Reviewer's report

Title: Evaluation of pulse-oximetry oxygen saturation taken through a skin protective covering

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Reviewer: amir kugelman

Reviewer's report:

General
This article evaluates the accuracy of pulse oximetry readings taken through a skin protective gauze or micropore adhesive tape in newborns.

The authors suggest that because of limited budget, it is essential and economic to use adult probes in newborns in developing countries.

To avoid injury, they use protective measures and aim to show that the accuracy of the pulse oximeter is not impaired.

The revised study was performed on neonates, and the statistical methods were changed.

In general, this study might be of importance in developing countries, but it still has some significant limitations.

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

1. Technical limitations: the authors did not use an arterial blood gas as a gold standard, and suggest that they replace an "established method" with another method. Yet, the reference for the use of an adult probe in a newborn is not clear. Reference 1 is 20 years old, and I did not have access to reference 5. The authors make only a short comment on page 7 regarding this issue. This is not the common practice as could be suggested: "The practice ....is not confined to resource scarce countries". I suggest that the authors will give more details to convince that this is an established method on which further information could be supported on.

2. They did perform this study in neonates. The information given on the infants studied is still very general and minimal. According to the figures at least 12 infants had oxygen saturation < 90%, which means they could not be very stable. I wonder how measurements taken 5, 10 or 15 minutes apart could be compared. Was there no intervention taken to give oxygen between measurements? Were these cardiac patients? I find this information important to the methods used, meaning: not measuring simultaneous saturation, with and without skin covering.

3. It is still not clear how values of oxygen saturation were chosen for analysis, and why they did not choose to compare measurements simultaneously.
with same brands of pulse oximeters. Measurements could be done simultaneously with same brand of pulse oximeter on both feet with and without covering to avoid the time between measurements. As the authors suggest (in their reply), "Our feeling is that there is variation in saturation all the time", and this is especially true in sick infants. Technical errors arising from movements could also emerge. Thus, repeated measurements with time-lag has a potential for error as they showed in the repeatability studies. There may be a fixed difference between different brands of pulse oximeters, but I have suggested to compare with same brand of oximeter. Furthermore, the accuracy between 2 instruments could be evaluated before using skin covering. The methods used by the authors is subject to human bias (choosing saturation at different random time points). I certainly do not suggest an intentional error, but the "reader of the oximetry" still could decide to choose unintentionally similar or close values). The methods also combine errors of repeatability and ignores physiological changes that may occur in time (especially in sick infants). I do not think the authors have clarified these issues.

4. The authors have made the suggested change and used the phrase: "may prevent injury". The authors chose not to give information regarding possible injury prevention from their experience.

5. The title was changed.

6. I suggest not to use the abbreviation POOS but the accepted methods: SpO2 for Pulse Oximetry Oxygen Saturation.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

1. Corrected.

2. Corrected.

3. It is not clear that in Ref 1 they used this method: using an adult clip in a newborn.

5. Methods: I would suggest that the authors will give more information on the study population as mentioned above. There are patients with oxygen saturation of 83-85%. What kind of patients are those (diagnoses) ? Were they kept steady on this saturation for 10-15 minutes ? Were they cardiac patients ? Did they get oxygen to correct this low saturation between measurements ?

6. The authors got only verbal informed consent, and did not get the approval of the "Helsinki" ethical committee of their center. They tried to evaluate "new" method that should prevent injury from the "old" method without covering ? They measured, I assume, oxygen saturation "for study purposes only" on several patients. Thus, they should have got written consent as well as Helsinki approval.

7. Regarding measurements: The authors have clarified that measurements were taken 5 minutes apart with no means and not obtaining pulse rate for accuracy. As I suggested, I have doubts if this is scientifically valid. The authors say in the reply: "Our feeling is that there is variation in
saturation all the time". Reading 10-15 min apart are even more variable especially in infants with low saturation and who might get oxygen. Thus, measurements should be taken simultaneously.

6. Results: the sequence of the figures was corrected.

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

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Discretionary Revisions (which the author can choose to ignore)

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**What next?:** Reject because scientifically unsound

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No

**Declaration of competing interests:**

I declare that I have no competing interests