Author’s response to reviews

Title: A health systems strengthening intervention to improve quality of care for sick and small newborn infants: results from an evaluation in district hospitals in KwaZulu-Natal, South Africa.

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To the editors: BMC pediatrics.

A health systems strengthening intervention to improve quality of care for sick and small newborn infants: results from an evaluation in district hospitals in KwaZulu-Natal, South Africa.

Thank you for the very insightful reviewers’ comments and the opportunity to respond to these. We have responded to each comment from the reviewer below and made changes in the text and highlighted these. If there are any further queries, please do not hesitate to come back to us.

Technical comments:

Comment 1: Please move all the tables and figure titles out of the results section and place them after the References in a section called "Figures, tables additional files". In this section, please include the Figure titles and legends as well as table headings with the tables.

Authors response: This has been done.

2. Can you please clarify the roles of author NM in the design, execution and analyses of the presented study? Please make sure all authors qualify for authorship. Guidance and criteria for authorship can be found in our editorial policies at https://www.biomedcentral.com/getpublished/editorial-policies#authorship
Authors response: Although NM did not take a leading role in the conceptualization and study design, he was involved from the start and provided comments and feedback for each of the steps. As a paediatrician he also provided technical support to the design of the tools and development of the scoring. He reviewed several versions of the manuscript and approved the final version. Given that he was involved in all stages of the research, he also agrees to be accountable for the results. I believe that he fulfils the requirements for authorship. I have amended the authorship section slightly to clarify this (L435-436).

3. Also, why was Mrs Zipporah Mbatha just acknowledged and not given an authorship if she collect the data?

Authors response: Mrs Mbatha is a retired professional nurse who was employed by the project for short periods to collect the data at each of the time points. She received training in management of sick and small newborns and in data collection, and was carefully supervised and supported to perform this task. She has no research experience or plans to undertake research activities in the future. In addition, she was not involved in the conceptualisation, design or analysis of the study, and has not reviewed the manuscript.

Preamble:

Thank you for your efforts in expanding and revising your manuscript, "A health systems strengthening intervention to improve quality of care for sick and small newborn infants: results from an evaluation in district hospitals in KwaZulu-Natal, South Africa." I appreciated the thoughtful and thorough responses to my suggestions and questions, including additional analyses, helpful details in tables and figures, and expanded methods and discussion. I note a few suggestions below for final consideration; most are minor, but I would suggest some additional clarification around to what extent the selected measures speak to health system strengthening.

Comment 1:

Tables and Figures - The additional detail in the tables is very helpful. I would suggest removing "N=" in describing the number of items, as this may invite confusion since the numbers are similar to the number of facilities in the sample. Instead if Tables 1 - 3 consistently report the number of items in the total score in the last row, as already done in some cases, this would provide sufficient detail for readers.

Authors response: Thank you we agree that the N is confusing. We have also included the number of items contributing to the score in the title of the tables, and removed the Ns. We have included the composite scores at the bottom of the tables in all three tables as suggested.
Comment 2:

Is 29 correct for the number of items in the resuscitation score in Table 3? I see 25 items listed. The text indicates there are 89 total items, though I see 88 (34, 29, 25). Please check and confirm the counts throughout.

Authors response: Thank you for pointing out this very annoying oversight. We confirm that the correct score for resuscitation is 25 (total composite score 88). I have corrected this in the text and also in figure 2.

Comment 3:

Please report sample size for Figure 3 in text and / or Figure description

Authors response: Thank you for pointing out this important omission. We have added in the numbers as requested in the text (L259-261) and the n’s into figure 3.

Comment 4:

The sentences "Scores were combined from the three domains to calculate an overall score for each hospital. No weighting of scores was undertaken, all variables contributed equally to the final score." Are still subject to misinterpretation - perhaps simply stating 'Variables were combined to calculate an overall score for each hospital' or similar for the first sentence?

Authors response: I have made the change suggested and highlighted (L218).

Comment 5:

Discussion - The sentence on improvement in knowledge (lines 290 - 292) implicitly assumes similar knowledge at baseline; the results as shown demonstrate that those trained had more knowledge than those not trained, as stated later in lines 385 - 389. Suggest making this explicit or rewording for consistency.

Authors response: we agree that the two points are inconsistent with each other. We have rephrased the first statement as follows and highlighted (L278-279).

‘Improvements in knowledge scores may suggest that HWs trained in newborn care during the project period had a better knowledge of care practices for sick and small newborns, although the methodology used does not allow us to clearly infer that KINC training led directly to improved knowledge’.
Comment 6:

The revised paragraph on 360 - 374 now seems to address two distinct points - the difficulty in measuring the adherence to guidelines (presumably including timely and correct application of the actions noted in record reviews) and the challenges in using patient outcomes such as length of stay and mortality to evaluate quality of care. These are both important considerations, but not the same, as the substantial literature on the use of process measures vs. outcome measures attests to [1-3] Consider making the link here explicit: ideally one would measure the timeliness and correctness of care processes as actually applied; given difficulty doing this, outcomes likely to reflect high quality care processes were considered. Decided against using outcomes due to challenges in risk selection and case mix across a diverse set of hospitals .... –

Authors response: Thanks for the insightful comment. We have amended the text and rearranged the points in that paragraph and added an additional paragraph to address the points and highlighted (p13-14). We have also referred to two of the suggested references.

Comment 7:

It is essential to situate the measures used here appropriately within the domains of health system quality in order to properly interpret what the results can and can not say. Based on the measures reported and assuming no alternative explanations for improvement, the intervention demonstrated important improvement in inputs to care, including provider knowledge, and in adherence to clinical guidelines as documented in patient records. As noted in the discussion, these measures may not attest to the actual performance of care in terms of consistent, correct, and timely performance of tasks required to improve newborn health. It is further not known if differences in clinical competence would be sufficient to improve newborn outcomes, from length of stay to survival, and the only available data on outcomes not surprisingly shows no difference yet. I would suggest a more nuanced consideration of what the selected measures do speak to as well as the (valid) reasons for selecting these over the two alternatives suggested - more intensive process measures and outcome measures.

Authors response: Please see response above we have added to this section of the discussion and referred to the references the reviewer suggests.

Comment 8:

In keeping with this, please review the statements on improvements in the health system and health system strengthening (e.g., lines 293-296) for consideration as to what elements can be described as improved and what additional evidence would be necessary to attest to the
meaningfulness of the observed improvements in terms of ongoing care processes and newborn outcomes.

Authors response: As above we have revised this section of the discussion

Comment 9:

Reviewer: Related to the prior points, where the discussion notes the complexity of quality measurement (lines 347 - 359), it focuses on weighting of indicators. This conclusion is also included in the abstract. While it's a valid methodological question, issues about how indicators are likely to relate to the production of better health are more central to the interpretation of this work. In particular, I would revisit the abstract conclusion and consider emphasizing other outstanding questions that require further assessment, like whether the changes documented are sufficient to affect newborn health outcomes.

Authors’ response: We have amended the abstract in line with this suggestion and highlighted