Utility and feasibility of integrating pulse oximetry into the routine assessment of young infants at primary care clinics in Karachi, Pakistan: a cross-sectional study

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BACKGROUND: Hypoxemia may occur in young infants with severe acute illnesses or congenital cardiac anomalies, but is not reliably detected on physical exam. Pulse oximetry (PO) can be used to detect hypoxemia, but its application in low-income countries has been limited, and its feasibility in the routine assessment of young infants (aged 0-59 days) has not been previously studied. The aim of this study was to characterize the operational feasibility and parent/guardian acceptability of incorporating PO into the routine clinical assessment of young infants in a primary care setting in a low-income country.

METHODS: This was a cross-sectional study of 862 visits by 529 infants at two primary care clinics in Karachi, Pakistan (March to June, 2013). After clinical assessment, oxygen saturation (Sp02) was measured by a handheld PO device (Rad-5v, Masimo Corporation) according to a standardized protocol. Performance time (PT) was the time between sensor placement and attainment of an acceptable PO reading (i.e., stable SpO2 + 1% for at least 10 s, heart rate displayed, and adequate signal indicators). PT included the time for one repeat attempt at a different anatomical site if the first attempt did not yield an acceptable reading within 1 min. Parent/guardian acceptability of PO was based on a questionnaire and unprompted comments about the procedure. All infants underwent physician assessment.

RESULTS: Acceptable PO readings were obtained in ≤ 1 and ≤ 5 min at 94.4% and 99.8% of visits, respectively (n = 862). Median PT was 42 s (interquartile range 37; 50). Parents/guardians overwhelmingly accepted PO (99.6% overall satisfaction, n = 528 first visits). Of 10 infants with at least one visit with Sp02 <92% on a first PO attempt, 3 did not have a significant acute illness on physician assessment. There were no PO-related adverse events.

DISCUSSION: Using a commercially available handheld pulse oximeter, acceptable Sp02 measurements were obtained in nearly all infants in under 1 minute. The procedure was readily integrated into existing assessment pathways and parents/guardians had positive views of the technology.

CONCLUSIONS: When incorporated into routine clinical assessment of young infants at primary care clinics in a low-income country, PO was feasible and acceptable to parents/guardians. Future research is needed to determine if the introduction of routine PO screening of young infants will improve outcomes in low-resource settings.