

Validity and Correspondence of Non-invasively Determined Hemoglobin Concentrations by Two Trans-cutaneous Digital Measuring Devices.

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Hemoglobin (Hb) concentration is the central diagnostic indicator for anemia, including nutritional anemia. The objective of this study was to compare the Hb values determined by two portable, non-invasive devices across a wide Hb spectrum against formal laboratory measurements, and with each other.

Eighty Guatemalan adults (40 highland men, 40 lowland pregnant women) provided venous blood for formal Hb colorimetric determination. Hb was also registered sequentially on the Rad-87TM pulse CO-Oximeter with Rainbow Set technology (Masimo) and Haemospect® (MBR Optical Systems) by non-invasive skin-probe contact procedures as per manufacturers' instructions.

Whole blood Hb concentrations ranged from 7.8 to 18.5 g/dL (mean, 12.9±2.3 g/dL and median, 13.3 g/dL). Corresponding descriptive statistics were: range, 9.6 to 16.2 g/dL; mean, 12.1±1.5 g/dL; and median, 11.9 g/L, respectively, with the Rad-87TM (nail bed). They were: range, 8.7 to 15.8 g/dL; mean, 12.7±1.8 g/dL; and median 13.0 g/dL for the Hemospect® for forearm contact. They were: range, 9.1 to 17.5 g/dL; mean, 13.2±2.1 g/dL; and median, 13.4 g/dL for palm contact. The Pearson correlation coefficient of venous blood Hb with the former device's Hb values was $r=0.59$ ($p<0.001$), and $r=0.94$ ($p<0.001$) and $r=0.90$ ($p<0.001$) with those of the latter device at the palm and forearm, respectively. The inter-site Lin coefficient was $r=0.84$. Sensitivity and specificity were variable across devices, depending on Hb cut-off and measurement procedures.

With Hb cut-off values of <12.0 g/dL for adult (non-pregnant women and <13.0 g/dL for adult men), the Haemospect device's performance here would provide adequate potential for screening purposes.