Reviewer's report

Title: High proportion of maternal near-miss and death associated with caesarean section complications: a cross-sectional study at a university hospital and a regional hospital in Tanzania

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Reviewer: Nanna Maaløe

Reviewer's report:

I find this cross-sectional study on maternal near-miss and death at two big Tanzanian hospitals to be a coherent and sound addition to scientific knowledge, revealing important new estimates on the risk related to CSs in low resourced settings. In addition, the manuscript presents other important quality issues that are widespread in developing countries, such as the high risk of eclampsia and the high rate of intra-hospital uterine rupture.

The submission is well written, and references are made to relevant reviews and studies on this topic. How the WHO near-miss criteria were applied at these low resourced hospitals with poor laboratory resources etc. must be described further, and in general, the discussion and conclusion should be better balanced and more comprehensive. Please see specific comments below.

COMPULSORY AND ESSENTIAL REVISIONS

Abstract:

1. Concerning the description of the study aim, by writing “in a low-income country”, it may be understood as more than the two hospitals. Please rephrase.

2. Concerning “More training of anaesthesiology staff and better postoperative surveillance might reduce the risks of complications following CS”. This seems too narrow. What about e.g. the CS procedure and timing of the CS?

Methods:

3. The study was conducted “between February and June 2012”. Was it all women who delivered within this period, or does this include the 42 days follow-up on the last woman included to assess maternal death? Please be more accurate.

4. Concerning “Participants” paragraph 1 (“We included all women with maternal near-miss as defined by WHO”), this must be elaborated. As (too) briefly mentioned in the discussion, Nelissen et al. and van den Akker et al. (reference 8 and 10) conclude that application of these organ-failure based criteria is problematic in low-resourced settings such as the ones here described (especially the regional hospital with laboratory services “rarely available”). Van den Akker concluded maternal near-miss cases to be underestimated when
applying the criteria in these settings, and based on these findings Nelissen et al. applied a moderated list of criteria. What did the authors of the current study do? How was e.g. the shock criteria defined?

5. Regarding “participants”, paragraph 2 (“Among the near-miss events and deaths included…”) is unclear, please rephrase.

6. Regarding “participants” paragraph 3, please give an example of “In addition, we also included as moderate associations cases where there was a pre-existing condition”.

Results:

7. Concerning paragraph 5, it would be interesting to know in general how many of the women met their first maternal near-miss criteria after admission to the hospital (maybe excluding referral cases).

8. Concerning paragraph 6, please include number of maternal deaths in the following sentence: “After the assessment, we concluded that 51 cases were associated with CS complications”.

Discussion:

9. Regarding paragraph 2, this statement appears too strong without references: “Our results may be generalized to both university and regional hospitals in other low-income countries, since the resources at the two hospitals we investigated are representative of other hospitals in urban settings in the region”. Also, please be more precise regarding other low-income countries vs. other urban hospitals in the region.

10. Concerning paragraph 5 “Eighty percent of the women with eclampsia were already having seizures when they arrived at the hospital”, how many of them were referrals? Maybe better knowledge on preeclampsia and availability of magnesium sulphate at health centers / smaller hospitals would be a relevant action to recommend.

11. Regarding the cases with strong and moderate associations to CS, only the 6 cases with high spinal anesthesia seem to be discussed in-depth. E.g., there are 10 cases of severe post-operative infections, which may lead to a discussion of causes (prophylactic antibiotics, midline vs. transverse incision etc.). Please broaden the discussion on the risks of CSs.

12. Concerning the many postpartum hemorrhage cases, this must be discussed in-depth and e.g. include the “the conspicuous lack of equipment” described, including oxytocin.

Conclusion:

13. Concerning “More training of anaesthesiology staff and better postoperative surveillance may reduce the risks during and after CS”, please see comments 2 and 11.
DISCRETIONARY REVISIONS

Title:

14. In the study, interesting data are also presented and discussed on the general maternal near-miss and death ratios at the study sites, and the aim was “to describe the occurrence and panorama of maternal near-miss and death at a university hospital and a regional hospital…”. The authors may consider broadening the title (and abstract) to include this.

Abstract:

15. Concerning “Major causes were eclampsia and postpartum hemorrhage, but we also detected several iatrogenic complication”, number of cases would be interesting.

Background:

16. Concerning paragraph 3, the comparison of risk ratios between the university hospital and the regional hospital is not included in the study objective. Maybe that would be relevant?

Methods:

17. Regarding “ethics approval”, as there is only one university hospital in Dar es Salam, this facility is not anonymous. Is this a problem?

18. Concerning “The leading cause of near-miss or death was considered to be the primary diagnosis stated in the medical record”, consider giving an example.

Discussion:

19. Regarding paragraph 1, consider including all relevant percentages in parentheses.

20. Regarding paragraph 3, should “near-miss and” be deleted?: “Also, determining the underlying cause of near-miss and death was difficult, because autopsies were not performed and the only information available was the medical record”.

21. In paragraph 6, it is stated: “A high proportion of near-miss and deaths attributed to CS complications is especially problematic since the number of CS performed on non-medical indications [26, 27] and among low-risk groups [12] is rising in many low-income countries”. I agree that the proportions of maternal near-miss and death associated with CS complications seem high, and this conclusion is strengthened by the risks of life-threatening complications /1000 CSs. Would it in any way be possible to explore it further? E.g., by comparison to the overall CS rate at the hospitals; if the intra-hospital CS rate is very high, it makes sense that a big proportion of the near-miss and death cases are due to CS.
22. Regarding increased use of vacuum extraction as a possible contributing solution, it would be interesting to know how many of the caesarean sections were performed on women in second stage of labour? Also, when describing the setting (methods-section), whether instrumental vaginal deliveries were performed at the settings would be interesting to know.

23. Concerning “an increased risk of maternal death in CSs managed by an untrained anaesthesiologist has been cited in one study [16]. This might explain our findings…”, this analysis would be strengthened by being coupled to the causes of near-miss and death. Please also see comments 2, 11 and 13.

24. The CS rate of 12% in these near-miss and death cases at the regional hospital seems low. Do the authors have any data, which may suggest that other women in the study population needing CS did not receive the surgery?

Conclusion:

25. The authors distinguish between iatrogenic complications and e.g. fits and postpartum hemorrhage, though some of the latter cases may be an iatrogenic complication due to lack of timely management including active management in third stage of labour etc.?

MINOR ISSUES NOT FOR PUBLICATION

Abstract:

26. …we also detected several iatrogenic complications.

Methods:

27. “Data on total number of deliveries, live births and PREVIOUS CSs were derived from the obstetric database…”

28. In the sentence “The country’s latest Demographic and Health Survey shows the total fertility….”, please be consequent with present/past tense.

29. Just to be sure: The referral hospital attend over twice as many deliveries per year when compared to the university hospital?

Results:

30. “No ANTENATAL problems were detected in 77% (n = 370) of the women.”

Table 1:

31. “Vaginal delivery # 28 WEEKS gestation”

In general:

32. Please be consequent with introducing and using abbreviations, e.g. MNM.
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.