Author’s response to reviews

Title: Structured on-the-job training to improve retention of newborn resuscitation skills: a national cohort Helping Babies Breathe study in Tanzania

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Reviewer Comments & Author Responses

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Structured on-the-job training to improve retention of newborn resuscitation skills: a national cohort Helping Babies Breathe study in Tanzania
Dear Editors,

Thank you for the comments. They were very useful to strengthen the paper. Below is a summary of the reviewers’ comments and the authors’ responses. We welcome any further comments or feedback.

Kind regards,

Mary Drake

Comment | Response
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Abstract: please mention about the HBB program, details of 2 training approaches and include the cadre of attendants. | The abstract has been updated to include this content.

The abstract does not make it clear what was done in the control group, and what on the job training actual entails in regards to practice. I had to read this several times to fully understand what was being done. My interpretation: In a pre OJT period, the learners were assessed directly after a course and then 4-6 weeks after a course. After OJT was developed, this was incorporated into workshop, and the post-OJT era learners were assessed after a workshop and then again at 4-6 weeks. Were the post-OJT learners completely HBB naïve, and there was no overlap between the two groups?

We have added to the abstract to describe what was done in each group. Each group was HBB naïve and there was no overlap between the groups.

I think the abstract was well structured and easy to follow. In key words, the authors may consider using "low-income countries" instead of "developing countries". This has been changed although the authors note that “developing countries” is included as MeSH term while “low-income countries” is not.

Statistical analyses section should be revised for; the analyses for categoric variables and numerical variables in two independent groups and within groups (as Table 3). Thanks for the comment. The section has been updated.

Two training approaches are hard to understand. Please revise. The mean number of attendies for each train, the frequnecy and the details of OJT should be especially noted.

The description of the OJT has been updated in the Methods section.

Tables are very complicated and should be revised throughly; Table 1 and 2 should be either merged or
written in the text. Table 1 information has been incorporated into the text.

Table 3, 4, 5 all should be merged and presented in one table. This table should include brief explanations regarding statistical analyses of the comparisons (both between groups and within groups). Is "Skills drop" the net difference between the scores or the percent decrease? Thank you for the comment. We have merged the tables as suggested. We are looking at skills retention vis a vis reduction in skills drop. Skills drop is the decrease in points scored when comparing the initial post-training assessment to the follow-up assessment done at 4-6 weeks after training. We have updated the Abstract and Methods sections so that this is more clear.

As to NRP, suction in necessary situations and stimulation have great importance within the golden minute. I think the drop in the scores of these two steps is very important should be discussed for its improvement. Thank you for this suggestion. You’re absolutely correct; bulb suctioning and especially stimulation are important interventions in the Golden Minute. Therefore, we have updated our Discussion (Paragraph 2) to emphasize that there was a decrease in all three critical skills, including bulb suctioning and stimulation. Subsequently, in Paragraphs 3 and 4, we discuss that the drop off in skills can be addressed and we describe evidence-based interventions for retention of these skills.

Because HBB 2nd edition does not make recommendations on the exact structure for a system of ongoing practice, having more detailed on exactly what was recommended in OJT would be important so that other sites could replicate this intervention. There have been studies on other methods of ongoing practice, such as low-dose, high-frequency practice (Mduma et al., 2015; KC et al., 2017; Rule et al., 2017; Tabangin et al., 2018) which provide some detail on other methods of ongoing practice, including a bag-mask ventilation checklist, oversight with a master trainer, and peer-to-peer learning. Certain types of ongoing learning may suit different types of workers better than others.

The description of the OJT has been updated in the Methods section. In the Conclusion, we also had made mention of the need for further study in this area.

The second edition of Helping Babies Breathe (HBB), released in 2016, specifically recommends that a system of ongoing practice should be put into place after an initial training, although no specific recommendations on the frequency of practice are able to be given due to a lack of consensus in the literature. In the initial era after HBB implementation and dissemination, the authors noted that resuscitation skills performed in simulation declined when assessed 4-6 weeks after an initial training and onsite inspection revealed that there was limited self-initiated practice, verbal rather than hands-on facilitation of the HBB content, and no formal ongoing practice. For the reason, the on the job (OJT) intervention was developed to facilitate self-learning and continuous peer-to-peer learning. This OJT provided a more structured format where learners would review 4 key concepts after an initial training, so that these concepts could be reinforced. Thank you for your comments.

The manuscript also illustrates an even more important point--that a plan for ongoing practice needs to be put into place before the initial workshop is over--and that champions on the ground, in conjunction with supportive supervision from their facilitators and local health leaders--need to continue the efforts to integrate HBB into the local health care system before the enthusiasm, momentum and energy from the initial workshop wear off. The time period directly after the workshop is one in which this ongoing support is critical, before the newly acquired skills disappear.

Overall, it is an important topic. The study population is large.

Thank you for your comments.
Could the authors provide more details on who medical attendants are? Can the authors comment on the makeup of these group by job cadre and whether different job type meant previous exposure to neonatal resuscitation or simulation? A previous exposure to neonatal resuscitation could improve performance after a refresher because these individuals are having a booster rather than being tested on new material.

1. We have updated our Discussion so that, at the first mention of ‘medical attendants,’ we include a definition of this healthcare cadre. Specifically, we describe medical attendants as “semi-trained healthcare works often at lower-level health facilities.” Since there’s significant variability in experience and training among this cadre, it can be difficult to give a universal definition, but we hope this new addition is helpful. 2. With regard to differing training and previous experience between healthcare providers, we agree with the reviewer that these differences can plan a role in skills acquisition and retention. Therefore, we have updated our Methods to explain that we also analyzed skills by healthcare cadre “to help assess for differences in skills acquisition and retention across provider training and clinical experience, healthcare providers were categorized into three groups:.....” While the Results mention that skills acquisition was similar across all cadres, retention of skills varied. However, which cadre displayed greater retention varied by training approach (modified versus initial) and by skill (bulb, stimulation, ventilation), making it difficult for one to conclude how previous exposure or training-level impacted skills retention.

How did you decide how to score your OSCE, compared to that of HBB, and rank which steps were more important that deserved additional points?

Thank you for this suggestion. In the Methods, we have referenced the original paper that describes in detail the development and validation of this tool. We also have now included additional details here in the Methods stating that our OSCE and its scoring were adapted from the AAP’s original HBB OSCES and were validated by the Tanzania MOH and experts in the field: “As previously described, this single-scenario OSCE and its weighted scoring were adapted from the AAP’s original HBB OSCEs and validated by the Tanzania MOH and experts in the field of large-scale newborn training programs [4].” We have also added a reference ([4]) to the original AAP OSCE materials.

The references are woefully incomplete--there are a number of current pertinent papers that have not been cited. The authors do not cite Helping Babies Breathe, which is what the manuscript is about, specifically the 2nd Edition, which makes the recommendation for a system of ongoing practice, the topic pertinent to this manuscript. Another major omission is Mduma et al, a study using low dose-high frequency practice in their country of interest: Tanzania. The work of these authors should be mentioned (KC, Nepal; Kamath-Rayne, Honduras; Eblovi, Ghana; Rule, Kenya). They also failed to cite the big NICHD implementation trial (Bang et al.). Some of these studies also show an early drop off of skills (e.g. Tabangin et al, from Honduras). Because of this lack of in-depth knowledge about the literature that exists, the manuscript in its currently form is incredibly outdated. We have updated the references throughout the manuscript.

In the tables--the term "Skills drop" is unclear. Is this a percent decrease in score? I think you actually mean skills retention. Thank you for the comment. We are looking at skills retention vis a vis reduction in skills drop. Skills drop is the decrease in points score when comparing the initial post-training assessment to the follow-up assessment done at 4-6 weeks after training. We have updated the Abstract and Methods sections so that this is more clear.
One concern for me is the methods part where the Modified Approach is poorly described. I am told there is a 13-page instruction in local language and that there is repetitive training but more information is needed to understand the difference between the two groups. How often was OJT performed? Daily? With certain intervals? How many of the staff participated? Did it vary between sites?

The description of the OJT has been updated in the Methods section. In the Conclusion, we also noted mention of the need for further study in this area.

One weakness in the methodology is the short time of follow up of skills. Previous data typically uses sustainability at three or six months. Why use only 4-6 weeks in this study? The authors explain that this study demonstrates that skills can deteriorate quickly which is worrisome, but how sustainable is their model of OJT after 3 months? Six months? It would have been interesting to see that.

The reviewer is correct that, in this study, we do not have data on skills retention beyond its follow-up period of 4-6 weeks. While we feel our 4-6-week follow-up provides critical evidence for quick fall of in skills that can be reversed with specific interventions, this study does not show skill levels beyond this follow up. Therefore, we have revised our Limitations paragraph to also include the limitation that our data on skills retention are limited to the follow-up period of 4-6 weeks.

Another weakness is that the groups are trained at different points in time. Could other factors explain the difference in skills retention? More or less workload, for example due to seasonal differences which affect patient flow, could affect the time staff can allocate for retraining. Other training initiatives going on in one of the periods and not in the other? This should at least be discussed.

Thank you for this suggestion. We have updated our Limitations paragraph to state that the two approaches were completed sequentially and that interim events could have impacted our results: “Since the initial and modified training approaches were implemented sequentially, the results may have been impacted by any interim events, however, we are not aware of any interim trainings or other potential confounders.”

What also needs to be discussed is the lack of clinical outcomes in this study. It is mentioned and stated that the reason is because of resources. But as some studies has demonstrated a change in simulated skills but not in clinical practice after HBB training it is important to discuss this further. The lack of clinical outcomes is related to limitations on timeliness, completeness and accuracy of data. We have clarified this in the Limitations section. We have also added more on the link between training, application of skills and clinical outcomes to the earlier part of the Discussion section.

Conclusion could be more to the point rather than repeating results and discussion again. Repeating references in the conclusion is rare I think.

Thank for your comment. This section has been edited.

The p-value in the note is unclear to me. What does it refer to? Thanks for the comment, we have edited for clarity.

Comparing table 1 and 2 the number of participants in the two groups seems to differ. Table 1 had included description of all people trained, even if follow-up assessment was not done. Table 2 is the study dataset, and includes the number for which we have data on the same individual at immediate
post-training and at 4-6 weeks follow-up. We have updated the description of each table to make this
distinction clear. Based on another comment, Table 1 information has been integrated into the text.