Can Non-Invasive Spectrophotometric Hemoglobin Replace Laboratory Hemoglobin Concentrations for Preoperative Anemia Screening? A Diagnostic Test Accuracy Study

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Preoperative assessment of hemoglobin concentration in blood is important to diagnose anemia. The primary aim of this prospective diagnostic test accuracy study was to monitor non-invasive spectrophotometric hemoglobin (SpHb, g/dL) concentrations among adults prior to elective surgery and to investigate the correlation and agreement of SpHb with laboratory hemoglobin (Hb, g/dl). A secondary aim was to identify the anemia cut-off values for SpHb based on the World Health Organization (WHO) definitions for anemia. This study included 151 consecutive patients (age ≥ 18 year) presenting for preoperative evaluation prior to scheduled elective general or orthopedic surgery. Results identified the mean ± SD of SpHb at 11.43 ± 2.01 g/dL, which underestimated the mean laboratory Hb (12.64 ± 2.29 g/dL, $p < 0.001$). A bias mean difference (SpHb-Hb) of -1.21 g/dL, with a SD of 1.76, was reported. This bias (SpHb-Hb) was inversely correlated with the mean Hb concentrations. A positive correlation existed between SpHb and Hb, with a good degree of reliability and a significant Intra Class Correlation (ICC). SpHb diagnosed anemia in 32.3% and 60.3% of males and females, respectively. The SpHb cut-off values to identify anemia were 11.3 and 10.2 g/dL for males and females, respectively, with a sensitivity of 83.3% for males and only 62.9% for females. The specificity for males and females were 81% and 91.3%, respectively. SpHb sensitivity allows for anemia diagnosis among males, but not females. However, the specificity allows SpHb to rule out anemia for both.