Reviewer’s report

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

Version: 2 Date: 24 September 2014

Reviewer: Walter Karlen

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With great interest I have read this manuscript. The use of pulse oximetry for the screening of ill children is a timely subject and has great potential in low resource settings as the technology is non-invasive and becoming more and more affordable. So far little was known about implementation and adoption of these devices in low resource settings.

Discretionary Revisions

1) P6 methods: A CHW and a research assistant consisted of a study team. From the given descriptions, it was not clear to me what the roles of each were. From the procedures in P7, it seems like the CHW did everything, including interviews? Could you summarize their functions at the beginning of the paragraph?

2) P10L212: WHO is abbreviated earlier and then not used

3) Figure 1: Please add more ticks to axes for easier reading.

4) Figure 1: The application time of oximeter is shown as flat line after 0 s and 60 s. Is there an explanation that application takes much longer at the second attempt?

Minor Essential Revisions

5) P4L69: “PO is an accurate, yet non-invasive method ...”. In fact, PO is not particularly accurate in estimating SaO2 and many devices have RMS errors of +/- 2%. However, this is considered as clinically acceptable, considering it is non-invasive.

6) P4L70: “measuring oxygen saturation (SpO2) based ...”. A PO measures peripheral oxygen saturation (SpO2) and not arterial oxygen saturation (SaO2), which is measured invasively. SpO2 is an estimation of SaO2 and often used interchangeably (by mistake) in clinical practice. Since both terms are used later it would be better to be accurate when introducing the term.

7) P17L369: The authors report significant differences between clinic sites. It would be helpful if authors could report in results the number and demographics of CHW that performed the measurements. What training did they receive?
Experience with oximetry? How would this be different from LHW?

8) Figure 2: This figure is very interesting. The distribution of SpO2 is unexpected. When breathing room air and in healthy conditions, the expected SaO2 is around 98%. Higher values are only achievable through administration of O2. The shown distribution would suggest that there is a bias and/or error of at least 2% in the used measurement device.

Also, very few subjects actually had low SpO2. Recognizing this sensor bias, would more patients be included in the hypoxemia group?

Major Compulsory Revisions

9) P6 Study setting. As normal SpO2 and hypoxic thresholds are dependent on elevation, please provide altitude of sites in Karachi (sea level I believe). It would also be worthwhile to mention this limitation/particularity in the discussion eg. in P16

10) P8L148: An “acceptable” or successful measurement was defined as 10 sec of stable SpO2, presence of HR, and green signal strength. Why was 10 sec as window chosen? Why did SpO2 needed to be stable? The error range of the used device is larger than the allowed variation of +-1%. This condition might have been too restrictive? To obtain a reliable SpO2 reading a stable signal quality would be more important. Also, if only green signal strengths were accepted, subjects with low perfusion would have been excluded? Low perfusion can be a sign for bad sensor placement, but also disease. A little more critical discussion of the study design might help future studies selecting an appropriate design.

11) P9L176: The authors have made measurements with competing PO device technology, but state that this data has been excluded from the analysis for good reason. However, in the results section, this data is reported and compared, suggesting somewhat superior performance of the main study sensor. This should be avoided. Please remove all comparisons of other devices not tested rigorously.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests:

I declare that I have no competing interests