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Case Report: Grade 5 Neonatal Jaundice with Delayed Referral and Evaluation of Management in Surabaya

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Abstract

Background: Neonatal jaundice is a common condition in newborns due to increased bilirubin levels. If left untreated, it can cause serious complications such as kernicterus. Early detection, consistent management, and parental education are crucial to prevent long-term effects

Case Report: Baby Z, born full-term at the hospital with a birth weight of 3,300 grams, showed signs of jaundice on the second day. The baby was not immediately taken to a health facility and was only examined at the community health center at 9 days of age, diagnosed with grade 5 neonatal jaundice. After a follow-up on the 12th day, the condition remained the same, so a referral was made to a hospital in Surabaya. At the hospital, the infant received medication and breastfeeding education and was scheduled for a follow-up checkup in 7 days. At the follow-up checkup, the infant's total bilirubin level was measured at 12.89 mg/dL, and phototherapy was administered for 2x24 hours. After phototherapy, the total bilirubin level dropped to 8.73 mg/dL. Growth and development monitoring showed good motor development and feeding ability, although mild jaundice was still apparent at nearly two months of age.

Conclusion: Early detection, consistency in management, and education of parents about the danger signs of jaundice are key to preventing serious complications such as kernicterus and ensuring optimal infant development.

Keywords: Neonatal jaundice; Phototherapy; Early detection; Parent education; Access to primary health care and referral services

1. Introduction

Physiological jaundice is a common condition in newborns, characterized by increased serum bilirubin levels due to erythrocyte breakdown and immaturity of the hepatobiliary system. The accumulation of unconjugated bilirubin, which cannot be processed perfectly by the infant's liver, can cause yellow discoloration of the skin and sclera (Murniati, Kurniati, and Kusumasari, 2024). Although physiological in nature, this condition has the potential to develop into severe hyperbilirubinemia, which can cause neurological complications such as kernicterus if not treated quickly and appropriately (Azhari et al., 2024).

Data from the United Nations Children's Fund (UNICEF) shows that 1.8% of infant deaths worldwide are caused by hyperbilirubinemia among all perinatal cases (Ilawati and Susanti, 2022). According to the World Health Organization (WHO), the incidence of jaundice in developing countries such as Indonesia is around 50% in normal newborns and 80% in premature babies (WHO 2019). According to Basic Health Research data, the incidence of hyperbilirubinemia (the cause of neonatal jaundice) in Indonesia is 51.47% (Indonesian Ministry of Health, 2023). Recent data shows that hospitals in Surabaya report neonatal jaundice as one of the main reasons for neonatal visits, but the specific prevalence rate has not been explicitly published in the 2024 East Java Provincial Health Statistics.

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In some cases, untreated hyperbilirubinemia can lead to complications. High bilirubin levels can cause brain damage (kernicterus) and have long-term effects such as mental retardation, cerebral palsy (abnormal muscle control), deafness, and inability to move the eyes upward (Ilawati and Susanti, 2022). The American Academy of Pediatrics (AAP) recommends universal bilirubin screening before discharge from healthcare facilities. Countries that implement this have shown a significant reduction in kernicterus cases (AAP, 2022). The success of neonatal jaundice management in Indonesia is reflected in a case study at X Hospital in South Tangerang (2023), which shows that phototherapy intervention can reduce bilirubin levels within 2–3 days without causing complications (Desmiati and Selatan, 2025). The urgency of treating neonatal jaundice lies in the critical period of the first week of life, during which 75% of neonatal deaths occur, and 40% of those occur within the first 24 hours. Therefore, early detection, maternal education, and appropriate intervention are essential components of effective management (Utami and Arifah, 2024). The success of interventions such as bilirubin screening, phototherapy according to protocol, and early breastfeeding education has been proven to reduce referral rates and increase compliance with follow-up visits (Siregar, 2024).

Jaundice can be assessed using the Kramer scale, where the division of yellow zones on the baby's body illustrates the severity. Jaundice with a Kramer score of 5 indicates that the entire body of the baby, including the palms of the hands and soles of the feet, has turned yellow. This condition indicates a sufficiently high bilirubin level that the infant requires close observation, continuous care, and referral to an advanced facility. However, in practice, there are cases where infants with high-grade jaundice (Kramer 5) are not immediately referred by the community health center. This condition risks increasing complications and worsening the infant's condition. The purpose of this case report is to highlight the importance of early detection, consistent management, and parental education in handling neonatal jaundice, thereby preventing severe complications such as kernicterus and ensuring optimal infant growth and development.

2. Case Report

The assessment was conducted on Baby Z, a 9-day-old male infant born through normal delivery at a hospital in Surabaya, with a gestational age of 38-39 weeks. His birth weight was recorded at 3,300 grams, length 48.5 cm, head circumference 35 cm, and chest circumference 34 cm. On the second day after birth, the mother began to notice a yellowish discoloration of the baby's skin, but she did not immediately take the baby to a health facility because she was focused on the 7-day check-up schedule. On the 9th day, the baby was taken to the community health center and found to have grade 5 jaundice, where the yellow color had reached the palms of the hands and feet. The frequency of breastfeeding was recorded every 2–3 hours, with good activity, strong muscle tone, and a frequency of 1–2 bowel movements per day with soft consistency and brownish-yellow color, and a frequency of 6–7 urinations per day with clear yellow color.

Vital sign examination showed the infant's general condition within normal limits, respiration 44 times/minute, SpO_2 99%, body temperature 36.7°C, and pulse rate 128 times/minute. Weight remained at 3,300 grams. Based on examination at the health center, the infant was diagnosed with grade 5 neonatal jaundice. The health center provided education to the mother on increasing the frequency of breastfeeding and exposing the infant to morning sunlight, and scheduled a follow-up visit three days later.

During a follow-up visit to the health center on day 12, the infant still showed signs of jaundice with a severity of 5, so he was immediately referred to the hospital for further treatment. At the hospital, the infant received pharmacological therapy and was allowed to go home with instructions to return for a check-up one week later. During the follow-up visit to the hospital on day 19, the infant underwent further examination and was found to have a total bilirubin level of 12.89 mg/dL, so the infant was admitted and underwent phototherapy for 2x24 hours. After therapy, the total bilirubin level decreased to 8.73 mg/dL, and the infant was declared stable enough to be discharged. The next growth and development monitoring at 1 month and 8 days showed good results, with a weight of 4.6 kg and a length of 51 cm. The baby appeared to be feeding strongly with a frequency of every 2-3 hours, and the frequency of bowel movements and urination was within normal limits, both in terms of consistency and color. During the follow-up monitoring at 1 month and 27 days of age, the infant still showed mild jaundice (Kramer 1), but demonstrated good feeding ability and active motor movements, including the ability to move the head to the right and left, indicating age-appropriate motor development.

3. Discussion

Physiologically, jaundice usually begins to appear on the 2nd to 3rd day of life and peaks on the 3rd to 5th day, then gradually disappears within 7–10 days in full-term infants (Cloherty et al., 2022). After birth, infants experience the

breakdown of fetal erythrocytes (HbF) in large quantities. Newborns have a shorter erythrocyte lifespan (~80 days compared to 120 days in adults). This physiological hemolysis process increases unconjugated bilirubin levels. Monitoring bilirubin levels at 24–48 hours can predict the risk of severe hyperbilirubinemia. In Baby Z's case, signs of jaundice appeared at 2 days of age, which is still considered the early phase of physiological transition. With early detection of the initial signs on the second day, the baby should have undergone serum bilirubin testing and received appropriate treatment.

Delaying bringing the infant to a health facility until 9 days of age meant that bilirubin level monitoring was not performed during the most critical period (days 2–5), when bilirubin levels typically peak. As a result, bilirubin increased to a Kramer grade of 5, which is classified as pathological according to the AAP (2022). Midwives or health workers can actually conduct a second neonatal visit (day 3 to day 7) to comprehensively monitor the baby's condition through home visits by evaluating breastfeeding, checking for danger signs such as jaundice, monitoring early growth, and educating parents about baby care at home. These visits play an important role in the early detection of health disorders, preventing the progression of jaundice, and ensuring continuity of care in accordance with neonatal service standards. Ayele et al. (2022) in their study in Frontiers in Public Health found that only about 46% of mothers were able to correctly identify at least three signs of neonatal danger. The most influential factors are the quality of counseling by health workers and the timing of education during postpartum or neonatal visits. Widjaja et al. (2021) also mentioned that midwives and nurses often focus on the physical aspects of the mother and baby at discharge, but overlook effective communication about danger signs that require immediate action. According to the WHO (2023), every mother should receive postnatal education that includes recognizing danger signs in infants, such as yellow skin and eyes within the first 24 hours, poor feeding, fever, hypothermia, or seizures. This education is an integral part of efforts to reduce neonatal morbidity and mortality. In this case, the mother was fixated on the 7-day check-up schedule and did not take the baby to a health facility when he appeared jaundiced on the 2nd day. This condition indicates a gap in the transfer of information between health workers and mothers, resulting in mothers' perceptions of danger signs being inaccurate. Limited educational communication caused the mother to lose her ability to make quick decisions in risky situations.

During a 9-day-old examination at the community health center, neonatal jaundice with a Kramer grade of 5 was found. The baby was allowed to go home with recommendations to increase the frequency of breastfeeding, expose the baby to morning sunlight, and schedule a follow-up visit three days later. Sunbathing is no longer recommended as the primary treatment for jaundice. Sun exposure can help reduce mild bilirubin levels, but the risk of skin damage and skin cancer outweighs the benefits. Phototherapy remains the gold standard for managing neonatal jaundice. The Indonesian Pediatric Society (IDAI) emphasizes that sunbathing should only be done as a mild additional measure, provided it is done in the morning before 9 a.m., for a short duration (10–15 minutes), and not directly exposed to sunlight (through glass/windows) (IDAI, 2024). According to the Indonesian Ministry of Health (2022), in the Essential Neonatal Health Care Guidelines, babies with jaundice that has reached Kramer grade 4 or 5 must be referred to a hospital for total bilirubin level testing and assessment of phototherapy needs. This is because high-grade jaundice carries a risk of developing into pathological hyperbilirubinemia, which can cause permanent neurological damage if not treated promptly.

During the follow-up visit at the health center on day 12, the infant still showed signs of jaundice at Kramer grade 5, so they were immediately referred to the hospital for further management. Physiologically, jaundice appears after the first 24 hours of birth, peaks on days 3–5, and resolves within 1–2 weeks. In contrast, pathological jaundice is characterized by the appearance of jaundice within the first 24 hours, an increase in bilirubin levels >5 mg/dL per day, total bilirubin levels >12 mg/dL in full-term infants, or persistence for more than 10 days (Maisels & McDonagh, 2020). Infants who still show grade 5 jaundice on day 12 indicate that the jaundice is pathological and has not improved, so it is appropriate to refer them to a hospital for further examination and treatment to prevent severe complications such as kernicterus and ensure that the infant receives optimal therapy. At the hospital, the infant receives pharmacological therapy and is allowed to go home with a recommendation for a follow-up visit one week later. Pharmacological therapy such as ursodeoxycholic acid (UDCA) has been shown to accelerate the decrease in bilirubin levels and improve liver function in infants with prolonged jaundice or mild cholestasis (Alkrimi et al., 2021; Liu et al., 2023). In this case, the infant with grade 5 jaundice on day 12 exhibited prolonged jaundice. Infants with a history of grade 5 jaundice should not be discharged without first checking their bilirubin levels. Doing so could potentially delay the detection of bilirubin rebound, which could lead to severe complications such as bilirubin encephalopathy (kernicterus). In some hospital practices, infants are discharged without bilirubin testing due to facility or local policy factors. Therefore, family education and a strict follow-up schedule (≤48 hours) are essential to prevent delays in treatment if jaundice recurs. A

follow-up appointment one week later is important to evaluate the effectiveness of therapy and ensure the infant's condition continues to improve.

During the follow-up on day 19, further examination was performed, and the total bilirubin level was found to be 12.89 mg/dL, so the infant was admitted and underwent phototherapy for 2x24 hours. After therapy, the total bilirubin level decreased to 8.73 mg/dL, and the infant was declared stable enough to be discharged. The management of neonatal jaundice in the form of phototherapy is the main therapy aimed at reducing indirect bilirubin levels through the process of photoisomerization and oxidation into a water-soluble form that can be excreted through urine and feces (Maisels & McDonagh, 2020). Bilirubin levels must be monitored regularly to determine the effectiveness of therapy and prevent complications such as kernicterus. In this case, the infant had a total bilirubin level of 12.89 mg/dL at 19 days of age, which falls into the category of prolonged jaundice, given that the infant was older than 14 days but still had high bilirubin levels. This condition indicates the need for further evaluation to rule out pathological causes such as infection, congenital hypothyroidism, or hepatobiliary disorders, but it can also occur due to breast milk jaundice, which is jaundice caused by components in breast milk that slow down bilirubin conjugation. Phototherapy for 2x24 hours was the appropriate treatment given that the bilirubin level was above the intervention threshold. After therapy, the bilirubin level decreased to 8.73 mg/dL, indicating a good response to therapy. These results show the success of management in accordance with clinical standards (Indonesian Ministry of Health, 2022).

Follow-up growth monitoring at 1 month and 8 days showed good results with a weight of 4.6 kg and a length of 51 cm. The infant appeared to be feeding strongly with a frequency of every 2-3 hours, and the frequency of bowel movements and urination was within normal limits, both in terms of consistency and color. During follow-up monitoring at 1 month and 27 days of age, the infant still appeared to have mild jaundice (Kramer 1), but showed good feeding ability and active motor movements, including the ability to move the head to the right and left, indicating age-appropriate motor development. Post-treatment monitoring is an important step in ensuring the success of neonatal jaundice management and assessing its impact on infant growth and development. According to the American Academy of Pediatrics (AAP, 2022), infants who have experienced hyperbilirubinemia need to be monitored regularly to ensure that there are no neurological complications or growth disorders due to increased bilirubin, which is toxic to the central nervous system. As for infants who still appear yellow at nearly 2 months of age, according to Maisels (2021), this type of jaundice can persist until 8–12 weeks of age, but it does not adversely affect the infant's growth and development as long as bilirubin levels remain below toxic limits and the infant is feeding well. This condition reflects optimal management outcomes, both clinically and neurologically. The absence of warning signs such as poor feeding, hypotonia, or reflex abnormalities indicates that the previously elevated bilirubin levels did not cause neurotoxic effects.

4. Conclusion

The case of neonatal jaundice in Baby Z shows delayed detection, lack of postnatal education, and decision-making that contributed significantly to the progression of jaundice to Kramer grade 5. It is recommended that primary care health workers improve their competence through ongoing training on early detection and management of neonatal jaundice, and strengthen compliance with national guidelines for neonatal health services. With the consistent implementation of neonatal service standards and effective communication between health workers and families, delays in the treatment of severe jaundice can be minimized, and the risk of serious complications such as kernicterus can be prevented.

Compliance with ethical standards

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Disclosure of Conflict of interest

All authors declare have no conflict of interest in anything that has an effect on to articles.

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