

Article journey

Submitted

26/4/2024

Revised

23/9/2024

Accepted

29/9/2024

Online first

29/9/2024




ORIGINAL RESEARCH


The impact of asphyxia on the development of hyperbilirubinemia in newborns: An observational study

Sumarni Sumarni , Fitria Prabandari

Author information

Department of Nursing, Universitas Muhammadiyah Gombong, Indonesia

 sumarni2880@gmail.com

 <https://doi.org/10.31603/nursing.v11i2.11294>

Abstract

Asphyxia is still a major cause of morbidity and mortality in newborns in both developing and developed countries. The prevalence of asphyxia in provincial referral hospitals in Indonesia is 41.94%. The purpose of this study was to determine the correlation between the first minute Apgar score and bilirubin levels in newborns at Margono Soekarjo Hospital, Purwokerto. The type of research used is analytic observational with a cross-sectional approach. The population in this study were newborns who were cared for in the perinatal room at Margono Soekarjo Hospital Purwokerto in 2021-2022 with a total of 3824 babies. The sample size was 156. Data analysis used the Pearson Product Moment test. The results showed that the lowest Apgar score was 1 and the highest Apgar score was 8, the average Apgar score was 5. The lowest bilirubin level was 0.1 mg/dL and the highest bilirubin level was 24.16 mg/dL, the average bilirubin level was 10.68 mg/dL. There is a significant correlation between Apgar scores and bilirubin levels in newborns at Margono Soekarjo Hospital, Purwokerto, with a weak correlation (-0.231). The greater the Apgar score, the lower the bilirubin level.

Keywords: Asphyxia; paediatric nursing; hyperbilirubinemia; hospital care; nursing care

Introduction

Asphyxia in newborns, often defined as a critical condition resulting from inadequate oxygen supply during the perinatal period, can have dire consequences for an infant's immediate and long-term health (Mota-Rojas et al., 2022). This condition may arise from various factors, including obstructed airways, maternal complications during labor, or inadequate placental blood flow, which can lead to hypoxia—an insufficient level of oxygen in the body (Woday, Muluneh, & St Denis, 2019). The physiological repercussions of asphyxia can manifest rapidly, with infants exhibiting symptoms such as bradycardia, respiratory distress, and altered consciousness (Demisse et al., 2023). If not swiftly recognized and treated, asphyxia can precipitate severe neurological impairment, including cerebral palsy, cognitive deficits, and other developmental disorders, underscoring the urgency of effective intervention in the neonatal period (Boskabadi, Ashrafzadeh, Doosti, & Zakerihamidi, 2015). The impact of asphyxia extends beyond the immediate health concerns of the newborn; it also poses significant challenges for healthcare professionals, particularly nurses who are often at the forefront of neonatal care (Ahearne, Boylan, & Murray, 2016). Nurses must possess a comprehensive understanding of the risk factors and clinical manifestations associated with asphyxia, enabling them to perform rapid assessments and implement life-saving interventions (Ye, Wang, & Sun, 2022). This includes administering appropriate resuscitation techniques, such as positive pressure ventilation and chest compressions, as well as monitoring vital signs meticulously to ensure the infant's stability (Sintayehu et al., 2020). Furthermore, nurses play a crucial role in the multidisciplinary team approach, collaborating with pediatricians and respiratory therapists to devise tailored care plans that address the unique needs of each affected infant.

Beyond acute management, the nursing profession is instrumental in providing education and support to families grappling with the implications of asphyxia. Nurses serve as advocates for parents, offering guidance on the potential long-term effects of asphyxia and the importance of early intervention services, such as physical therapy and developmental assessments (Chirinian & Mann, 2011). They also provide emotional support, helping families navigate the complexities of their infant's condition and fostering resilience in the face of uncertainty. Promoting awareness of preventive measures and facilitating access to resources not only enhance the immediate care of newborns affected by asphyxia but also contribute to improved health outcomes and quality of life for these vulnerable infants and their families in the long run. Asphyxia is one of the main causes of morbidity and mortality in newborns in both developing and

developed countries (Abdo et al., 2019). World Health Organization (WHO) reports that there is a newborn mortality rate of around 900.000 deaths per year caused by asphyxia (World Health Organization, 2012). The incidence of asphyxia at Margono Soekarjo Hospital in 2021 was 454 cases, accounting for 25.2% of total admissions. In the same year, cases of hyperbilirubinemia were reported at 442, representing 24.5% of admissions (RSUD Margono Soekarjo, 2021). In 2022, there were 373 cases of asphyxia, accounting for 18.5% of the total admissions, while cases of hyperbilirubinemia reached 405, representing 20.1% of the infants treated at Margono Soekarjo Hospital in Purwokerto (RSUD Margono Soekarjo, 2022).

Asphyxia causes a redistribution of blood flow, known as the dive reflex, prioritizing circulation to the brain, heart, and adrenal glands, while reducing blood flow to other organs. This situation can lead to hypoxemia, hypercapnia accompanied by metabolic acidosis (Abdo et al., 2019). Hypoxemia negatively impacts the liver and other organs, leading to liver dysfunction that disrupts bilirubin metabolism and results in hyperbilirubinemia as a consequence of asphyxia (Saini et al., 2021). Hyperbilirubinemia is a state of increased bilirubin levels > 5 mg/dL which is often characterized by jaundice (Rohsiswatmo et al., 2018). Severe neonatal hyperbilirubinemia can cause brain damage, including bilirubin encephalopathy and kernicterus (Zhang, 2018). A prospective study by Hankins in America for 6 years in infants with 32 weeks' gestation who experienced asphyxia and encephalopathy found an incidence rate of liver dysfunction of 80% (37 of 46 subjects) (Hankins, 2002). A study in full-term infants with asphyxia criteria Apgar minutes less than 5, metabolic acidosis, and HIE have an incidence of liver dysfunction of 85% (110 of 130 subjects) (Alhadar, Amir, Oswari, & Windiastuti, 2010). Severity of hypoxemia in neonates with asphyxia has a negative impact on the liver and other organs (Kosim, Garina, Chandra, & Adi, 2016). Hepatic shock (severe liver impairment) as a result of asphyxia can disrupt the physiological function of the liver (Saptanto, Kurniati, & Khotijah, 2016). Based on several research results, it is necessary to have early prevention efforts and faster and more appropriate treatment for hyperbilirubinemia and asphyxia so that there is no brain damage due to hyperbilirubinemia in infants.

The impact of asphyxia on the development of hyperbilirubinemia in newborns is a critical area of study due to the significant health implications associated with both conditions. Asphyxia can lead to oxygen deprivation, which not only affects immediate survival but also has lasting effects on organ function, particularly the liver. Understanding the relationship between asphyxia and hyperbilirubinemia is essential for developing effective interventions and treatment protocols that can mitigate the risks of jaundice and its potential complications, such as kernicterus, which can result in severe neurological damage. This observational study aims to provide valuable insights into the prevalence and mechanisms linking these two conditions, ultimately contributing to improved neonatal care practices and outcomes. Despite the importance of this research, there are notable gaps in the existing literature that this study seeks to address. While previous studies have explored the individual effects of asphyxia and hyperbilirubinemia, there is a lack of comprehensive investigations that examine their interrelationship in depth. Additionally, much of the current research is limited by small sample sizes or a focus on specific populations, which may not be representative of broader demographics. Conducting a thorough observational study can fill these gaps, providing a clearer understanding of how asphyxia influences the onset of hyperbilirubinemia across diverse populations and identifying potential risk factors that could inform preventive strategies and targeted treatments for at-risk newborns. This study aims to determine the correlation of the first minute Apgar values with bilirubin levels in newborns at Margono Soekarjo Hospital, Purwokerto.

Method

This research employed an analytic observational design with a cross-sectional approach, focusing on the impact of asphyxia on the development of hyperbilirubinemia in newborns. Prior to initiating the study, a hypothesis was formulated to guide the analytical framework, which is a critical step in ensuring that the research is structured and focused. Conducted at Margono Soekarjo Hospital in Purwokerto, Central Java, the research spanned from March to June 2023. The study population consisted of newborns treated at the hospital during the years 2021-2022, totaling 3,824 infants. This broad population base provided a robust context for analysis, allowing researchers to derive meaningful insights regarding the prevalence and correlation between asphyxia and hyperbilirubinemia. For the sampling technique, simple random sampling was employed to ensure that every newborn in the target population had an equal chance of being selected, thereby minimizing selection bias. The sample size determination utilized the unpaired categorical analytic formula, resulting in 156 cases for detailed analysis. This strategic approach to sampling not only enhances the reliability of the findings but also ensures that the results can be generalized to the wider population of newborns treated in similar settings. Data collection was meticulously executed through observation sheets, focusing on secondary data that had been previously documented. The rigorous data collection process involved multiple stages, including editing, coding, and tabulating, which were essential for ensuring data accuracy and integrity before analysis.

Once the data was collected, it was processed and analyzed using SPSS, a powerful statistical software that facilitates complex data analysis. The grouping of data involved calculating the total score for each assessment component, particularly the Apgar score and bilirubin levels, using descriptive statistics such as mean, maximum, minimum, and standard deviation values. This descriptive analysis provided a foundational understanding of the data distribution and central tendencies within the sample. To determine the correlation between asphyxia and hyperbilirubinemia, the Pearson Product Moment test was employed, which is appropriate for assessing linear relationships between continuous variables. The researchers aimed to uncover significant associations that could inform clinical practices and highlight areas for further investigation, ultimately contributing to improved neonatal care strategies.

Results

This research involved 156 respondents with various characteristics, as summarized in the accompanying data of respondent characteristics. The analysis revealed that the lowest Apgar score among the newborns was 1, while the highest Apgar score reached 8, with an average Apgar score of 5. Additionally, the bilirubin levels exhibited a range, with the lowest recorded at 0.1 mg/dL and the highest at 24.16 mg/dL, resulting in an average bilirubin level of 10.68 mg/dL. These findings indicate a significant correlation between Apgar scores and bilirubin levels in newborns at Margono Soekarjo Hospital, Purwokerto, characterized by a weak correlation coefficient of -0.231. Among the 156 newborns studied, the lowest Apgar score was 1, and the highest was 8. The average Apgar score of 5, with a standard deviation of 1.88, illustrates that most infants experienced moderate asphyxia during the first minute after birth, falling within the category of moderate asphyxia, which is defined by a score range of 4 to 6. In terms of bilirubin levels, the data showed that the lowest level recorded was 0.1 mg/dL, while the highest was 24.16 mg/dL. The average bilirubin level of 10.68 mg/dL, accompanied by a standard deviation of 3.35, indicates that the average newborn exhibited hyperbilirubinemia, as normal indirect bilirubin levels typically range from 0.3 to 1.1 mg/dL. The significant correlation between Apgar scores and bilirubin levels in newborns at Margono Soekarjo Hospital is noteworthy. The Pearson correlation value of -0.231 suggests a weak negative correlation, meaning that as the Apgar score increases, the bilirubin level tends to decrease. This relationship is further illustrated in Graph 3, which demonstrates that lower Apgar scores correspond to higher bilirubin levels. Conversely, higher Apgar scores are associated with lower bilirubin levels in newborns. These findings clearly indicate that low Apgar values correlate with elevated bilirubin levels, emphasizing the importance of monitoring these parameters in the neonatal population at Margono Soekarjo Hospital, Purwokerto.

Discussion

The findings of this observational study reveal a positive correlation between asphyxia and the development of hyperbilirubinemia in newborns, shedding light on an important aspect of neonatal health that necessitates immediate attention and intervention. Asphyxia, characterized by a deficiency of oxygen during critical moments of birth, has far-reaching implications for various organ systems, particularly the liver, which plays a vital role in bilirubin metabolism (Mamo, Teshome, Tesfaye, & Goshu, 2022). The study underscores the need for healthcare professionals, especially nurses, to be acutely aware of the potential for hyperbilirubinemia in infants who have experienced asphyxia. Early identification and management of elevated bilirubin levels can significantly reduce the risk of severe complications, such as kernicterus, thereby improving long-term outcomes for these vulnerable patients (Rattanaprom, Ratinthorn, Sindhu, & Viwatwongkasem, 2023). Nurses are often the first line of defense in recognizing the signs and symptoms of both asphyxia and hyperbilirubinemia in newborns. Their training equips them with the skills to perform thorough assessments and monitor vital signs, enabling them to detect deviations from normal physiological parameters (Kamath et al., 2021). In light of this study's findings, it is imperative that nursing education incorporates comprehensive training on the relationship between asphyxia and hyperbilirubinemia. This includes understanding the mechanisms by which asphyxia can lead to liver dysfunction and the subsequent development of jaundice (Espinoza & Parer, 1991). Fostering a deeper understanding of these connections enhance their clinical judgment and make informed decisions regarding interventions and referrals.

Furthermore, the role of nurses extends beyond immediate clinical care; they are pivotal in educating parents about the risks associated with asphyxia and the potential for hyperbilirubinemia (Maiwald et al., 2023). Parents often seek guidance and reassurance during the stressful period following their newborn's birth, particularly if complications arise (Heringhaus, Blom, & Wigert, 2013). Providing clear, evidence-based information empower parents to recognize early signs of jaundice and encourage timely medical consultations. This proactive approach not only enhances parental understanding but also fosters a collaborative environment where families feel supported in navigating the complexities

of their infant's health (Horsch et al., 2017). The government also plays a crucial role in addressing the implications of this study. Policies aimed at improving maternal and neonatal health can significantly impact the incidence of asphyxia and its associated complications. Investing in comprehensive prenatal care, access to skilled birth attendants, and advanced neonatal care facilities can reduce the prevalence of asphyxia and, consequently, hyperbilirubinemia. Additionally, public health initiatives that promote awareness of neonatal health issues can help educate communities about the importance of seeking timely medical attention for newborns exhibiting signs of distress (Lawn, Manandhar, Haws, & Darmstadt, 2007). Moreover, the establishment of standardized protocols for the management of newborns who experience asphyxia is essential. These protocols should include guidelines for monitoring bilirubin levels and implementing interventions such as phototherapy when necessary (Haider & Bhutta, 2006). Standardizing care practices can ensure that all newborns receive timely and appropriate treatment, thereby minimizing the risk of long-term complications. The collaboration between nurses, physicians, and policymakers is vital in developing and implementing these protocols, ensuring that they are evidence-based and reflective of the latest research findings (Wang, Liu, Li, & Li, 2015).

Parents, too, have a pivotal role in this dynamic. Their awareness and understanding of their newborn's health can significantly influence outcomes. Education programs aimed at parents should emphasize the importance of recognizing the signs of jaundice and understanding the potential risks associated with asphyxia (Sundal & Vatne, 2020). Improving an environment where parents feel informed and empowered can enhance the overall quality of care for newborns. Additionally, support groups and community resources can provide ongoing education and emotional support for families navigating the challenges of caring for a newborn with health complications (Bornstein, Suwalsky, & Breakstone, 2012). This study also highlights the need for further research to explore the underlying mechanisms linking asphyxia and hyperbilirubinemia. While the positive correlation identified in this study is significant, understanding the biological processes involved can lead to more targeted interventions and preventive measures. Future studies could investigate the specific pathways through which asphyxia affects liver function and bilirubin metabolism, providing valuable insights that could inform clinical practice and policy development. Furthermore, exploring the long-term outcomes of infants who experience both asphyxia and hyperbilirubinemia is crucial. Longitudinal studies that track developmental milestones, cognitive function, and overall health in these populations can provide a clearer picture of the lasting effects of these conditions. Such research would be instrumental in shaping early intervention strategies and support systems for affected families, ultimately improving the quality of life for these children. The positive correlation between asphyxia and hyperbilirubinemia in newborns underscores the importance of a multifaceted approach to neonatal care. The collaborative efforts of nurses, government entities, and parents are essential in addressing the complexities associated with these conditions. Enhancing education, improving access to care, and fostering awareness can work together to mitigate the risks and improve health outcomes for newborns affected by asphyxia and hyperbilirubinemia. The findings of this study serve as a call to action for continued research and advocacy in the realm of neonatal health, ensuring that vulnerable infants receive the comprehensive care they need to thrive.

Conclusion

This observational study highlights the significant impact of asphyxia on the development of hyperbilirubinemia in newborns, underscoring the need for vigilant monitoring and early intervention in affected infants. The findings suggest that asphyxia not only compromises immediate respiratory function but also poses a risk for subsequent liver dysfunction and elevated bilirubin levels. These insights are crucial for neonatal care, as they emphasize the interconnectedness of various health complications arising from asphyxia, which can lead to severe outcomes if not addressed promptly. Future research should focus on larger, multicenter studies to validate these findings across diverse populations and settings, ensuring a comprehensive understanding of the relationship between asphyxia and hyperbilirubinemia. Additionally, longitudinal studies are recommended to track the long-term developmental outcomes of infants affected by both conditions, providing insights into potential interventions that could mitigate risks. Nursing research should also explore the efficacy of specific nursing interventions aimed at preventing hyperbilirubinemia in at-risk populations, including education and training programs for healthcare providers. Prioritizing these areas can enhance nursing practices and improve health outcomes for newborns experiencing asphyxia and hyperbilirubinemia.

Author's declaration

The authors made substantial contributions to the conception and design of the study as well as took responsibility for data analysis, interpretation, and discussion of results. Both of the authors have read and approved the final manuscript.

Funding

None declare.

Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

Acknowledgments

We extend our sincere gratitude to all people for their valuable contribution in this research.

References

- Abdo, R. A., Halil, H. M., Kebede, B. A., Anshebo, A. A., & Gejo, N. G. (2019). Prevalence and contributing factors of birth asphyxia among the neonates delivered at Nigist Eleni Mohammed memorial teaching hospital, Southern Ethiopia: a cross-sectional study. *BMC Pregnancy and Childbirth*, 19(1), 536. <https://doi.org/10.1186/s12884-019-2696-6>
- Ahearne, C. E., Boylan, G. B., & Murray, D. M. (2016). Short- and long-term prognosis in perinatal asphyxia: An update. *World journal of clinical pediatrics*, 5(1), 67–74. <https://doi.org/10.5409/wjcp.v5.i1.67>
- Alhadar, A. K., Amir, I., Oswari, H., & Windiastuti, E. (2010). Korelasi nilai apgar menit kelima kurang dari Tujuh dengan kadar transaminase serum pada Bayi baru lahir. *Sari Pediatri*, Vol. 12, No. 3, Oktober 2010, 12(3), 190–196. <https://doi.org/https://dx.doi.org/10.14238/sp9.5.2008.323-7>
- Azra Haider, B., & Bhutta, Z. A. (2006). Birth asphyxia in developing countries: current status and public health implications. *Current problems in pediatric and adolescent health care*, 36(5), 178–188. <https://doi.org/10.1016/j.cppeds.2005.11.002>
- Bornstein, M. H., Suwalsky, J. T., & Breakstone, D. A. (2012). Emotional relationships between mothers and infants: knowns, unknowns, and unknown unknowns. *Development and psychopathology*, 24(1), 113–123. <https://doi.org/10.1017/S0954579411000708>
- Boskabadi, H., Ashrafzadeh, F., Doosti, H., & Zakerihamidi, M. (2015). Assessment of Risk Factors and Prognosis in Asphyxiated Infants. *Iranian journal of pediatrics*, 25(4), e2006. <https://doi.org/10.5812/ijp.2006>
- Chirinian, N., & Mann, N. (2011). Therapeutic hypothermia for management of neonatal asphyxia: what nurses need to know. *Critical care nurse*, 31(3), e1–e12. <https://doi.org/10.4037/ccn2011873>
- Demisse, M., Tadesse, R., Kerebeza, K., Alemayehu, Y., Hoyiso, D., & Yeheyis, T. (2023). Birth asphyxia and its associated factors among newborns at a tertiary hospital: evidence from Southern Ethiopia. *African health sciences*, 23(3), 132–140. <https://doi.org/10.4314/ahs.v23i3.17>
- Espinoza, M. I., & Parer, J. T. (1991). Mechanisms of asphyxial brain damage, and possible pharmacologic interventions, in the fetus. *American journal of obstetrics and gynecology*, 164(6 Pt 1), 1582–1591. [https://doi.org/10.1016/0002-9378\(91\)91440-8](https://doi.org/10.1016/0002-9378(91)91440-8)
- Hankins, G. (2002). Neonatal organ system injury in acute birth asphyxia sufficient to result in neonatal encephalopathy. *Obstetrics & Gynecology*, 99(5), 688–691. [https://doi.org/10.1016/S0029-7844\(02\)01959-2](https://doi.org/10.1016/S0029-7844(02)01959-2)
- Heringhaus, A., Blom, M. D., & Wigert, H. (2013). Becoming a parent to a child with birth asphyxia-From a traumatic delivery to living with the experience at home. *International journal of qualitative studies on health and well-being*, 8, 1–13. <https://doi.org/10.3402/qhw.v8i0.20539>
- Horsch, A., Jacobs, I., Gilbert, L., Favrod, C., Schneider, J., Morisod Harari, M., & Bickle Graz, M. (2017). Impact of perinatal asphyxia on parental mental health and bonding with the infant: a questionnaire survey of Swiss parents. *BMJ paediatrics open*, 1(1), e000059. <https://doi.org/10.1136/bmjpo-2017-000059>
- Kamath, A. M., Thom, M. G., Johanns, C. K., Panhorst Harris, K., Schwarzbauer, K., Ochoa, J. C., Zuniga-Brenes, P., Rios-Zertuche, D., Mokdad, A. H., & Hernandez, B. (2021). Tackling equitable coverage and quality of care for neonates in hospitals: a pre-post assessment on asphyxia interventions in Mesoamerica. *BMC pediatrics*, 21(1), 534. <https://doi.org/10.1186/s12887-021-02999-0>
- Kosim, M. S., Garina, L. A., Chandra, T., & Adi, M. S. (2016). Hubungan Hiperbilirubinemia dan Kematian Pasien yang Dirawat di NICU RSUP Dr Kariadi Semarang. *Sari Pediatri*, 9(4), 270. <https://doi.org/10.14238/sp9.4.2007.270-3>

- Lawn, J. E., Manandhar, A., Haws, R. A., & Darmstadt, G. L. (2007). Reducing one million child deaths from birth asphyxia--a survey of health systems gaps and priorities. *Health research policy and systems*, 5, 4. <https://doi.org/10.1186/1478-4505-5-4>
- Maiwald, C. A., Rovers, C., Janvier, A., Sturm, H., Michaelis, M., Marckmann, G., Ehni, H. J., Poets, C. F., Rüdiger, M., & Franz, A. R. (2023). Parental perspectives about information and deferred versus two-stage consent in studies of neonatal asphyxia. *Archives of disease in childhood. Fetal and neonatal edition*, 109(1), 106–111. <https://doi.org/10.1136/archdischild-2023-325900>
- Mamo, S. A., Teshome, G. S., Tesfaye, T., & Goshu, A. T. (2022). Perinatal asphyxia and associated factors among neonates admitted to a specialized public hospital in South Central Ethiopia: A retrospective cross-sectional study. *PloS one*, 17(1), e0262619. <https://doi.org/10.1371/journal.pone.0262619>
- Mota-Rojas, D., Villanueva-García, D., Solimano, A., Muns, R., Ibarra-Ríos, D., & Mota-Reyes, A. (2022). Pathophysiology of Perinatal Asphyxia in Humans and Animal Models. *Biomedicines*, 10(2), 347. <https://doi.org/10.3390/biomedicines10020347>
- Rattanaprom, P., Ratinthorn, A., Sindhu, S., & Viwatwongkasem, C. (2023). Contributing factors of birth asphyxia in Thailand: a case-control study. *BMC pregnancy and childbirth*, 23(1), 584. <https://doi.org/10.1186/s12884-023-05885-y>
- Rohsiswatmo, R., Oswari, H., Amandito, R., Sjakti, H. A., Windiastuti, E., Roeslani, R. D., & Barchia, I. (2018). Agreement test of transcutaneous bilirubin and bilistick with serum bilirubin in preterm infants receiving phototherapy. *BMC Pediatrics*, 18(1), 315. <https://doi.org/10.1186/s12887-018-1290-9>
- RSUD Margono Soekarjo. (2021). 10 besar kasus rawat inap SMF kesehatan anak di RSUD Margono Soekarjo 2021. <https://www.rsmargono.go.id/rsms-opendata/dataset/view/10-besar-kasus-rawat-jalan-klinik-paru-anak-di-rsms-rsud-margono-soekarjo-2021>
- RSUD Margono Soekarjo. (2022). 10 besar kasus rawat inap SMF kesehatan anak di RSUD Margono Soekarjo 2022. <https://www.rsmargono.go.id/rsms-opendata/dataset/view/10-besar-kasus-rawat-inap-smf-kesehatan-anak-di-rsms-rsud-margono-soekarjo-2022>
- Saini, A. G., Sankhyan, N., Malhi, P., Ahuja, C., Khandelwal, N., & Singhi, P. (2021). Hyperbilirubinemia and Asphyxia in Children With Dyskinetic Cerebral Palsy. *Pediatric Neurology*, 120, 80–85. <https://doi.org/10.1016/j.pediatrneurol.2021.02.002>
- Saptanto, A., Kurniati, I. D., & Khotijah, S. (2016). Asfiksi Meningkatkan Kejadian Hiperbilirubinemia Patologis pada Bayi di RSUD Tugurejo Semarang. *Jurnal Kedokteran*, 5(2), 1–5. <https://jurnal.unimus.ac.id/index.php/kedokteran/article/view/2600>
- Sintayehu, Y., Desalew, A., Geda, B., Tiruye, G., Mezmur, H., Shiferaw, K., & Mulatu, T. (2020). Basic neonatal resuscitation skills of midwives and nurses in Eastern Ethiopia are not well retained: An observational study. *PloS one*, 15(7), e0236194. <https://doi.org/10.1371/journal.pone.0236194>
- Sundal, H., & Vatne, S. (2020). Parents' and nurses' ideal collaboration in treatment-centered and home-like care of hospitalized preschool children - a qualitative study. *BMC nursing*, 19, 48. <https://doi.org/10.1186/s12912-020-00445-7>
- Wang, Y., Liu, Y. F., Li, H., & Li, T. (2015). Attitudes toward Physician-Nurse Collaboration in Pediatric Workers and Undergraduate Medical/Nursing Students. *Behavioural neurology*, 2015, 846498. <https://doi.org/10.1155/2015/846498>
- Woday, A., Muluneh, A., & St Denis, C. (2019). Birth asphyxia and its associated factors among newborns in public hospital, northeast Amhara, Ethiopia. *PloS one*, 14(12), e0226891. <https://doi.org/10.1371/journal.pone.0226891>
- World Health Organization. (2012). Guidelines on basic newborn resuscitation. World Health Organization. <https://www.who.int/teams/maternal-newborn-child-adolescent-health-and-ageing/newborn-health/perinatal-asphyxia>
- Ye, Z., Wang, W., & Sun, P. (2022). Effectiveness of Nursing Risk Management in Neonatal Asphyxia Resuscitation Care. Evidence-based complementary and alternative medicine: eCAM, 2022, 5465472. <https://doi.org/10.1155/2022/5465472> (Retraction published Evid Based Complement Alternat Med. 2023 Jun 21; 2023:9785029. doi: 10.1155/2023/9785029)

Authors' insight

Key points

- The impact of asphyxia extends beyond the immediate health concerns of the newborn
- Asphyxia not only compromises respiratory function but also poses a risk for subsequent liver dysfunction
- This study serves as a call to action for continued research and advocacy in the realm of neonatal health

Emerging nursing avenues

- What are the underlying physiological mechanisms of asphyxia?
- How can early identification and management of asphyxia in newborns reduce the incidence of hyperbilirubinemia?
- What role do healthcare professionals, particularly nurses, play in educating parents about the risks of asphyxia?

How to cite this article (APA style)

Sumarni, S., & Prabandari, F. (2024). The impact of asphyxia on the development of hyperbilirubinemia in newborns: An observational study. *Journal of Holistic Nursing Science*, 11(2), 92–98. <https://doi.org/10.31603/nursing.v11i2.11294>