Reliability and Validity of a Smartphone-Paired Pulse Oximeter for Screening of Critical Congenital Heart Defects in Newborns.

Neonatology. 2017 Aug 3;112(4):324-329. doi: 10.1159/000477294. [Epub ahead of print]

Huizing MJ(1), Villamor-Martínez E, Chavagne IA, Vanagt WY, Spaanderman MAE, Villamor E.

Author information:
(1)Department of Pediatrics, Maastricht University Medical Center (MUMC+), Maastricht, The Netherlands.

BACKGROUND: Barriers to widespread implementation of pulse oximetry screening of critical congenital heart defects (CCHD) in newborns include increasing trends of out-of-hospital births and cost of equipment. In recent years, smartphone-compatible pulse oximeters have appeared on the market, but the validity of such devices in the setting of CCHD screening has not been evaluated.

OBJECTIVES: To compare the performance in CCHD screening of a smartphone-paired pulse oximeter (Masimo iSpO2-Rx™) and a hospital-grade pulse oximeter (Masimo Radical-7™).

METHODS: Preductal (right hand) and postductal (either foot) saturations were determined in a population of 201 term newborns by 2 independent teams, one using the Radical-7 and the other using the iSpO2-Rx. Bland-Altman analysis was applied to calculate mean bias and 95% limits of agreement between the 2 pulse oximeters.

RESULTS: For the preductal oxygen saturation, the mean bias (Radical-7 minus iSpO2-Rx) was -0.08 (SD 1.76) and the lower and upper limits of agreement were -3.52 and 3.36, respectively. For the postductal oxygen saturation, the mean bias was -0.11 (SD 1.68) and the lower and upper limits of agreement were -3.49 and 3.18, respectively. In addition, the iSpO2-Rx provided reliable measurements of saturations below 95% in a group of 12 infants admitted to the neonatal intensive care unit.

CONCLUSIONS: Our data suggest that CCHD screening with the Masimo iSpO2-Rx is feasible and accurate. The use of reliable smartphone-paired pulse oximeters may contribute to the extension of CCHD screening to home births and low resource settings.