Received: 7 September 2016 | Revised: 20 March 2017 | Accepted: 30 April 2017

DOI: 10.1111/ijn.12561

WILEY INTERNATIONAL JOURNAL of NURSING PRACTICE

RESEARCH PAPER

Helping Babies Breathe implementation in Zanzibar, Tanzania

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Abstract

Aim: To assess the efficacy and feasibility of implementing Helping Babies Breathe, a neonatal resuscitation programme for resource-limited environments.

Background: This quality improvement project focused on training midwives on Helping Babies Breathe to address high rates of neonatal mortality secondary to birth asphyxia.

Methods: The convenience sample was 33 midwives in Zanzibar, Tanzania. The train-the-trainer strategy with repeated measures design was used to assess knowledge and skills at 3 time points. Observations were completed during "real-time" deliveries, and a focused interview generated feedback regarding satisfaction and sustainability.

Results: Knowledge scores and resuscitation skills significantly improved and were sustained, $P < .05$. Of the 62 birth observations, 19% needed intervention. All were appropriately resuscitated and survived.

Conclusion: Results indicate that participants retained knowledge and skills and used them in clinical practice. Observations demonstrated that participants took appropriate actions when presented with a baby who was not breathing.

KEYWORDS

birth asphyxia, neonate, newborn, resuscitation, Tanzania

SUMMARY STATEMENT

What is already known about this topic?

- Evidence supports that implementation of Helping Babies Breathe has impacted reduction in neonatal mortality and stillbirths in many resource-limited environments.
- There is limited evidence on successful methods to conduct observations after initial training and what tool would be most effective for this.
- There is limited evidence around methods of sustaining implementation of Helping Babies Breathe over time.

What this paper adds:

- Implementation of Helping Babies Breathe in rural Zanzibar was effective using the train-the-trainer implementation strategy combined with follow-up over time. Sustainability was considered throughout the process by using reusable supplies, the train-the-trainer strategy, and focus group discussion regarding next steps.
- Observations revealed that Helping Babies Breathe skills and knowledge were carried over to practice. Translation of skills into practice may have been influenced by time spent to ensure mastery of skills and knowledge, supportive supervision by master trainers during observations, access to reusable supplies, and the Helping Babies Breathe Action Plan tool to inform practice. Of the 62 observations, all 12 babies who had difficulty breathing at birth received effective intervention.
- Use of the Helping Babies Breathe Action Plan in handout format was an effective tool to conduct "real-time" observations.

The implications of this paper:

- This paper supports that by applying key strategies such as the train-the-trainer model, mentoring, allocation of reusable supplies, observations with supportive feedback, and focus group discussion

regarding next steps when implementing Helping Babies Breathe can result in improved clinical practice.

1 | INTRODUCTION

Each year, there are approximately 3.6 million neonatal deaths in the world, with 98% of these deaths occurring in resource-limited environments (Little, Keenan, Niermeyer, Singhal, & Lawn, 2011). Of these 3.6 million deaths, nearly 50% occur within the first 24 hours of life (Ersdal, Mduma, Svensen, & Perlman, 2012). Sub-Saharan African countries have some of the highest rates of neonatal mortality when compared to other areas of the world and are priority areas for intervention. The United Nations made the reduction in childhood mortality a priority through designation of Sustainable Development Goal 3, which aims at reducing mortality of children under 5 years of age (United Nations, 2015). Over the past 2 decades, progress has been made in reducing the number of deaths of children less than 5 years of age, although newborn deaths and stillbirths are reducing at a much slower rate (World Health Organization, 2014). Therefore, there is great priority for reduction through the designation of *Every Newborn: an action plan to end preventable deaths*, which specifically targets reduction in neonatal mortality and stillbirths (World Health Organization, 2014).

Birth asphyxia accounts for 23% of neonatal deaths globally (World Health Organization, 2011). This percentage is even higher in certain locations, like a rural Tanzanian hospital where 61% of neonatal deaths were attributed to birth asphyxia (Ersdal et al., 2012). Another global challenge to reducing neonatal deaths in developing countries is fewer than half of all births are attended by a birth attendant with formal training (World Health Organization, 2016).

Helping Babies Breathe (HBB) is a basic perinatal resuscitation programme developed by the American Academy of Paediatrics (AAP) for resource-limited populations (American Academy of Pediatrics, 2017). The World Health Organization and United States Agency for International Development support HBB (American Academy of Pediatrics, 2017).

Helping Babies Breathe implementation has resulted in positive outcomes (Goudar et al., 2013; Msemo et al., 2013). A 47% reduction in early neonatal mortality within the first 24 hours, and a 24% reduction in fresh stillbirths were documented during a 2-year follow-up of an HBB programme in 8 Tanzanian hospitals (Msemo et al., 2013). Additionally, a study conducted in India implemented HBB and results indicated a small reduction in stillbirths without increasing or reducing neonatal mortality (Goudar et al., 2013). Other studies conducted in sub-Saharan Africa indicated increases in trainees' knowledge and overall satisfaction with HBB after implementation (Bondoe, Brown, Riner, Allam, & Stephenson, 2014; Hoban et al., 2013; Musafili, Essén, Baribwira, Rukundo, & Persson, 2013). These studies support the effectiveness of implementing HBB in resource-limited environments as an effort to reduce neonatal mortality. They also raise the question of what factors are essential to influence practice and ultimately lead to reductions in fresh stillbirths and neonatal mortality.

The purpose of this quality improvement project was to evaluate the efficacy and feasibility of implementing HBB for midwives in Zanzibar, Tanzania. The goal of this programme was to improve participants' overall knowledge and skill using basic resuscitation equipment; document use of these skills during real-life emergency situations in daily clinical practice; evaluate retention over time; and gain insight from participants about improving trainings and promoting sustainability.

2 | METHODS

2.1 | Design

This quality improvement study used a mixed methods repeated measures design. Qualitative and quantitative data were collected through interviews prior to implementation and knowledge and skill scores prior to implementation, immediately after implementation, and then 3 months later; data were also collected through observations and focus group discussion. This study was granted exemption from Institutional Review Board Review by the Duke University Health System Institutional Review Board.

3 | SETTING

Training occurred in 4 districts in Zanzibar, Tanzania. Zanzibar is separated from mainland Tanzania by the Indian Ocean. Each participating district was located several miles from the main hospital. Each district is composed of many villages with most having a local health clinic staffed with one or more nurse midwives. Larger clinics may also have a clinical officer present, however, this is rare. Most clinics have electricity, although it is unreliable.

4 | SAMPLE

The convenience sample consisted of 33 participants from 24 Primary Health Care Units or Primary Health Care Units plus in 4 districts of interest. Midwife participation was voluntary. A total of 31 participants considered themselves nurse midwives while two considered themselves clinical officers.

From the sample of 33 participants, 6 were designated master trainers and selected in collaboration with the Ministry of Health. The selection process was based on experience, leadership, and ability to speak both English and Kiswahili. Four of 24 total clinics represented had a master trainer working on-site. The master trainers were diverse in age and experience.

5 | INNOVATION

The innovation, HBB, is a basic neonatal resuscitation training programme developed by the AAP designed for those delivering babies in resource-limited environments. Helping Babies Breathe was developed on the principle that everyone tasked with caring for neonates at birth should have the opportunity to learn basic techniques to help neonates who cannot breathe on their own (American Academy of Pediatrics, 2017). The HBB programme offers a hands-on approach to learning using simulation with a newborn simulator (NeoNatalie), as well as

collaboration and teamwork as participants work in small groups. Helping Babies Breathe curriculum emphasizes thermoregulation, stimulation to breathe, and basic assisted ventilation when needed. Helping Babies Breathe stresses using these techniques in "The Golden Minute," which is the first minute following birth (American Academy of Pediatrics, 2017). To learn more about HBB and other Helping Babies Survive programmes, visit https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/helping-babies-survive/Pages/About.aspx.

6 | MEASURES/PROCEDURES OF INNOVATION

This project was conducted using the train-the-trainer implementation strategy. This involved a certified AAP HBB instructor training master trainers first and then supporting master trainers while they trained remaining participants. Techniques used for training included hands-on demonstration, simulations using NeoNatalie, overview of the HBB Action Plan, small group collaboration, as well as modelling proper assembling, disassembling, and cleaning of resuscitation equipment.

All written materials were provided in Kiswahili. The duration of training was 3 days. At the end of the initial training, master trainers spent time collaborating and planning how to conduct subsequent rounds of training for the 27 remaining participants. Master trainers also spent time practicing their delivery of HBB curriculum to ensure comfort with materials.

Additional trainings were facilitated for remaining participants. Master trainers decided on locations to increase accessibility for trainees. Trainings lasted 3 days and used the same HBB materials and techniques. All participants received reusable HBB supplies including upright bag-mask resuscitator, penguin suction device, solar light, HBB Action Plan, and learner handbook in Kiswahili.

During the 3 months following trainings, all master trainers conducted observations of participants during real-time deliveries. The tool used was a printed copy of the HBB Action Plan. Each master trainer documented results by circling steps observed on the HBB Action Plan and made notes including concerns or more detailed explanations of observations. After the observations, master trainers reviewed HBB skills and barriers to implementation with each midwife. Attendees were reminded about the importance of cleaning supplies between uses. Master trainers communicated with AAP HBB certified trainer in the United States of America via email and messaging.

Three months after the initial training, the AAP HBB instructor returned to Zanzibar. At this time, all 33 participants performed final evaluations of knowledge and skills. A refresher of HBB was not conducted prior to final evaluations. The same measurements collected pre-implementation and post-implementation were collected again. A focus group discussion was also held to understand barriers and how to promote sustainability.

7 | DATA COLLECTION

Prior to implementation, each participant was interviewed individually about previous resuscitation training and availability of resuscitation supplies in their clinics. Participants were also asked 2 open-ended questions: (1) indicate the first course of action you would take if a baby was not breathing or had difficulty breathing at birth and (2) if this technique did not work, what would be your second course of action? Each participant was also asked to demonstrate the use of the penguin suction device. Data were recorded based upon the observed actions of the participant.

Knowledge and skill scores were obtained using the 4 tools listed below and were repeated at 3 time points, post-intervention, and again approximately 3 months after initial implementation. All test measurement tools are from the HBB programme:

- A written or verbal questionnaire included 17 multiple choice questions measuring participants' general knowledge of HBB. The maximum possible score was 17.
- A bag-mask skill performance assessment comprised 7 action points demonstrating the skills needed to perform bag-mask resuscitation. NeoNatalie was used to evaluate ventilation speed and technique. Participants were observed and given points for each skill correctly performed. The maximum possible score was 7.
- Two objective structured clinical evaluations (OSCEs) A and B tested participants' ability to perform HBB skills in a situational simulation. Participants were observed and given points for each skill demonstrated correctly. Maximum possible scores were 13 for OSCE A and 18 for OSCE B.

Observations of deliveries were completed by master trainers between time points 2 and 3. A focus group was conducted with participants 3 months post-implementation. A member not associated with any training facilitated the focus group. The focus group used open-ended questions to gather insight from trainees regarding satisfaction, translation of skills into practice, the referral process, and overall programme sustainability.

8 | DATA ANALYSIS

Microsoft Excel was used for data management. All data collected, both qualitative and quantitative, were de-identified by master trainers in Zanzibar prior to being given to the AAP HBB instructor.

Data from interviews and observations were analysed using descriptive statistics. Quantitative data consisting of knowledge scores, bag-mask resuscitator skill check scores, and OSCE A and OSCE B scores at each time point were analysed using JMP Pro 12, a statistical analysis software program that performs similar functions as SPSS. A repeated measures analysis of variance was conducted to determine if there was statistical significance over time for each of the following scores taken at 3 time points: knowledge scores, bag-mask resuscitator skill check scores, and OSCE A and OSCE B scores. After determining if there was statistical significance over time, pairwise comparisons were completed to determine at which time-points significance occurred. Therefore, pairwise comparisons were conducted comparing time points 1 to 2, time points 1 to 3, and time points 2 to 3. Any P value of $<.05$ was considered statistically significant.

Qualitative data from the focus group were analysed by reviewing the transcription of the dialogue to identify themes. The facilitator of

the focus group transcribed the dialogue. Data were then given to the AAP HBB instructor. Transcriptions were reviewed to identify overall themes.

9 | RESULTS

9.1 | Descriptive statistics

Of the 33 total participants, 31 (93%) stated they had heard of resuscitation before and 9 (27%) had experienced resuscitation training previously. Prior to the training, none (0%) of the 33 participants had neonatal bag-mask resuscitators in their clinics. Furthermore, only one (3%) participant had a suction device prior to implementation. Everyone participated in the complete training duration.

Several descriptive statistics were gathered prior to implementation. Tables 1 and 2 describe participants' responses when asked what actions they would take if a baby was not crying or breathing at birth. Prior to implementation, only 3 of 27 (11%) participants demonstrated correct use of the penguin suction device. Additionally, 13 of 27 (48%) participants improperly squeezed air from the penguin suction device into NeoNatalie's mouth or nose.

9.2 | Participant knowledge

Over 3 measured time points, there was an overall statistically significant effect of time on HBB knowledge scores, $F_{2,10} = 5.24$, $P = .03$ (Figure 1). Post hoc pairwise comparisons show a statistically significant increase in knowledge scores between the first and second HBB testing ($P < .001$), this increase in knowledge was maintained to the third time point 3 months post-training ($P = .01$). There was no significant change in knowledge scores between the last 2 tests ($P = .85$) (Table 3).

TABLE 1 Participants' response to what is the first course of action if baby was not breathing at birth

First Course of Action	Responses	Percentage
Rub or stimulate	7	28%
Clean	5	20%
Shake	5	20%
Turn baby upside down	5	20%
Other	3	12%

TABLE 2 Participants' response to what is the second course of action if baby was not breathing at birth

Second Course of Action	Responses	Percentage
Refer	9	36%
Spank	3	12%
Put baby on side	2	8%
Shake	2	8%
Suction	2	8%
Mouth-to-mouth	2	8%
Other	5	20%

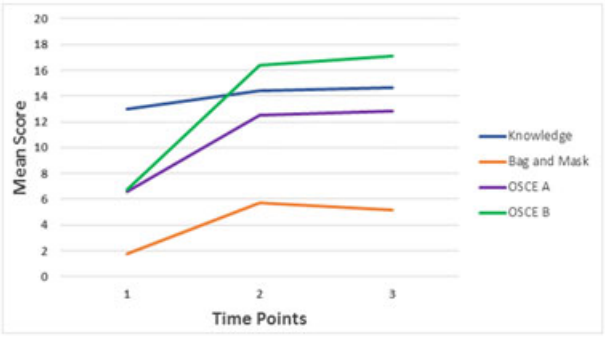

FIGURE 1 Participant knowledge, skill, and simulation scores at each time point (Mean ± SEM). ANOVA for all 4 tests individually was significant ($p < 0.05$). Significance using pair wise t-test comparing time point 1 with time points 2 or 3 ($p < 0.05$).

9.3 | Bag-mask resuscitator skill performance

A repeated measures analysis of variance over 3 measured time points showed a statistically significant effect of time on bag-mask skill performance, $F_{2,13} = 9.04$, $P \leq .001$ (Figure 1). Post hoc pairwise comparisons showed a significant increase from scores at time points 1 to 2 ($P < .001$). Similarly, there was a significant increase in scores from time points 1 to 3 ($P < .001$). There was a significant decrease in scores between time points 2 and 3 ($P = .04$) (Table 4).

9.4 | Situational simulations (OSCEs)

There was also a statistically significant effect of time over the 3 measurements on both OSCE A and OSCE B, (OSCE A: $F_{2,13} = 232.88$, $P = <.001$; OSCE B: $F_{2,13} = 88.63$, $P = <.001$) (Figure 1). For OSCE A, significant increases were noted for each paired measure. This includes time points 1 to 2 ($P < .001$), time points 1 to 3 ($P < .001$), and also time points 2 to 3 ($P = .03$). For OSCE B, significant increases were also noted for each paired measure. This includes time points 1 to 2 ($P < .001$), time points 1 to 3 ($P < .001$), and also time points 2 to 3 ($P = .002$) (Table 5).

9.5 | Observations

During the 3 months following training, 62 observations were conducted. Twelve times (19%) a baby was not crying at birth and needed stimulation, and suctioning. Four times (7%) a bag-mask resuscitator had to be used. In all 62 observations, each neonate began breathing and was able to independently breathe normally. All survived the Golden Minute. Some observers wrote teaching points discussed during their observations, including switching wet cloth (kanga) after drying thoroughly, removing top set of gloves before cutting the cord, hand washing, delayed cord clamping, and positive reiteration of steps performed.

9.6 | Focus group

During focus group discussions 3 months after implementation, participants shared they learned the following: importance of preparing the environment before delivery, not to immediately cut the cord, how to use the penguin suction device when needed, and the first minute is critically important. They also stated they feel more comfortable handling emergency situations during the Golden Minute. Overall,

TABLE 3 Participant knowledge results

	Time Point 1 (PRE)				Time Point 2 (Immediate POST)				Time Point 3 (3-Month POST)			
Outcome variable	Min.	Max.	Mean	SD	Min.	Max.	Mean	SD	Min.	Max.	Mean	SD
Knowledge	9	16	12.96	1.70	12	16	14.44	1.05	12	16	14.67	1.30

TABLE 4 Bag-mask resuscitator skill performance results

	Time Point 1 (PRE)				Time Point 2 (Immediate POST)				Time Point 3 (3-Month POST)			
Outcome variable	Min.	Max.	Mean	SD	Min.	Max.	Mean	SD	Min.	Max.	Mean	SD
Bag mask skill performance	0	4	1.76	1.28	4	7	5.69	1.06	3	7	5.13	1.30

TABLE 5 Objective structured clinical evaluation (OSCE) results

	Time Point 1 (PRE)				Time Point 2 (Immediate POST)				Time Point 3 (3-Month POST)			
Outcome variable	Min.	Max.	Mean	SD	Min.	Max.	Mean	SD	Min.	Max.	Mean	SD
OSCE A	2	11	6.55	2.15	11	13	12.5	0.62	12	13	12.86	0.35
OSCE B	1	12	6.71	2.69	14	18	16.38	1.04	17	18	17.13	0.35

participants stated the HBB Action Plan was helpful because it provided step-by-step instructions of what to do after birth. When exploring the aspects learned from training, one concept discussed was translation of skills into practice. Ideas of how the training informed practice were use of the simple HBB Action Plan as a guide, clearly understanding necessary steps, and now having supplies to use. When asked what could be done to improve trainings, participants wanted additional trainings to learn more and supportive supervision. Participants stated 3 days of training was sufficient.

Discussion of the referral process was also explored. Responses to when participants would refer a newborn were a baby not crying at 2 minutes, use of bag-mask ventilation, unable to breastfeed for 6 hours, signs of cleft palate, spina bifida, jaundice, or excessive crying. Midwives stated the approximate distance to referral centres was 15 to 21 km. Participants stated transportation complicates the referral process, which typically takes several hours to facilitate.

10 | DISCUSSION

These results support the effectiveness of implementation of HBB when conducted using the steps completed in this project. Results indicated significant improvements in all categories between pre-intervention and post-intervention measurements taken immediately after the training. Improvements were also maintained over time. This indicates participants retained HBB skills and knowledge.

Another HBB study conducted in Rwanda measured knowledge and skill at the same 3 time points. The results were similar, except in Rwanda, there was a decrease in skill 3 months after implementation (Musafili et al., 2013). This study in Zanzibar extends the research, due to increases in skill when comparing results post-intervention to 3 months later for OSCE A and OSCE B. Noticeable differences between the 2 studies were training length and observations paired with supportive supervision. Helping Babies Breathe training conducted in Rwanda was 1 day with participants requesting additional training days. Helping Babies Breathe training in Zanzibar was conducted over 3 days. An additional difference in Zanzibar is observations were conducted of "real-time" deliveries paired with supportive supervision. These factors may have influenced the results particularly at the 3-month follow-up.

10.1 | Bag-mask resuscitator skill check

One interesting result was the decrease in bag-mask skill performance between time points 2 and 3. Findings indicate that this was specifically due to missing one or more of the steps needed to improve ventilation when NeoNatalie's chest did not move. This requires repositioning of the head, clearing secretions if present, obtaining a firm seal, and squeezing the bag harder. At time point 3, participants most often missed the step for "clearing secretions if present." One potential influencer of this result is that secretions were not visible during simulation, which meant the skill was not intuitive for participants.

The second most commonly missed step was "squeeze the bag harder." This is interesting because if the previous steps were performed correctly, one may not need to squeeze the bag harder. However, the participants maintained the overall technique most of the time. This includes achieving a firm seal with the mask, proper ventilation, and chest movement. Overall, participants were able to grasp the basics of the method, even if finer details may have been lost over time. It is also possible that participants could benefit from increased practice with a bag-mask resuscitator and NeoNatalie to maintain overall skill, especially for those with limited exposure in clinical practice.

10.2 | Situational simulations

The demonstration skills for OSCE A and OSCE B significantly increased from pre-intervention to post-intervention and were sustained 3 months later. These findings support the effectiveness of this project. They also reinforce skills being retained and participants continuing to develop as they practice and use HBB in clinical care.

The fact that these scores continued to increase without additional training adds validity to this implementation.

Remarkably, both OSCE A and OSCE B resulted in significant increases at all 3 time points. Practically speaking, midwives had real-life use of these skills and it would be expected they would continue to improve. Possible inferences for continued improvement are participants had time to become comfortable performing HBB steps, observations by master trainers, and participants using HBB skills in clinical practice.

10.3 | Observations

Observations of practice in real-time settings were the most impressive findings because research indicates that only about 10% of learning is actually transferred into job performance (Holton & Baldwin, 2003). Midwives did successfully incorporate HBB skills and knowledge into real-time deliveries. Observations were conducted by 6 master trainers. Four of the master trainers worked in 4 of the 24 clinics being observed. Participants were observed in the clinics that they work in by the 6 master trainers. Observations were designed, as a tool to give constructive feedback in a nonpunitive manner. They were equally focused on evaluating translation of HBB into practice and facilitating an environment of teamwork between the observer and midwife. Therefore, this may introduce some bias in the results of observations, although it could also help promote sustainability. Observations demonstrated that midwives followed HBB protocol and took necessary steps in the Golden Minute. The observations support that when neonates had difficulty breathing at birth, appropriate interventions were completed to result in all 62 newborns independently breathing normally and placed skin-to-skin with their mother.

10.4 | Focus group

The focus group provided feedback on how to enhance trainings in the future and highlighted what participants gained from trainings. Participants stated many actions and learning points from training now informing their practice. The discussion also explored what concepts the participants felt most influenced translation of HBB skills into practice. The concepts identified by the participants recognized the importance of the simple HBB approach and availability of supplies. When asked how trainings could be improved, several requested further trainings and follow-up. Based on these results, further trainings are being planned to address neonatal mortality and build on the HBB foundation. Next trainings will include other Helping Babies Survive programmes including Essential Care for Every Baby and Essential Care for Small Babies focused on addressing causes of preventable neonatal mortality in the first month of life (American Academy of Pediatrics, 2017). An interesting discussion point in the focus group was the referral process. Further exploration should be conducted regarding the referral process to address challenges, resources, and potential innovations.

10.5 | Trainings

This implementation was unique as HBB training length was 3 days in duration, which was determined after reviewing common themes in HBB implementations, as well as considering a study conducted over 1 day that did not lead to skills being translated into practice (Ersdal et al., 2013; Goudar et al., 2013; Msemo et al., 2013; Musafili et al., 2013). In addition, the success of this implementation is owed to the master trainers who facilitated trainings. Master trainers developed ownership of the project that will lead to sustainable outcomes. All were local to Zanzibar and able to address issues of language, culture, and religion important for this population. All were part of the midwife community in the districts being trained. This established rapport and trust with participants. The train-the-trainer implementation model has been used in similar successful projects and increases the sustainability of this project (Goudar et al., 2013; Msemo et al., 2013).

Trainee ownership was equally significant. Great intention was placed on facilitating environments allowing for creativity and implementation of ideas. Some of the many ideas cultivated by the midwives were wearing 2 sets of gloves initially and taking off the top pair before cutting the cord, using a cup of water to practice with the penguin suction device, and use of encouraging language to the mother. Everyone helped create an environment of teamwork and equality. Other interactive techniques were used, such as touching a wet kanga (cloth that is typically used to dry newborns) to demonstrate how leaving a baby wrapped in a wet kanga can affect thermoregulation, having all participants hold their breath for 1 minute demonstrating the importance of moving quickly, and tapping out the difference between a slow heart rate versus a neonate's normal heart rate. One unforeseen outcome was empowerment of midwives through their ownership of the programme. Master trainers demonstrated this when serving in leadership roles that involved planning trainings, inviting participants, teaching, and providing supportive supervision. This was also observed during training among those participating. The empowerment was evident by their enthusiasm, innovative approaches, and collaboration.

11 | IMPLICATIONS

Limitations of this initiative are sample size and statistical rigour, however, the clinical significance and applicability to other settings is profound. Utilization of the evidence supporting HBB implementation and effective approaches yielding positive outcomes has influenced success of this implementation. The detailed outline and simple approach of this HBB implementation fosters great potential for replication in similar environments. Increasing the number of HBB trained and equipped birth attendants has potential to impact deliveries in resource-limited environments.

12 | CONCLUSION

This HBB implementation impacted care of newborns in the 4 participating districts of Zanzibar. Furthermore, this implementation provided a straightforward and organized approach to follow with the HBB Action Plan. Ultimately, the observation period reinforces HBB measures that are impacting the care and outcomes of newborns and can potentially do the same in other settings. Although participants did not remember every training detail over time, the overall approach was retained and influenced care of newborns. This

programme impacted care of newborns and empowered those entrusted with their care.

For HBB to impact neonatal mortality in Zanzibar, it needs to be scaled up. Two districts remain to be trained, however both districts are in urban areas where a majority of residents live. Helping Babies Breathe needs to be adopted in these districts and in Zanzibar's midwifery schools. It will be important for the Zanzibar Ministry of Health to continue supporting midwives moving forward. Follow-up education, observations, and replacement supplies must be made available. These efforts will increase individual and country ownership of the HBB programme. Evidence suggests that large-scale implementation of HBB has potential to reduce neonatal mortality and stillbirth rates (Msemo et al., 2013).

ACKNOWLEDGEMENTS

We thank Zanzibar Ministry of Health's Integrative Reproductive Child Health Office led by Dr Ali O. Ali, MD, and his staff including Zuhura Mohammed Nassor, Maryam Juma Bakar, and Hanuni Waziri Sogora for generously supporting this initiative.

DISCLOSURE

No conflicts of interest to report.

AUTHORSHIP STATEMENT

This statement confirms that all listed authors meet the authorship criteria and that all authors are in agreement with the content of the manuscript.

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How to cite this article: Wilson GM, Ame AM, Khatib MM, Rende EK, Hartman AM, Blood-Siegfried J. Helping Babies Breathe implementation in Zanzibar, Tanzania. *Int J Nurs Pract*. 2017;e12561. https://doi.org/10.1111/ijn.12561