal Asfiksia Neonatorum. https://keslan.kemkes.go.id/view_artikel/2746/mengenal-asfiksia-neonatorum
- Najib, A., & Suminar, I. T. (2025). Laporan Kasus Pada Pasien Asfiksia Neonatus Dengan Pola Nafas Tidak Efektif Di Ruang High Care Unite RSUD Panembahan Senopati Bantul. *Menulis: Jurnal Penelitian Nusantara*, 1(8), 95-98.
- Oktaviani, E., Soewito, B., & Amelda, T. U. (2022). Penerapan Metode Swaddling Untuk Meminimalkan Nyeri Pada Neonatus dengan Asfiksia Selama Pemasangan infus. *JKM: Jurnal Keperawatan Merdeka*, 2(1), 46-51.
- Putri, A., Maharani, S., Ratnaningsih, T., & Wahyuni, L. (2024). Asuhan Keperawatan Dengan Masalah Pola Nafas Tidak Efektif Pada Bayi Asfiksia Di Rsi Sakinah Mojokerto (Doctoral dissertation, Perpustakaan Universitas Bina Sehat PPNI).
- Putri, D. P., & Rahmah. (2024). Perbedaan Status Oksigenasi Setelah Pemberian Nesting pada Asfiksia Neonatorum. <https://jurnalisticomah.org/index.php/jkmi/article/view/1295>
- Raha, B. K., Uddin, M. T., & Nurunnabi, M. (2022). Outcome of Preterm Admissions at the Neonatal Unit of a Tertiary Care Military Hospital of Bangladesh. *Journal of Bangladesh College of Physicians and Surgeons*, 40(1), 39-44.
- Sari, N. W. N. K. (2020). Gambaran Asuhan Keperawatan Pada Bayi Asfiksia Dengan Pola Napas Tidak Efektif Di Ruang Perinatologi Brsud Tabanan Tahun 2020 (Doctoral dissertation, Poltekkes Denpasar Jurusan Keperawatan).
- Sulfianti, S., Hutomo, C. S., Hasnidar, H., Supriadi, R. F., Muzayyarah, M., Arum, D. N. S., & Lestari, R. T. (2022). Gawat Darurat Maternal Neonatal. *Yayasan Kita Menulis*.
- Suryandari, C. H. R. Y., Arief, Y. S., & Utami, S. (2021). Factors affecting the implementation of developmental care in the care of premature babies in NICU nurses: A systematic review. *Nurs J*, 7(2).
- Walani, S. R. (2020). Global burden of preterm birth. *International Journal of Gynecology & Obstetrics*, 150(1), 31-33.

Rika*, Siti Arifah

Universitas Aisyiyah Yogyakarta
Corresponding author: *Email: rikarika0087@gmail.com

DOI: <https://doi.org/10.56922/mchc.v5i7.16>