

NEONATAL JAUNDICE: A COMPREHENSIVE REVIEW OF ETIOLOGIES, CLINICAL
MANIFESTATIONS, AND MANAGEMENT STRATEGIESAttia Imdad^{1*} and Ume Amara²¹Aziz Fatima Nursing College Affiliated with University of Health and Science.²Zalan Medical College Affiliated with University of Health and Science.

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ABSTRACT

Neonatal jaundice, characterized by the yellowish discoloration of the eyes and skin in newborns due to elevated bilirubin levels, poses a significant health concern worldwide. This review article aims to provide a comprehensive overview of neonatal jaundice, including its diverse etiologies, clinical presentations, and management approaches. The discussion encompasses both physiological and pathological causes, highlighting key factors influencing the need for treatment, such as bilirubin levels, age of the infant, and underlying conditions. Moreover, the review explores associated clinical features, such as excess sleepiness and loss of appetite, as well as potential consequences such as seizures and cerebral palsy. Various management strategies, ranging from conservative measures like frequent feeding to more advanced interventions like phototherapy and exchange transfusions, are examined in detail. Through synthesizing current knowledge and evidence-based practices, this review aims to enhance understanding and optimize management approaches for neonatal jaundice, ultimately contributing to improved outcomes for affected infants.

KEYWORDS: Neonatal jaundice, bilirubin, liver, unification, pathological causes.**BACKGROUND**

Neonatal jaundice is a common condition in newborns characterized by the yellowing of the skin and eyes due to elevated levels of bilirubin in the blood. A review of neonatal jaundice focusing on etiologies, clinical manifestations, and management strategies provides a thorough understanding of the condition.

Etiologies of neonatal jaundice can be diverse, encompassing both physiological and pathological causes. Physiological jaundice often occurs in healthy newborns due to the immature liver's inability to efficiently process bilirubin. Pathological causes may include hemolytic diseases, such as Rh incompatibility or ABO blood group incompatibility, as well as liver diseases or infections.

Clinical manifestations of neonatal jaundice extend beyond the visible yellowing of the skin and eyes. Newborns with jaundice may exhibit symptoms such as poor feeding, lethargy, and abnormal sleep patterns. In severe cases, complications such as seizures or cerebral palsy may occur, highlighting the importance of timely diagnosis and management.

Management strategies for neonatal jaundice vary depending on the underlying cause and severity of the condition. Conservative measures, such as frequent feeding to promote bilirubin excretion, may be sufficient for mild cases. Phototherapy, which involves exposing the baby's skin to special lights to break down bilirubin, is commonly used for moderate to severe jaundice. In cases where phototherapy is ineffective or the bilirubin levels are dangerously high, exchange transfusions may be necessary to rapidly lower bilirubin levels.

The earliest known mention of neonatal jaundice dates back to a Chinese textbook from a millennium ago.^[1] It commonly occurs as a natural physiological phenomenon during the transitional phase after birth. Rather than being a singular ailment, it manifests as a physical manifestation associated with various potential factors. Severe neonatal jaundice is considered pathophysiological. Jaundice arises from the accumulation of bilirubin, a yellow-orange pigment, in the skin, sclerae, and other tissues, without implying any specific causation.^[2] Neonatal jaundice is a prevalent condition globally, affecting up to 60% of term and 80% of preterm newborns within the first week of life. While severe hyperbilirubinemia is rare in developed nations, it remains relatively common in developing countries,

often leading to kernicterus and its accompanying medical, economic, and social burdens on patients, families, and society at large.^[3]

Given the multitude of definitions for neonatal jaundice and hyperbilirubinemia, assessing the extent of the issue in neonatal units across different regions or areas poses a challenge. In the United States, findings from the National Collaborative Perinatal Project indicated that 6.2% of infants weighing over 2500g exhibited serum bilirubin concentrations exceeding 220 $\mu\text{mol/l}$ (12.9 mg/dl). Contrastingly, data from 12,587 babies (weighing 2500g or more) born in Singapore between 1986 and 1989^[4] revealed a lower incidence of this degree of neonatal jaundice at 4.6%. Despite Asian full-term babies typically being smaller in size, when normal birth weight is defined as over 2270g, the incidence remains at only 5.2%.

Infants within this range of bilirubin concentrations were observed. It is believed that our proactive approach to treating neonatal jaundice, through increased availability of phototherapy units and a more liberal policy in initiating treatment for even mild cases of jaundice, has contributed to a decline in the occurrence of severe jaundice.^[4]

The primary cause of jaundice within the first 24 hours of life is often hemolytic disease of the newborn (HDN) due to rhesus (Rh) hemolytic disease. This occurs when the mother develops sensitization from previous pregnancies, leading to the formation of anti-D IgM and IgG antibodies. Among these, anti-D IgG is particularly problematic as it can cross the placenta, causing Rh hemolytic disease in the neonate. Rh incompatibility arises when an Rh-negative mother, previously sensitized, carries an Rh-positive fetus.^[5] Recently, there has been a suggestion by several researchers that the incidence of significant neonatal jaundice has risen. Changes in obstetric practices, particularly the increased use of oxytocin for inducing labor, have been attributed to this rise. However, establishing oxytocin's role in this increase is challenging, as its use is associated with other factors contributing to jaundice, such as preterm delivery, instrumental delivery, and epidural anesthesia.^[6]

The etiology of this bilirubinemia is multifaceted, as recently outlined, and primarily involves processes contributing to increased bilirubin production or decreased bilirubin clearance. The former may stem from factors that elevate bilirubin production and enterohepatic circulation, while the latter is mainly a consequence of immature conjugative capacity, although impaired hepatic uptake or excretion may also be involved. It has been proposed that serum total bilirubin (STB) concentrations within the physiological range are maintained by a balance between bilirubin production and elimination. However, in some neonates, an imbalance between these mechanisms may occur, with bilirubin production relatively outweighing conjugation.

This imbalance is believed to lead to hyperbilirubinemia.^[7]

TREATMENT METHODS

Jaundice, a common condition among newborns, is usually benign. However, close monitoring is crucial due to the potential harm caused by elevated levels of bilirubin, a yellow pigment resulting from the breakdown of red blood cells. Bilirubin can be toxic to the central nervous system, leading to a condition known as bilirubin encephalopathy, or more severely, kernicterus. These conditions can result in significant and permanent neurodevelopmental impairments if left untreated.

The primary goal of treatment for neonatal jaundice is to either reduce the circulating bilirubin concentration or prevent its further increase. One of the most effective treatments for jaundice is phototherapy. Phototherapy utilizes specific wavelengths of light to alter the structure of bilirubin molecules, making them more easily excreted from the body, even in cases where conjugation processes are impaired.

During phototherapy, the newborn is placed under special blue or white lights, typically in a hospital setting. These lights penetrate the skin and are absorbed by the bilirubin present in the dermal and subcutaneous tissues. As a result, various photochemical reactions occur at different rates, ultimately transforming bilirubin molecules into different forms.

One outcome of these reactions is the production of yellow stereoisomers of bilirubin, which are less toxic than the original form. Additionally, colorless derivatives of lower molecular weight are also generated. These transformed bilirubin products are less lipophilic, meaning they are less likely to accumulate in tissues, and can be excreted more easily in bile or urine, without requiring the conjugation process that is often impaired in newborns with jaundice.^[8]

In summary, phototherapy is a highly effective treatment for neonatal jaundice, as it helps to reduce the levels of circulating bilirubin and prevent the development of severe neurological complications. By altering the structure of bilirubin molecules through specific light exposure, phototherapy facilitates their safe elimination from the body, ultimately promoting the health and well-being of newborns affected by jaundice.

CONCLUSION

In conclusion, neonatal jaundice remains a significant global health concern, marked by the yellowish discoloration of newborns' eyes and skin due to elevated bilirubin levels. This review has provided a comprehensive examination of neonatal jaundice, encompassing its various etiologies, clinical presentations, and management strategies. By addressing both physiological and pathological causes, alongside factors influencing treatment decisions, such as bilirubin

levels and infant age, this review aims to equip healthcare professionals with a deeper understanding of the condition. Additionally, it highlights associated clinical features and potential complications, underscoring the importance of prompt and appropriate management. From conservative measures like frequent feeding to more advanced interventions such as phototherapy and exchange transfusions, a range of management strategies has been explored, reflecting the complexity of addressing neonatal jaundice. By synthesizing current knowledge and evidence-based practices, this review seeks to optimize management approaches and ultimately improve outcomes for infants affected by neonatal jaundice. Continued research and collaboration in this field are essential to further enhance our understanding and refine treatment strategies for this prevalent and impactful condition.

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