Reviewer's report

Title: Maternal near miss and mortality in a rural referral hospital in northern Tanzania: a cross-sectional study

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Reviewer: Claudia Hanson

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The paper gives insights into clinical aspects of the quality obstetric care in a referral hospital in northern Tanzania. The study includes all cases of hospital-based maternal deaths and mothers who experienced severe morbidity (based on the new WHO near-miss criteria to identify mother with severe morbidity during childbirth).

The paper adds to the knowledge to which extent essential interventions to deal with complicated deliveries in a referral facilities in Tanzania are implemented. The study gives insights into the applicability of the WHO near-miss definition in this setting (although not mentioned as an objective).

The methods are well described except for some measures (see below) and data seems sound. The conclusions should be reworked, and finding could be more focused. Limitations are mentioned but needs to be expanded.

Title and abstract convey what has been found. I recommend some

Some minor Compulsory revisions are numbered, other comments are just listed

1) The paper would benefit from re-working through the main messages and conclusion. The conclusion that “scaling up of evidence-based interventions by developing and implementing local guidelines is needed” is not really supported by the research. ‘Developing and implementing guidelines’ is not part of the research work. Same, audits are not part of this study. Both recommendations are generally ok, but the study only proposes that key evidence-based interventions are not implemented in women with complication or women who died.

Overall layout of the paper

The manuscript follows the common structure and the different sections cover all important aspects to be included in the respective sections. Thus the comments are rather specific and do only imply minor revision.

Abstract:

2) MMR data should refer to the latest WHO publication from 2012, which has
indicated a much lower maternal mortality (also relevant for introduction, and discussion)

3) Was a ‘questionnaire’ or a ‘data abstraction form’ used? A questionnaire is rather asking people, but I’m not sure whether this was done?

4) Make clear also in abstract that MMR is actually ‘hospital-based’ MMR.
   Maybe to reduce abbreviations in the abstract as there are a bit too many
   The decimal places have no public health importance and could be omitted, particular in the abstract

Introduction: Millennium ‘project’ is a bit misleading as it is a declaration, which has triggered efforts and projects.

First paragraph: Jump in flow: The relative low absolute MD is mentioned, but for readers who might not be familiar why near-miss cases are used for audit and quality improvement work, might have difficulties to follow; thus the rational for near-miss could be better developed.

5) The study rather focuses on a few aspects of quality of care, or better ‘implementation levels of key interventions’. One could put this a bit more in context (see for example the introduction to QoC in: Duysburgh, E., et al., Quality of antenatal and childbirth care in selected rural health facilities in Burkina Faso, Ghana and Tanzania: similar finding. Tropical Medicine & International Health, 2013

   It would be prudent to reformulate the aim (such as to study the occurrence of mortality and morbidity and the implementation levels of.... in women experiencing severe morbidity or who died....)

Method: I recommend shifting the last two sentence of the first paragraph to the beginning of the paragraph as this puts the cross-sectional study done into the needed context

6) Outcome measures: would specify that the LB are also the LB ‘in the hospital’
   The second paragraph (outcome measures) is a bit difficult to read, the measures are all in the table 5, but then no helping footnote is available when looking at this table. Maybe one can make this more ‘reader’ friendly.

7) The secondary outcome measures are little defined (PPH = 500ml blood loss ?, only eclampsia or also pre-eclampsia? How was sepsis defined? and did the definition of ‘parental antibiotics’ include any antibiotic, and how long?).
   The rational for the change in definition is clear, but in the discussion the change of at least five units of blood transfusion to only ‘one’ should be taken up, and how this might have changed the indicators and results.

8) The description ‘general information and obstetric details’ were collected is a bit too vague and should be more concrete. How was the questionnaire / data abstraction form designed, what was the content, who abstracted data? How complete were they finally??

   A new guide was published in 2012 for better classification of maternal deaths. I wonder whether this was used? WHO, The WHO application of ICD-10 to deaths

Results: They are well written and good to follow.

Table 4: There is mentioning of pregnancy-related cases: are these co-incidental cases? (pregnancy-related in its definition also includes indirect and direct maternal deaths)

Table 5: This table might need some re-work as the messages are not easily to pick

Eg: “all women who delivered in a hospital” is misleading, these are rather the complicated deliveries who did take place in the hospital,

“Treatment of PPH” is the first row. Is this about ‘any’ type of treatment?

And then uterotonics use is mentioned as ‘routine’ so should be shifted to prevention of PPH?

Discussion

9) First paragraph: Clearly there is too little knowledge about maternal morbidity and mortality in Tanzania, but there are actually quite a few studies published. Also other studies (e.g from Kigoma Mbaruku et al if I recall right) pointed to many uterus ruptures in the hospital, other studies using audits have pointed to similar QoC issues,...

Second paragraph: Would be better to use the most recent data on MMR and to compare with other ‘hospital based MMR’. I was actually surprised that the in-hospital based MMR is still that high although the North is not among the least developed area in TZA.

10) Third paragraph: One could interpret maybe a bit more in light of the situation in TZA (nominal free care, transport,...). I would think this also a place a discussion where the change to ‘one’ unit of blood transfusion could be discussed.

11) Fourth paragraph: good to see the background, maybe also refer to the studies from Sorensen, B.L who also describe similar deficiencies. I’m not sure whether the last sentence should be added, that is simply another topic: ‘How’ to improve QoC.

Fifth: “CS is the most important risk factors..” I’m not sure whether this statement is clearly supported by the study, or better to reword ‘seems to be one of’ as we don’t know about other risk factors such as premature rupture of membranes, obstructed labour,..

12) Limitations: maybe to develop here a bit more also in regard to definitions, completeness,...

The main conclusion is that evidence based interventions are too little implemented. This study only gives indication on implementation levels in complicated cases but not normal deliveries, thus better to be more specific.

The last paragraph I think could be dropped as the discussion does not lead to this point.
A point coming up in the conclusion but not in the discussion is the applicability of the WHO near-miss definition. One could add this earlier and also as an objective of the study and one might expand on this in the discussion.

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

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests