

## Visual Assessment of Neonatal Jaundice in the Primary Care Setting

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Neonatal jaundice is a transient physiologic phenomenon related to the transition to extrauterine life. High levels of serum bilirubin are neurotoxic. Monitoring for hyperbilirubinemia in the neonatal period aims to identify babies at risk of neurotoxicity secondary to severe hyperbilirubinemia. Transcutaneous bilirubin measurement devices are increasingly used to identify at risk babies. However, in the outpatient setting pediatricians and other primary care providers often depend on visual assessment for decision making. Little research exists to evaluate the accuracy of visual evaluation of neonatal jaundice in the primary care setting. We aimed to study the accuracy of visual assessment of neonatal hyperbilirubinemia compared to transcutaneous and serum measurements of bilirubin in the primary care setting. A secondary aim was to evaluate the concordance of transcutaneous measurements of bilirubin on the forehead and sternum. Neonatal jaundice is a highly prevalent clinical condition affecting over 80% of newborns. Although the condition is transient and self-resolving, appropriate management is critical to prevent neurotoxicity in a subgroup of affected infants. Despite the increasing use of transcutaneous bilirubin measurement devices in the hospital setting, visual evaluation of jaundice is commonly utilized by clinicians in the outpatient setting. Information about the accuracy of visual evaluation is important to confirm the appropriateness of this clinical practice. How well does clinicians' visual evaluation of jaundice correlate with transcutaneous or serum bilirubin measurements in neonates presenting in the outpatient setting? Observational cross sectional study design was used to collect data from a convenience sample of newborns presenting for first newborn visit to their primary care clinic. We obtained transcutaneous bilirubin measurements on the infants whose parents consented to enroll in the study. Physicians independently ordered transcutaneous and/or serum bilirubin on babies based on their visual assessment of the jaundice and assessment of the case. A physician's decision to order a transcutaneous bilirubin was used as a proxy for concern for a higher bilirubin level. We analyzed the data for correlation between the physician's visual assessment of jaundice as reflected by the physician's decision to obtain any (transcutaneous or serum) bilirubin measurement, and the transcutaneous bilirubin level measured by the investigators. Results: Between July 2019 and October 2021, we enrolled 171 newborn infants for this study. The average transcutaneous bilirubin level was higher in the group of children whose physicians requested a bilirubin measurement based on visual evaluation. (Mean of 12.4 sternum/12.3 forehead transcutaneous measurements) for ordered and 8.9/9.3 for not ordered with  $p < 0.001$  respectively). Receiver Operating Characteristic Curve (ROC) showed that the area under



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the curve (AUC) was 0.730 and 0.703 for the forehead and sternum measurements respectively, indicating that the visual evaluation of jaundice correlated moderately with transcutaneous measurements. The correlation between sternum and forehead transcutaneous measurements was strong (Pearson = 0.941), but the correlation between sternum and serum measurements was stronger (Pearson correlation = 0.810) than that between forehead and serum (Pearson = 0.603). Physicians ordered transcutaneous or serum bilirubin levels in 15 of the 22 infants who had a transcutaneous bilirubin level above 15 and in all nine patients who had bilirubin levels above 16.