Author’s response to reviews

Title: Beyond coverage: Improving the quality of antenatal care delivery through integrated mentorship and quality improvement at health centers in rural Rwanda

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Author’s response to reviews:

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Dr Remare Ettarh

BMC Health Services Research

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Dear Dr Ettarh

Thank you for providing the review of our submitted manuscript, entitled “Beyond coverage: Improving the quality of antenatal care delivery through integrated mentorship and quality improvement at health centers in rural Rwanda” (BHSR-D-17-01105). We would also like to thank the reviewers for their insightful comments and suggestions, which we believe have significantly strengthened the manuscript. We have tried to address all the comments and our
responses to each of the reviewer’s points are outlined below. Please do not hesitate to contact me with further questions or considerations.

Sincerely,

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Reviewer: Anthony Idowu Ajayi, Ph.D

The title of this manuscript is catchy, however, it raises expectations that are not met in the article. Rwanda is one of the few sub-Saharan African countries that achieved Millennium Development Goal 5 and it is important to document strategies used. Indeed, maternal mortality is preventable with the use of quality maternal healthcare. Thus, increasing coverage as well as improving quality are crucial to preventing maternal deaths. This study attempts to examine the effects of a MESH-QI program on completeness of danger sign assessments.

Thanks very much for the comment. While coverage and quality are crucial to improve antenatal care, a particular attention has been paid to increased number of antenatal care visits. We believe that our responses to your specific comments and revisions to our manuscript have addressed the limitations and improved the scientific soundness of our manuscript. As such, we recommend to leave the title as written.
The major deficiency of this study is the failure to provide sufficient details about the status quo before the implementation of intervention. As such, the quality of the evidence is weak and effect of the intervention reported appears exaggerated.

Thank you for the comment. In addition to detailed description of the baseline gaps including poor and inconsistent assessments of danger signs and other antenatal care screening items before the MESH-QI implementation, we revised the following paragraph and cited published evidence on the performance of recommended practices in maternal and newborn care at health facilities in Rwanda. Now the paragraph on page 4-5 reads as:

“In Rwanda and other developing countries, poor quality of care is often exacerbated by the lack of basic equipment and low performance of health care workers [19–21]. While over 80% of the burden of diseases is addressed by health center nurses [40], the Africa Health Workforce Observatory estimated that Rwanda has only 1 nurse per 1,493 people [22]. Such a low density of skilled professionals affects the overall quality of care at health center level. Although more than half of maternal deaths could be averted by adequate assessments and management of danger signs during ANC visits [9, 23–25], innovative strategies are needed to improve core maternal health care delivery processes [26, 27].”.

We included additional information in the limitations section of the manuscript (page 11 and 12).

Hopefully this improved description of the program at baseline addresses your concerns. We believe that we have strong internal validity in our conclusions about our program because health centers serve as their own control. The time from baseline to follow-up is short. To our knowledge, there are no other interventions that could influence our results. Moreover, we did control for potential confounders that changed over this period that could influence the change in adherence.

Notable questions to ponder on includes: what was the situation on ground that could make the baseline assessment of danger signs improve from 2.1% to 84.2%? Were the nurses not ignorant of the importance of assessing the danger signs? Or were they knowledgeable but always ignore such assessments? Or do they do the assessment but do know document? Provision of such information might explain the reason for the huge difference/improvement. What exactly did the intervention impact on that led to such huge improvement?

Thanks for the important questions. Nurses were knowledgeable about danger signs assessment from pre-service education and Focused Antenatal Care Trainings. Therefore, challenges to translate theoretical knowledge into practice, systems-level barriers and poor supervision remain
the major gaps. MESH-QI intervention consisted in an intensive one-on-one bedside teaching as well as systems-targeted improvement initiatives.

Some of this is detailed in the background section. Further, to address your concerns, we added the following paragraph in the discussion section provided on page 11.

“The lack of essential tools to guide clinical supervision may have led to notable inconsistencies prior to MESH-QI intervention. The use of standardized checklist as part of MESH-QI intervention helped to assess and improve nurse-mentee’s competencies and address systems gaps”.

Another major flaw of this article is the methodology. Currently the method section is not detailed enough and left many questions unanswered. For instance, what is the unit of analysis in this study? Is it the number of cases or the nurses conducting the assessment?

Thank you for catching this. We have revised our methods section and included the unit of analysis on page 8 and 9. Now the paragraph reads as:

“The unit of analysis was the clinical encounter. The outcome of this study was the danger sign assessment score calculated based on equal weighting of the completion of each of the seven key danger sign assessments (0 indicating no danger sign was assessed and 7 indicating that all seven danger signs were assessed). We used interaction terms to assess whether the intervention district, completion of FANC training, level of mentee’s education, or type ANC visit (first or non-first ANC visit) modified the effect of the MESH-QI intervention. The interaction term was included in the final model if the interaction term variable was significant at the $\alpha=0.05$ level in bivariable analyses. We performed a multivariable linear regression analysis to assess the effect of MESH-QI on the danger sign assessment score, controlling for the following potential confounders: district (Southern Kayonza/Kirehe), mentee’s education level, mentee’s FANC training and type of ANC visit under observation (first vs others). Because a nurse could lead multiple clinical encounters, we used a random effect to account for clustering among observed ANC consultations conducted by the same nurse”.

A nurse that routinely fails to assess danger signs would do this in 1000 cases; however, if she realizes the importance of such assessment or mentored would also complete such assessment in 1000 subsequent assessments. Thus, reporting 1000% improvement amounts to exaggeration.
These are key issues that might have influenced the result reported in this study. Are the mentees qualified nurses? If not why refer to them as nurses?

We partially agree with this comment. If his/her knowledge of importance of this assessment was the only barrier, then your logic fully applies. However, there are notably other barriers. For example, if an assessment item requires a tool, then her fully complying when she recognizes the importance may be less than 100% if that tool is not always available. Facilities may have had systems gaps from the absence of ANC protocols to frequent stock outs of essential ANC drugs that would explain why these tools were not available. Other reasons she may not fully comply are time limitations (as these are heavily burdened clinics, so if the full assessment takes 30 minutes and she only has 10 minutes, she may skip questions) or waning MESH-QI intervention effect. So for us, to see such a large improvement in some assessment items indicates that the intervention is a “good fit” for the deficit. If we did not see this, as was the case for some of the non-urgent assessment items, then that would indicate that the intervention was not addressing all of the barriers for that item.

Yes, to your question, all of the mentees in the study are nurses. To address your concerns, we have opted to use nurse-mentees in place of mentees throughout the paper.

There is no adequate discussion of contextual or implementation factors that could influence effects reported.

We agree that contextual factors could affect the generalizability of the results, and we have added the following details to the limitations section of the manuscript to address this point (page 12):

“In the efforts to promote the universal health coverage, Rwanda successfully launched a community-based health insurance scheme “Mutuelle” [54]. Local district officials incorporated mutuelle on the list of targets for district performance contracts locally known as “Imihigo”[55]. This study’s baseline data were collected during the evaluation of the district performance [56], a period marked by intensive efforts deployed by districts to accelerate the pace toward performance goals. This efforts may have increased mutuelle enrollments, leading to increased utilization of health center services. This efforts may have increased mutuelle enrollments, leading to increased utilization of health center services. Furthermore, an increased workload may have caused an intra-clinic pressure with indirect effect on baseline findings. As such, nurses may have rushed to complete consultations with limited time to focus on recommended ANC practices”.

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To expand on contextual factors, we provided information on nurse education and functions of the health center nurses in Rwanda. The following paragraph was added in the background section on page 6.

“Historically, Rwanda has three main education tracks for nurses and midwives including A2, A1, and A0. A2 level nurses and midwives are trained to the secondary school level and covers basic clinical subjects and specific area of nursing specialties [41]. Since 2006, the Ministry of Health stopped training and deploying A2 level nurses and midwives, deeming their skill sets were not sufficient to deliver high quality care services. Therefore, the ongoing efforts to upgrade A2 to A1 or A0 level may take several years [42]. In the meantime, A2 level nurses remain the bulk of nursing care at health center, fulfilling three functions including health promotions, provision of preventative services, and primary healthcare delivery [43][44].”

Even though the MESH-QI program is possibly a very important program that might have improved quality of care in rural Rwanda and could even be adopted in other sub-Saharan Africa countries, the evidence provided in this article lacks scientific rigor. Perhaps reporting the effects of the program on the mentees would be a better objective of this study.

While we recognize the limitations of this study, and note that this is not as rigorous as a randomized trial, our study team believes that the rigorous statistical analysis of this observational data provides compelling evidence that the MESH-QI intervention is improving adherence to the nationally adopted protocols. There do remain deficits in adherence in some assessment areas even after the intervention, but we have been forthcoming on these and made recommendations of how this can be addressed in the future.

However, noting your concern that this study may not be enough evidence for conclusions on the effect the intervention, we revised the last paragraph to recommend future research studies to explore the effect of the MESH-QI on the other aspects of individual nurse-mentees. Now the paragraph on page 13 reads as:

“We sought to assess the effect of the MESH-QI model on danger sign assessments and other ANC screenings. We assume that improving key ANC assessments has improved case management. Further studies are needed to assess the effect of the MESH-QI intervention on pregnancy outcomes. Future studies should also assess the impact of the MESH-QI on other aspects of the nurse-mentees including satisfaction, retention and perceived impact on their clinical competencies”. 
Reviewer: Eric Maimela, PhD

The paper is well written and addresses an important area which needs much attention to improve maternal health outcomes in Sub-Saharan Africa. Attention should be given to grammatical errors throughout the whole document but this does not dent or affect the message provided by this article.

Thank you for the comments which improved our manuscript. We have revised our full manuscript and addressed your specific comments below.

Introduction

The introduction to the study is well written and covers aspects of what was done in the past and what the gaps are in this field of study.

Thank you.

Methodology:

1. Line 26: It would be nice to explain what knowledge these A2-level nurses possess to can be able to be tasked with provision of health services in Rwanda. This is a worrying factor because they are of majority in terms of the explanation given in the methodology.

Thanks for the important comment. We have provided an overview of the nurse education and core competencies of the A-2 nurses in Rwanda. The following paragraph were included in the background section of the manuscript on page 6:

“Historically, Rwanda has three main education tracks for nurses and midwives including A2, A1, and A0. A2 level nurses and midwives are trained to the secondary school level and covers basic clinical subjects and specific area of nursing specialties [42]. Since 2006, the Ministry of Health stopped training and deploying A2 level nurses and midwives, deeming their skill sets were not sufficient to deliver high quality care services. Therefore, the ongoing efforts to upgrade A2 to A1 or A0 level may take several years [41]. In the meantime, A2 level nurses remain the bulk of nursing care at health center, fulfilling three functions including health promotions, provision of preventative services, and primary healthcare delivery [40][43]”. 
Results:

1. The results are well presented and interpreted.

Thank you

2. It will be of interest to know if there was any differences in the findings with regard to the level of education for the nurses. What is the level of completeness of ANC assessments between A2 and A1 trained nurses?

This is an important question. We did not find any statistically significant difference between A2 and A1 nurse-mentees’ assessments. We highlighted the following paragraph under the results section, page 10.

“No significant interaction was found between the effect of MESH-QI and FANC training (p=0.436) and level of mentee’s education (p=0.101). After controlling for level of mentee’s education and FANC training and clustering at nurse level, the MESH-QI intervention remained associated with significant improvement in the danger sign assessment score (Table 4)”.

Discussion:

1. The discussion is well written and has covered the limitations which had been encountered during the study which might affect generalizability of the findings.

Thank you

Consent to participate:

1. Line 24: Scientifically and ethically it is not allowed to conduct research without the consent of the participant. Why were there participant not given consent forms to sign before participating in the study?

Thanks for the comment. A verbal consent was obtained from each nurse-mentee. We have clarified this on page 14. Now the paragraph reads as:

“This study is covered through Population Health Implementation and Training Partnership research protocol approved by the Rwanda National Ethics Committee (RNEC 032/RNEC/2012) and Partners Institutional Review Board in Boston, MA (2009-P-001941/11; BWH). A verbal consent was obtained from each nurse mentee. Names and other personal identifiers were excluded from datasets extracted for the analyses”.
Editorial Policies

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Please read the following information and revise your manuscript as necessary. If your manuscript does not adhere to our editorial requirements this will cause a delay whilst the issue is addressed. Failure to adhere to our policies may result in rejection of your manuscript.

We read all information and revised the manuscript in accordance with the editorial requirements.