

## **Validity of non-invasive point-of-care hemoglobin estimation in healthy and sick children-a method comparison study.**

Bhat A(1), Upadhyay A(2), Jaiswal V(3), Chawla D(4), Singh D(5), Kumar M(6), Yadav CP(7). Eur J Pediatr. 2016 Feb;175(2):171-9. doi: 10.1007/s00431-015-2602-9. Epub 2015 Aug 19.

This study was conducted at a tertiary care center in northern India to evaluate the validity of non-invasive transcutaneous hemoglobin estimation in healthy and sick children in comparison to hemoglobin estimation by traditional lab method. A method comparison study was conducted including 150 subjects. Enrolled patients included 80 neonates with average age of  $3.9 \pm 2.1$  days, and 70 children with average age of  $5.8 \pm 2$  years. Each population (newborn and children) comprised of almost equal numbers of healthy and critically ill patients with shock.

Hemoglobin (Hb) was estimated on enrolment by transcutaneous spectrophotometry (SpHb) and traditional automated lab analyzer (Hb-Lab). Difference between Hb levels by the two methods (called bias) was measured and analyzed using Bland-Altman method. Out of 148 data pairs analyzed, bias between SpHb and Hb-Lab was  $-1.52 \pm 1.91$  g/dl (mean  $\pm$  SD). SpHb showed excellent positive correlation with Hb-Lab ( $r = 0.94$  ( $p < 0.001$ )) and good visual agreement on Bland-Altman plots. Bias was higher in sick subjects with shock as compared to healthy ones in both neonatal and pediatric population ( $-2.31 \pm 2.21$  g/dl versus  $-0.77 \pm 1.2$  g/dl, respectively). CONCLUSIONS: SpHb showed good accuracy and correlated well with lab estimated Hb levels in healthy children. However, in children with impaired peripheral perfusion, its diagnostic accuracy was inadequate to justify routine use for quantification of severity of anemia and making transfusion decisions solely on non-invasive estimation of hemoglobin.

WHAT IS KNOWN: Non-invasive hemoglobin estimation is a relatively new and novel method which has given mixed results regarding its potential efficacy in adults.

There is limited data regarding usefulness and accuracy of non-invasive Hb estimation by SpHb in sick neonates and children.

WHAT IS NEW: Non-invasive Hb estimation by SpHb monitor is reasonably accurate in healthy neonates and children. It can be used in critically ill children and neonates, but in conjunction with lab confirmation of Hb values.