IMPLEMENTATION PROCESS REPORT | JUNE 2021

Implementing PRONTO: an innovative intervention using simulation sessions to improve quality of care for the prevention and treatment of postpartum hemorrhage in seven health facilities in Zomba district, Malawi

Implementation Process Report

USAID FROM THE AMERICAN PEOPLE
UCSF Institute for Global Health Sciences
PRONTO INTERNATIONAL
University of Malawi Kamuzu College of Nursing
URC
IMPLEMENTATION SCIENCE COLLABORATIVE
USAID'S HEALTH EVALUATION AND APPLIED RESEARCH DEVELOPMENT (HEARD) PROJECT

ABBREVIATIONS AND ACRONYMS

APPHC	Advancements in Postpartum Hemorrhage Care
COMREC	College of Medicine Research and Ethics Committee Malawi
CPD	Continuous Professional Development
COVID-19	Coronavirus 2019
HEARD	Health Evaluation and Applied Research Development
ONSE	Organized Network of Services for Everyone's Health Activity
PPH	Postpartum Hemorrhage
RHD	Reproductive Health Directorate
UCSF	University of California at San Francisco
URC	University Research Co., LLC
USAID	United States Agency for International Development

Introduction

Despite considerable progress, PPH remains the leading cause of maternal mortality. In Malawi, though the maternal mortality ratio has declined over the past two decades, it remains high, at an estimated 349 per 100,000 live births[1], with 20-25 percent due to PPH. Inadequate human resources are a major concern, such as an insufficient number, improper distribution to rural areas, frequent transfers, and an aging workforce. There is limited quality evidence regarding behavioral and structural factors that affect PPH prevention and management.

Through a one-time USAID investment titled, Advancing Postpartum Hemorrhage Care (APPHC), a collaboration between the HEARD Project (implemented by University Research Co, LLC) and Breakthrough RESEARCH was established in 2019. In Malawi, partners include the Organized Network of Services for Everyone's (ONSE) Health Activity and Malawian stakeholders, including the Ministry of Health and Population (MoH), and the Kamuzu College of Health Sciences (formally called Kamuzu College of Nursing).

Advancing Postpartum Hemorrhage Care (APPHC) is a one-time catalytic investment from U. S. Agency for International Development (USAID) to generate and test solutions that address key barriers to PPH prevention, detection, and treatment, and to advance the use of related evidence. In Malawi, there has been on-going interest in improving the management of obstetric complications through mentoring approaches. The USAID-supported bilateral ONSE project has supported building the mentoring workforce within the MOH to promote health systems strengthening and MNH (among other health areas).

Therefore, one of the APPHC interventions was structured around the development and testing of a simulation and team mentorship approach to improve provider knowledge, skills, and communication improve the identification, management and treatment of PPH. For this intervention, we worked with PRONTO International, who designs and conducts simulation-based training for healthcare provider teams using an innovative, evidence-based approach to help learners move from knowledge to practice in the management of maternal and newborn emergencies. In addition to strengthening individual provider skills and knowledge, the sessions strengthen teamwork, communications, inter-professional collaboration, and respectful maternity care (RMC).

The main objectives of the simulation mentorship are to build capacity and confidence in managing obstetric conditions and complications, and help providers reflect on their work, manage stress, and feel respected in their roles in order to reduce potential burnout, improve motivation and support frontline health providers to manage PPH. The global COVID-19 pandemic introduced unexpected challenges to the APPHC effort, and as such the implementation of the PRONTO intervention was redesigned with dedicated training to delivering care in the context of COVID-19.

This Implementation Process Report describes the implementation process of the simulation, team training and communication intervention (PRONTO) to address provider knowledge, preparedness, and teamwork in managing PPH. The intervention implementation took place between March 2020 and December 2020. The report follows the Template for Intervention Description and Replication (TIDieR)[2] framework to organize the methods and process results of the Provider Implementation Research Study in Malawi, so that others may replicate or build on the learnings from this process. Following the TIDieR framework, the Methods contain the rationale, description, mode of delivery and study sites for the intervention, while the Results describe procedures, dose, adaptations, and fidelity.

[1]Trends in maternal mortality 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva: World Health Organization; 2019.

[2]Hoffmann Tammy C, Glasziou Paul P, Boutron Isabelle, Milne Ruairidh, Perera Rafael, Moher David et al. Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide BMJ 2014; 348 :g1687

Methods

Study sites

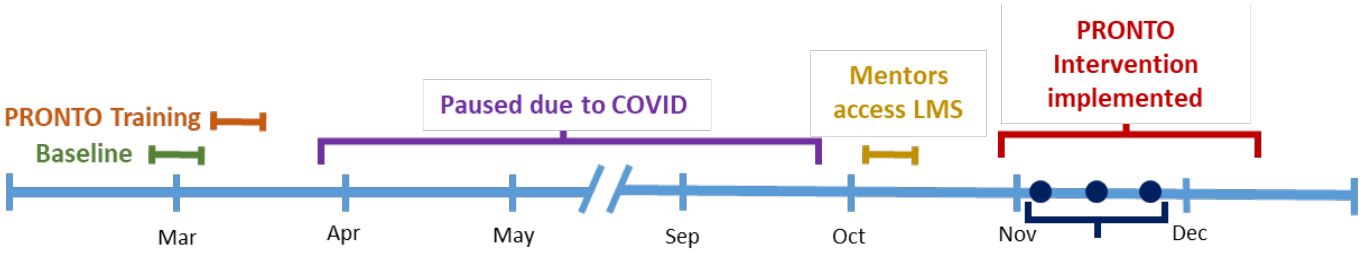
The seven PRONTO intervention facilities were purposively selected to provide representation from primary, secondary, and tertiary care facilities, while ensuring sufficient numbers of providers and deliveries to meet sample size requirements for the larger implementation research (IR) study (Table 1).

TABLE 1. DETAILS OF SELECTED FACILITIES IN ZOMBA RECEIVING THE PRONTO INTERVENTION.

Health Facility	Rural/Urban	Facility Level	# Maternity Unit Staff	Average births / mo.	PPH/ Delivery
Zomba Central Hospital	Urban	Central Hosp	67	211	2.3%
Matawale Health Center	Urban	Health Ctr	17	85	1.7%
St. Luke's Hospital	Peri-urban	Com. Hosp	8	151	1.6%
Nasawa Health Center	Rural	Health Ctr	6	33	2.7%
Pirimiti Community Hospital	Rural	Com. Hosp	8	127	3.5%
Mayaka Health Center	Rural	Health Ctr	7	113	1.7%
Ngwelero Health Center	Rural	Health Ctr	4	83	0.7%

The same 14 mentors who participated in the initial PRONTO Simulation Facilitator course also completed a digital course on PRONTO's learning platform, 'PRONTOLearn,' to familiarize themselves with the elements of simulation and facilitation after the 6-month pause due to COVID-19. Mentors also received three coaching calls and feedback reports from the PRONTO Master Trainers. These calls were provided for the mentors to have the chance to discuss challenges and successes in running simulation in their facilities, for Master Trainers to provide feedback and advice, and for the PRONTO team to orient mentors to the next PRONTO SimPack™ in the implementation progression. The coaching calls were interspersed between simulation sessions. Figure 1 depicts implementation timeline of the intervention package components. In addition to describing these four intervention components, the role of the intervention coordinator in implementing this work is described.

FIGURE 1. TIMELINE OF INTERVENTION ACTIVITIES, ZOMBA 2020.



Intervention components

1.PRONTO Simulation Course for Mentors in March 2020

The initial PRONTO Simulation Facilitator Course took place at Kamuzu College of Nursing, Kameza Campus in Blantyre, chosen for its modern skills lab and training facilities. The participants in the training included the 14 mentors from facilities in Zomba selected to implement the intervention, official representatives from MoH, ONSE, Kamuzu College of Nursing, and six PRONTO facilitators. See Appendix A for the list of participants. Among the 14 mentors implementing the simulations at their respective facilities in Zomba (two mentors per facility), exactly half were female and half were male, ranged in age from 30—45 years with an average of 7 years of nurse midwifery experience.

The PRONTO course, which ran from March 9-13, 2020, included leading simulations and debriefs, conducting knowledge reviews, skills activity sessions, and teamwork activities, as well as teaching mentors how to use the PRONTO curriculum and supplies. The curriculum, which includes normal birth, postpartum hemorrhage, respectful maternity care, and neonatal resuscitation, was delivered via didactic sessions, hands on activities, and highly realistic simulations. Participant knowledge was assessed through pre- and post-tests, as well as through observations during skills, and teamwork activities.

2. Virtual Learning Platform

Prior to the resumption of PRONTO implementation activities in the fall of 2020, the same 14 mentors completed a digital course on PRONTO's learning platform, PRONTOLearn, which included seven video modules (Table 2). This refresher series in the form of instructional videos or how to guides, was intended to refresh the mentors' knowledge in the areas of simulation and debriefing facilitation delivered in March, given the mentors had yet to put the simulation facilitation skills they learned during the initial training into practice.

The process was designed so that mentors would complete the digital course and accompanying assessments prior to running their first simulation in their facilities. This allowed for an opportunity to assess knowledge retention and the impact of the digital course on knowledge of simulation fidelity. This course was also intended to bolster the mentors' confidence and skills as they prepared to run their first simulation.

Mentors registered on PRONTO's learning management site to gain access to PRONTO's digital course. This course included a pretest, seven videos, and seven quizzes. PRONTO felt this digital course would be an important refresher training for participants prior to running the simulations. It was also valuable to provide PRONTO trainers with a sense of mentors' baseline knowledge in order for them to provide more nuanced and appropriate feedback. The mentors were able to access the videos throughout the implementation timeline should they want to refresh their knowledge.

TABLE 2. VIRTUAL MODULES PRESENTED IN THE DIGITAL COURSE

Module	Description
1. Overview of Supplies	Reviews the organization of the PRONTO simulation training supplies and mentor simulation training kits. The video orients participants to key PRONTO supplies, as well as where to find these specific supplies in their organizational bags.
2. A Look at the SimPacks	Introduces participants to PRONTO's simulation scenario guides – SimPacks - including the purpose and objective of how to use each page, how to use the SimPacks, as well as the formatting and design patterns.
3. Making Simulated Blood	Shows how to make simulated blood from the blood powder provided by PRONTO, how to fill the enteral and IV bags for simulation, and how to set-up the blood for PPH simulation scenarios.
4. A Tour of the PartoPants and How to Load the PartoPants	Orients learners to the PartoPants, which are PRONTO's birth simulator pants, worn by a patient actress. Includes what anatomical features are included, how to load the filled blood bag into the pants, as well as how to use the pants for clinical interventions.

5. Setting up the Simulation Area	Teaches how to set up the simulation area, including the labor bed, supplies, and neonatal resuscitation area.
6. Preparing the Patient Actress	Teaches learners how to dress and prepare the patient-actress for simulation, reviews how to teach the role in the simulation, as well as reviews the simulation hand signals required to communicate non-verbally with the patient-actress during simulation.
7. Facilitating Simulation	Introduces how to facilitate a simulation, including how to properly use the whiteboard, Simulation Progression page in the SimPack, and the PRONTO Cry Card.

3. Mentor facilitated simulations in intervention facilities in Zomba Oct - Dec 2020.

The PRONTO Team and the Kamuzu College of Health Sciences Intervention Coordinator worked with mentors to implement the PRONTO simulation sessions in seven facilities in the district of Zomba from October to December 2020. Prior to implementation, PRONTO added two COVID simulation scenarios, based on adherence to MoH and Reproductive Health Directorate policy guidance, to reinforce safe provider patient interactions to minimize the spread of the coronavirus.

The mentors conducted four simulations in their facilities: 1) Normal Birth of a Vigorous Baby, 2) Normal Birth of a Vigorous Baby and Immediate Postpartum Hemorrhage, 3) Severe Postpartum Hemorrhage Due to Atony (Delayed Postpartum – No Birth), and 4) COVID-19 Positive Patient with a Spontaneous Vaginal Birth of a Non-Vigorous Baby. Details about each of the simulation sessions are in Table 3. Each of the four simulation and debrief sessions were videotaped and analyzed using a code window with indicators for simulation and debriefing fidelity, and to inform instructional elements during the coaching calls.

TABLE 3. SIMULATION SESSION LOCATION, MODULE, DATE AND PARTICIPANTS.

Facility Name	Simulation Session Modules	Date conducted	# of participants
Zomba Central Hospital	1. Normal Birth of a Vigorous Baby	26/10/2020	17
	2. Normal Birth of a Vigorous Baby and Immediate PPH	14/11/2020	20
	3.Severe PPH Due to Atony (Delayed Postpartum – No Birth)	24/11/2020	12
	4. COVID-19 Positive Patient with a Spontaneous Vaginal Birth of a Non-Vigorous Baby	18/12/2020	14
Pirimiti	1. Normal Birth of a Vigorous Baby	21/10/2020	18
	2. Normal Birth of a Vigorous Baby and Immediate PPH	18/11/2020	26
	3. Severe PPH Due to Atony (Delayed Postpartum – No Birth)	02/11/2020	12
	4. COVID-19 Positive Patient with a Spontaneous Vaginal Birth of a Non-Vigorous Baby	14/12/2020	10
St. Luke's	1. Normal Birth of a Vigorous Baby	27/10/2020	18
	2. Normal Birth of a Vigorous Baby and Immediate PPH	17/11/2020	25
	3. Severe PPH Due to Atony (Delayed Postpartum – No Birth)	26/11/2020	12
	4. COVID-19 Positive Patient with a Spontaneous Vaginal Birth of a Non-Vigorous Baby	17/12/2020	10

Mayaka	1. Normal Birth of a Vigorous Baby	28/10/2020	8
	2. Normal Birth of a Vigorous Baby and Immediate PPH	13/11/2020	13
	3. Severe PPH Due to Atony (Delayed Postpartum – No Birth)	27/11/2020	9
	4. COVID-19 Positive Patient with a Spontaneous Vaginal Birth of a Non-Vigorous Baby	18/12/2020	12
Nasawa	1. Normal Birth of a Vigorous Baby	28/10/2020	10
	2. Normal Birth of a Vigorous Baby and Immediate PPH	12/11/2020	11
	3. Severe PPH Due to Atony (Delayed Postpartum – No Birth)	03/11/2020	11
	4. COVID-19 Positive Patient with a Spontaneous Vaginal Birth of a Non-Vigorous Baby	19/12/2020	7
Ngwelero	1. Normal Birth of a Vigorous Baby	30/10/2020	10
	2. Normal Birth of a Vigorous Baby and Immediate PPH	09/11/2020	12
	3. Severe PPH Due to Atony (Delayed Postpartum – No Birth)	23/11/2020	12
	4. COVID-19 Positive Patient with a Spontaneous Vaginal Birth of a Non-Vigorous Baby	18/12/2020	10
Matawale	1. Normal Birth of a Vigorous Baby	10/11/2020	20
	2. Normal Birth of a Vigorous Baby and Immediate PPH	19/11/2020	21
	3. Severe PPH Due to Atony (Delayed Postpartum – No Birth)	25/11/2020	12
	4. COVID-19 Positive Patient with a Spontaneous Vaginal Birth of a Non-Vigorous Baby	15/12/2020	13

4. Virtual Coaching Sessions with Mentors in Fall 2020

As part of PRONTO's rapid cycle learning process, mentors participated in group coaching calls with the PRONTO Master Trainers between each simulation session (Table 4). These calls were provided for the mentors to have the chance to discuss challenges and successes in running simulation in their facilities, for Master Trainers to provide feedback and advice based on the review of video recordings of the simulations, and for the PRONTO team to orient mentors to the next PRONTO SimPack™ in the implementation progression.

In addition to the coaching calls, another support mechanism was the initiation of a WhatsApp group so that mentor pairs could share ideas and challenges with each other, as well as direct questions to PRONTO facilitation staff. PRONTO staff monitored and answered questions via the WhatsApp group throughout the duration of implementation.

TABLE 4. VIRTUAL COACHING CALLS

Date	Content	Length of Call	Participants
November 2, 2020	Debrief from 1st Simulation Session (Normal Birth of a Vigorous Baby) and orientation to 2nd Simulation (Session Normal Birth of a Vigorous Baby and Immediate PPH)	80 minutes	• 14 Mentors • 4 PRONTO Master Trainers • 4 PRONTO Support Staff
November 30, 2020	Debrief from 2nd Simulation Session (Normal Birth of a Vigorous Baby and Immediate PPH) and orientation to 3rd Simulation (Severe PPH Due to Atony (Delayed Postpartum – No Birth)	90 minutes	• 13 Mentors • 4 PRONTO Master Trainers • 3 PRONTO Support Staff
December 15, 2020	Debrief from 3rd Simulation Session (Severe PPH Due to Atony (Delayed Postpartum – No Birth) and orientation to 4th Simulation (COVID-19 Positive Patient with Spontaneous Vaginal Birth of Non-Vigorous Baby)	90 minutes	• 9 Mentors • 4 PRONTO Master Trainers • 3 PRONTO Support Staff

Due to COVID-19, some of the mentor support transitioned to virtual support, by putting in place a digital platform where the facility-based mentors and PRONTO trainers could interface for further engagement with feedback and mentorship on how best to facilitate simulations in their respective facilities.

5. Implementation Support

To effectively implement the PRONTO simulation intervention required support from the Ministry of Health and facilities where the session occurred and leadership from KCN to engage key stakeholders such as ONCE and the RHD. Most importantly, a fulltime intervention coordinator (IC) was responsible for coordinating and communicating with mentors and administrators, and was critical to the organization, scheduling and implementation of the simulation sessions at each facility. The intention was for the IC to handle scheduling, support logistics at each session, video record the sessions for virtual coaching feedback and collect additional monitoring data.

Throughout the intervention, the research team collected input and process data from mentors, as well as participants in the simulation sessions (Table 5). Information collected provided key insights into what worked well in terms of knowledge, implementation and acceptability of the intervention, and what challenges should be addressed to successfully sustain and scale the approach.

TABLE 5. DATA COLLECTION INSTRUMENTS USED DURING APPHC PRONTO INTERVENTION

Instrument name	Frequency	Description	Participants
Pre- and post-tests which consisted of seven individual subject quizzes corresponding to virtual "video trainings"	Before accessing the LMS and after each of the 7 videos	A 56-item pre- post-test questionnaire to assess knowledge retention after accessing and viewing mentor videos on the MLS	Mentors
Video Recording of each simulation session	At each visit	To record fidelity simulation facilitation and debriefs	Mentors
Acceptability and feasibility survey	After 2nd and fourth simulation session	18-item questionnaire with 5-point Likert scale for responses	Providers and mentors
Mentor log book	After every visit	A record of participants and activities accomplished during the visit	Mentors
COVID Preparedness questionnaire	After 2nd and fourth simulation session	15-item questionnaire with 5-point Likert scale for responses	Providers and mentors

Results

1. PRONTO Simulation Course for Mentors in March 2020

Days 1 and 2 of the Simulation Facilitator Course were designed for mentors to experience the PRONTO curriculum first hand by being participants in the teamwork activities, knowledge reviews, and simulations. Day 3 was designed for them to learn the 'behind the scenes' skills of facilitating simulation. The mentors then translated that knowledge into practice on days 4 and 5 by facilitating the activities on their own with feedback and support from PRONTO's master trainers.

However, the training was interrupted due to a national increase in COVID-19 cases. The PRONTO team departed after the third day to avoid travel delays due to diverted flights amidst the pandemic. During the final two training days, participants self-led their assigned simulations with guidance from KCN and ONSE program staff, conducted knowledge reviews, and teamwork and communication activities without PRONTO facilitator feedback, an important component of the course.

To accommodate the absence of expert facilitators, the participants divided into four groups, each with designated specific activities to facilitate on Days 4 and 5. It was important that the four groups were well-balanced in terms of composition of mentors and stakeholders, as well as skill level. While the PRONTO team initially wanted all mentor pairs from the same facilities to be in the same group, it was ultimately more important that every individual gain confidence and skill in facilitating simulation. As such, mentor pairs that appeared to be struggling were separated and each individual put on a team where they would get more individualized support. This turned out to be a very effective way of providing support to these new mentors in the absence of PRONTO Master Trainers.

Groups spent time going over their activities, assigning roles, and running through activities they were unsure of, to improve the likelihood of success on Days 4 and 5. Overall, participants were knowledgeable; they picked up communication concepts and simulation quickly, and were well prepared. Their willingness to embrace PRONTO was evident in their eagerness to continue with the training despite the absence of PRONTO Master trainers.

The in-country leadership present was very additive to the educational experience. They participated enthusiastically and accepted their role in supporting the mentors without hesitation. For example, the leadership was eager to give mentors roles such as debriefing and running simulations, to give them opportunities to sharpen their skills before conducting simulations in facilities.

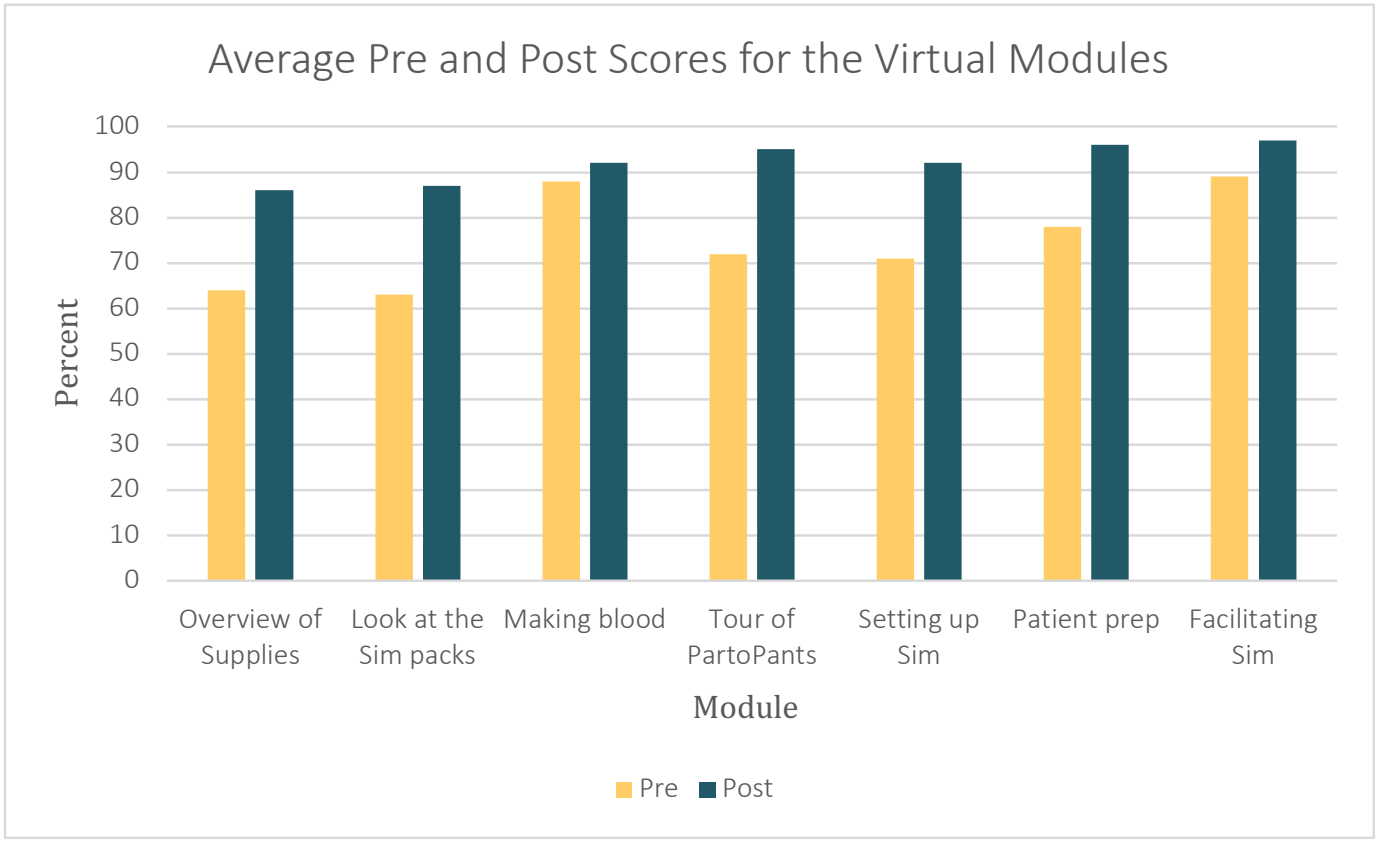
2. Virtual Learning Platform

All mentors completed the digital course across a 1-to-2-week period. They reported that the digital course was easy to use and valuable for their learning. The average time spent on learning management site was 7.5 hours, nearly double the amount of time PRONTO estimated it would take for the mentors to complete all of the modules.

The additional time need to complete the course was due to factors such as network issues, the use of phones rather than a tablet for access, and personal and professional interruptions. Several mentors remarked that their families interrupted their progress in some cases, while others had scheduling conflicts (funerals, maternity leave, other work obligations) that increased the time needed to complete the materials. The delays meant that extra effort was needed on PRONTO's side to keep each mentor moving through the process in a timely fashion. With continuous PRONTO support 92% of the mentors were able to complete the virtual assessments before running their first simulation session.

Mentors took a pre-test, which was a compilation of seven individual subject quizzes corresponding to each video. After each video, mentors then completed the video specific quiz to assess retention of the module. **For every module, mentors increased their knowledge after viewing the asynchronous videos (Figure 2).**

FIGURE 2. PRE- AND POST-TEST SCORES FOR THE VIRTUAL LEARNING MODULE



PRONTO incorporated relevant learning components, based on questions that were most often answered incorrectly in the digital course, into the first coaching call to address potential confusion or gaps in knowledge. Though all learners were able to complete the modules and demonstrated an increase in knowledge of the topics covered, there were a number of challenges that were encountered along the way.

Table 6 outlines the main challenges encountered and possible ways to mitigate these challenges in the future.

TABLE 6. CHALLENGES WITH THE ACCESSING VIRTUAL LEARNING PLATFORM

Challenges	Considerations for future use
Availability of and delays receiving data bundles from KCN to access the internet and stream the instructional videos	• Have data available in advance of activities, which will provide more time for mentors to review and complete assignments. • Provide enough data to allow learners to re-watch video modules to refresh knowledge
Use of project tablets	Provide tablets preloaded with data with sufficient capability to allow video viewing and access to online assessments.
Having learners complete the course in a timely manner	Though this LMS is designed to have learners engage on their own time (self-study), external staff should continuously monitor progress and engage learners to encourage completion and help trouble-shoot any problems that arise.
Email access and use	To engage the learning management system's log-in, an email address is required. Have coordinating staff available to support learners who need help with their login information and problem solve via WhatsApp.

3. Mentor facilitated simulations in intervention facilities in Zomba Oct - Dec 2020.

The simulation sessions were carried out in the seven facilities after much advance planning and communication between KCN staff and the administration in each facility. Mentors and participants were provided with facemasks and hand sanitizer prior to initiating a simulation session. Mentors completed a "logbook" entry after each facility visit. The data entry tool documented details of the PRONTO simulation session that occurred during the visit, including what simulation and activity was conducted, time spent, observations of what well and what needs attention, and the use of PPE. Twenty-eight records were captured, representing four simulation sessions at each of the seven intervention facilities (100% completion). According to these logbook entries, all four intended simulation were completed. Generally, mentors spent between 1-2 hours facilitating each session with debrief and related communication or team building activity. Mentors reported that PPE was available and in use among participants and observers over 80% of the time. Table 7 presents characteristics of the sessions.

TABLE 7. SUMMARY OF MENTOR LOGBOOK VISITS

Mentor Logbook Variables	Simulation Sessions N=28
Length of time for PRONTO Session	
1-2 hours	15 (53.6%)
2-3 hours	12 (42.9%)
3-4 hours	1 (3.6%)
Average number of participants in PRONTO simulation session	4.2 (2–6)
Average number of observers in PRONTO simulation session	14 (8–24)
Location where PRONTO simulation session occurred	
Labor Room	12 (42.9%)
Classroom	1 (3.0%)
Other Facility Space	15 (53/6%)
PPE was available and used during each visit	23 (82%)
Participants knew how to don and doff PPE	21 (75%)

The simulations sessions were also video recorded and coded using a standardized PRONTO codebook for analyzing sessions that measures fidelity to the facilitation process. The fidelity analysis examines the verbal and non-verbal actions of the facilitator, providers, and patient-actress and during the simulation session. A similar video analysis is conducted for the debrief sessions. These video reviews were used by the PRONTO Master Trainers to guide the virtual coaching calls, and are an important to help facilitators improve and sustain facilitation skills. Table 8 presents data on key fidelity measures recorded during the 28 simulations conducted by the mentor pairs.

TABLE 8. FIDELITY TO SIMULATION FACILITATION AND DEBRIEFS (N=28)

Description	Total Number (%)	First Simulation	Second Simulation	Third Simulation	Fourth Simulation
Facilitator					
Facilitator says "Action"	Yes = 16 (57.1)	28.6	100.0	71.4	28.6
Facilitator uses hand signals	Yes = 28 (100.0)	100.0	100.0	100.0	100.0
Facilitator communicates on whiteboard	Yes = 26 (92.8)	100.0	71.4	100.0	100.0
Facilitator refrains from talking to or coaching patient	Yes = 24 (85.7)	71.4	85.7	100.0	85.7
Facilitator wearing a mask	Yes = 19 (67.9)	42.9	28.6	71.4	100.0
Patient Actress					
Wore PartoPants	Yes = 28 (100.0)	100.0	100.0	100.0	100.0
Wore Injection Pads	Yes = 28 (100.0)	100.0	100.0	100.0	100.0
Wore IV Arm Bands	Yes = 28 (100.0)	100.0	100.0	100.0	100.0
Debrief					
RMC Discussed	Yes = 26 (92.8)	100.0	85.7	85.7	100.0
Was debrief conducted in a quiet location?	Yes = 25 (89.2)	71.4	100.0	85.7	100.0

At the end of the sessions, participants were asked to complete a short 10 minute paper-based survey that asked about their perception of the activities. Since these sessions targeted maternity ward staff, it is not surprising that over half of participants in attendance were nurse-midwife technicians. On average, providers had just over four years of experience. Participants had positive reactions to the simulation sessions with 99% responding that they found the session useful or very useful for managing future PPH cases, and that they would want to participate in a future PRONTO session. Table. 9 presents responses from some of the main questions.

TABLE 9. PARTICIPANT PERCEPTIONS, ACCEPTABILITY, FEASIBILITY

Responses	Simulation Session Participants N=228
Participant Characteristics	
Provider Cadre	
Clinical Officer / Specialist	33 (14.5%)
Registered Nurse/Midwife	43 (18.9%)
Nurse Midwife Technician	119 (52.2%)
Hospital Attendant / CMA / Student	33 (14.5%)
Number of years of experience	Ave 4.2 years (0 – 26) Median 3 years
PRONTO Perceptions	
Did you find the simulation activity useful for better managing your next case of PPH?	
Very useful	199 (87.3%)
Useful	28 (12.3%)
A little useful	1 (0.4%)
Not useful at all	1 (0.4%)
Would you support the use of PRONTO learning sessions at your facility the future?	
Yes, a lot	218 (96.5%)
Somewhat	5 (2.2%)
A little	2 (0.9%)
Not at all	1 (0.4%)
How likely are you to participate in a PRONTO learning session in the future, if offered at your facility?	
Very likely	177 (78.7%)
Likely	47 (20.9%)
Somewhat likely	1 (0.4%)
Not likely at all	0 (0.0%)
How often would you like to participate in a PRONTO learning session?	
Weekly	49.6% 113
Monthly	44.7% 102
Quarterly	5.7% 13
Participation frequency given current demands on your time	
Weekly	108 (47.6%)
Monthly	106 (46.7%)
Quarterly	11 (4.9%)
Yearly	1 (0.4%)
Facility has adequate space to conduct PRONTO learning sessions	
Yes	198 (88.4%)
No	24 (10.7%)
I don't know	2 (0.9%)

Continuity of obstetric care during COVID-19 is of concern globally. While not a primary objective of the simulation sessions, the sessions provided an opportunity to query providers about their thoughts and concerns about the provision of care during COVID-19, and how they perceived facilities were prepared with clear policy guidelines (Table 10).

TABLE 10. PROVIDING CARE IN THE CONTEXT OF COVID-19

COVID-19 Questions	Participant Responses (n=228)
Felt able to participle in PRONTO sessions safely, with adequate PPE to minimize the spread of COVID-19	
Yes, a lot	140 (61.7%)
Somewhat	28 (12.3%)
A little	47 (20.7%)
Not at all	12 (5.3%)
How prepared is the maternity unit you work in to manage patients diagnosed with COVID-19?	
Not at all prepared	60 (26.6%)
A little prepared	93 (41.2%)
Prepared	43 (19.0%)
Very prepared	18 (8.0%)
I don't know	12 (5.3%)
Does your facility have adequate PPEs?	Yes = 26.5%
Does your maternity unit have a ward for isolating COVID-19 patients?	Yes = 15.7%
Does your facility have a protocol for managing pregnant women and newborns with suspected /confirmed COVID-19?	Yes = 25.6%
Are you fearful of contracting COVID-19?	
Not fearful	27 (12.4%)
A little fearful	52 (24.0%)
Fearful	55 (25.4%)
Very fearful	83 (38.3%)

Challenges with conducting the simulation sessions

Scheduling: The goal was to conduct simulations during the afternoon hours on a day shift. While this post-lunch time-period worked for the majority of facilities, some staff reported being too tired or too busy to spare time and participate in the simulations. A few times, the sessions began as late as 4 pm because staff were still attending to patients or had competing activities to attend (by other partner organizations).

Incentivizing participation: Compensation for time and effort is the prevailing business model in health facilities and without it, mentors and staff were less motivated to attend PRONTO simulations, especially when other trainings and professional development activities hosted by other international entities offer compensation. Due to this challenge, participants and mentors received compensation in the form of an allowance of MK4000 per session at the second simulation session to cover lunch and transportation costs, and cover their time to complete the participant survey.

Social distancing during COVID-19: Some group work/team work activities involved close contact of participants and mentors. During the COVID-19 pandemic, these activities made it challenging for participants to observe preventive measures like social distancing.

Transportation for Implementation Coordinator: Having a dedicate car and driver for the intervention coordinator (IC) to travel to facilities would improve implementation as transportation was a challenge at times. The implementation coordinator was in charge of ensuring the sessions were set up correctly, videotaping the sessions, and implementation data collection activities at each facility. Ensuring that the IC has access to a car for the appointments in the facilities is essential.

Continuous professional development (CPD) points: CPDs are a potential non-monetary incentive for participants. However, CPD points are received for content area. For example, if a provider attends a simulation on PPH due to atony, that provider will receive a certain CPD point value. If that same provider attends a simulation session with the same content, or even if they attend a simulation on, for example, PPH due to cervical laceration, they will not receive any CPDs for attending the second simulation session. The power of simulation is actually the opportunity that each provider has to attend and practice the same scenarios many times even if the same clinical content is covered. Simulation builds muscle memory, which fills the know-do gap when otherwise rare emergencies like PPH occur. If CPDs are only given for one simulation per "clinical area covered" providers are not incentivized to attend, and the deeper value of simulation is lost. Over time, it will be unsustainable for mentors to attempt to attract providers to simulation sessions if they must provide different clinical content so that CPDs will be available.

Facility administration support: The overall message at facilities was the importance for the administration to support and emphasize PRONTO simulations sessions to their providers. It would also be beneficial for administrators to clearly message to providers that mentors are not receiving special compensation for their roles as mentors and simulation facilitators.

Despite the aforementioned challenges, simulations were generally welcome, and once initiated participants were enthusiastic and willing to participate in the simulations and receive additional knowledge and skills to manage PPH complications.

There was one incidence at Nasawa where a woman came in with PPH right soon after finishing the PPH simulation session. The providers demonstrated newly learned management skills having just practiced the scenario. The team observed the woman being well managed and she was referred to higher-level facility for continuation of care.

4. Virtual Coaching Sessions with Mentors in Fall 2020

A total of three coaching calls were conducted during the intervention period (in between the four simulations). These calls offered a platform for mentors and trainers to interface on how simulation sessions went. Challenges and successes for a preceding Simpack session were discussed during the coaching calls.

On average, the coaching calls lasted 1.5 hours and were conducted on Monday afternoons after the completion of each set of simulation sessions. Coaching calls through Zoom meetings were conducted with all mentors and trainers. In addition, a WhatsApp group was also established to improve connectivity in cases where utilizing Zoom was not always an option, particularly in rural areas. Data bundles were provided to mentors for the coaching calls.

Over the course of the PRONTO implementation mentors engaged in their own improvement cycles as they gained experience as simulators and facilitators. Mastering the role of the facilitator takes time and practice to create a safe space, ensure everyone knows their role and oversee the activities. Table 11 summarize the key observations shared with mentors during the calls. Time management, preparation and encouraging participation by speaking less is those attending the session were recurring area for themes.

TABLE 11. FEEDBACK ON COACHING CALLS

	What went well	What needs improvement
Call 1		
Simulation	1. Simulation area set-up - in the labour ward or similar location within your facility, ensuring all the supplies are there and arranged as they would be in your facility 2. Having confidence as facilitators	1. Properly orient providers to simulation. This includes orienting them to the supplies that they can use during the simulation and making sure they understand how to engage with the whiteboard. 2. Properly preparing the patient actress including orienting her to the hand signals, making sure you check-back with both her and the labor companion to check that they understand, and helping her feel comfortable enough in the role to make it realistic
Debrief	1. Followed debriefing guide. This includes asking questions from all three phases of the debrief, in the correct order, and leading an organized and structured debrief. 2. Involvement and engagement from participants	1. Speaking less than participants and asking open-ended questions. 2. Creating an environment where people feel comfortable sharing 3. Logistics - including managing time, sitting with participants, and taking some time to set up the debriefing area.
Call 2		
Simulation	1. Preparation. This includes setting up the simulation area and the pre-brief. 2. Participants were active and engaged	1. Ensuring the blood is loaded into the PartoPants and flowing correctly 2. Better preparing the patient actress and labour companion (e.g. hand signals) 3. Stopping and starting the simulation at the appropriate time
Debrief	1. Followed debriefing guide. In so doing, created a structured and organized debrief. 2. Created a safe learning space, including using a positive attitude, making sure all feel comfortable participating etc. 3. Had all participants seated in a circle, facing one another, to facilitate discussion.	1. Facilitator speaking less than participants 2. Time management 3. Connecting debrief to learning objectives
Call 3		
Simulation	1. Organization of the simulation, from rapid review to pre-brief to simulation set-up 2. Preparation of the patient actress, including hand signals, patient history etc.	1. Time management 2. Proper Pre-Brief (reading the ground rules, assigning participants communication concepts to watch for, and properly orienting participants to simulation and how they should act as they do in their clinical setting)

Debrief	1. Speaking less than participants 2. Encourage more participants to speak during the debrief 3. Asking open-ended questions	1. Improvement in asking open ended and follow up questions 2. Organization and structure of the debrief 3. Seating arrangements of facilitators and providers to encourage discussion

5. Implementation Support

The success of this implementation study was heavily reliant on the intervention coordinator, to ensure that each activity was planned, communicated, and completed (as planned or with modifications), based on the situation and resources available. It should be noted however, that as this was an implementation study with multiple data collection tools, the requirements were greater than if the simulation sessions were being scaled as part of a quality improvement project. For example, each session would not be videotaped, and providers may not need to complete a survey after each session.

For this study the intervention coordinator, based at KCN, required access to the following to implement the activities outlined in the intervention:

- Travel stipend to each facility
- Video camera
- Memory cards
- Time to take videos
- Time, equipment, and bandwidth to upload videos to video coder for review in preparation for each coaching call

Many of the items above were not included in the original scope of this role and as such, delays in procurement of items affected the implementation schedule. For example, the IC was unable to purchase a video camera so borrowed from another project at KCN when available, which required additional coordination and at times rescheduling sessions when it was unavailable. Extra time should be built into the video coding component as recording and uploading the videos took a greater portion of the IC's time than originally envisioned. Ideally, transportation to facilities should be coordinated such that there is a car and driver available to travel to facilities as needed to stay on target with implementation schedule.

Discussion

This PRONTO simulation intervention, while disrupted by COVID-19, generated important learnings.

The mentors demonstrated self-motivation and dedication to the simulation and facilitation process, and expressed a desire to continue running simulation in their facilities. Their passion and commitment during the challenges of COVID-19 are an encouraging testament to the potential for sustaining the program in Zomba and expanding to other districts in Malawi, with contributions from these mentors.

The pandemic provided an opportunity to test remote synchronous and asynchronous learning. Once the in-person PRONTO simulation and facilitation training occurred, rapid learning cycle were introduced so that learners could add more simulation content and grow their skills.

A sustainable simulation and team communication program in Malawi is possible, and can be an important and useful tool for providers in frontline facilities as they work to improve their management of maternal and neonatal emergencies and the provision of respectful maternity care. The issues of facility administration engagement in supporting simulation and team training at the facility-level along with issues of incentives and investigating whether the CPD point system could be tailored for participation in simulation are two of the most important considerations moving forward.

All mentors reported that the coaching calls and mentor reports were useful. They suggested that if given the opportunity to continuing to receive simulation learning support like this, they would make time to continue. Mentors reported that the combination of mentor-pair specific feedback reports and group coaching calls were each valuable in different ways and complemented one another. Mentors reported interest in running simulations on additional material such as preeclampsia/eclampsia.

The quality of those coordinating with the mentors has an enormous impact on their feeling supported and successful. The importance of such detailed day-to-day coordination cannot be understated in a project of this nature and the COVID disruption made the intervention coordinator's role even more critical.

As mentioned earlier in this report, the largest challenge facing the sustainability of this project is CPD points and incentives. Given the culture around incentives in Malawi, and the prior use of compensation for these simulation sessions, mentors feel motivating participants without such compensation will be extremely difficult. This challenge was self-reported by mentors across the board. Continued professional development points, while already used during the research phase of this project, could serve as a partial solution to this issue. However, given that CPD points cannot be received for the same simulation, there will need to be some way to incentivize participants to continue to repeat the same simulations. This is critical as not only is the power of simulation in its repetition, but the experience of playing the patient actress, the provider, or an observer, are distinct and valuable in their own ways.

Mentors discussed with PRONTO the importance of including and involving the administration at their facilities in simulation. Particularly given the challenges around incentives, it will be important for a hospitals administration to feel ownership over this simulation education, and support and endorse it. Orienting the administration will also be important in helping establish the necessary infrastructure for mentors to run simulation, for example, finding available spaces to run the simulation and debriefs during the workday.

If this project were to continue and be sustainable, it is important to note that while the majority of PRONTO's supplies are reusable and last years, there are a set of consumables that will need to be replaced. At many facilities these would need to be replaced now, and again at regular intervals.

Throughout this intervention, it became clear to PRONTO the power of peer-to-peer support in encouraging mentors, providing lessons learned, and answering questions. We believe that establishing local champions that carry forward this sense of teamwork will be important for sustainability. These individuals could even work their way into master trainers continue to grow the scale of their impact. Some mentors were identified as being particularly qualified for this local champion role.

In the long-term, it is likely that mentors may move to other facilities, so it will be important to find ways to continue to support the mentors that remain, and motivate them to continue running simulation. It will also be important to find ways to support mentors who leave their original facility but would like to keep running simulation. Ultimately, having support for skilled mentors who able to train more simulation facilitators to cover more facilities and providers in need of training will be key to scaling this work.

Conclusion

Simulation and team training in Malawi is possible and could be an important and useful tool for providers in frontline facilities to improve management of maternal and neonatal emergencies. The issues of facility administration engagement in supporting simulation and team training at the facility-level along with issues of incentives and investigating whether the CPD point system could be tailored for participation in simulation are two of the most important considerations moving forward. PRONTO appreciated creating a collaborative, adaptive relationship with the project partners

The simulations were helpful and effective in changing provider attitudes and reinforcing knowledge and skills in management of PPH complications in the facilities where implemented. Providers, as well as mentors, recommended that simulations be conducted often so that more knowledge and skills in management of PPH can be internalized. Deliberate measures should be in place to motivate and incentivize staff to attend such simulations in future. In this project, staff were provided monetary compensation to cover lunch and transportation, which is not sustainable within each facility.

The evidence from qualitative and quantitative data suggest that facility-based simulations can improve the quality of obstetric care by reinforcing clinical practices, communication and teamwork. This will not only improve the capacity of providers but will also be a way of sustaining the activities, in the absence of project-driven incentives. Some teamwork activities involved close contact of participants. These activities should be modified to remove some components that involve physical contact (or short distance interaction) to suit the current environment of social distancing to reduce potential spread of COVID-19.

In this report, we have described the details of the PRONTO intervention for the prevention and treatment of PPH at seven selected facilities in Zomba. We have aimed to report our implementation process and results in enough detail that this intervention could be replicated and implemented using the lessons we learned. These findings can inform the design and content of the next phase of capacity strengthening efforts with a broader mentorship program for frontline maternity providers in Malawi.

APPENDIX A. LIST OF PARTICIPANTS AT INITIAL PRONTO TRAINING IN BLANTYRE, MARCH 2020

Name	Designation	Facility
Chipiliro Masintha	Nursing Officer	St. Lukes Mission Hospital
Andrew Mtoso	Clinical Officer	St. Lukes Mission Hospital
Dr. Martha Kamanga	Senior Lecturer	KCN
Dr. Abigel Kazembe	Associate Professor	KCN
Evelesi Chimala	Lecturer	KCN
Agness Kapenda	Nursing Officer	Pirimiti Mission Hospital
Alexander Mboma	Implementation Coordinator	KCN
Chifuniro Mgunda	Medical Officer	Pirimiti Mission Hospital
Isaac Makuwira	Clinical Officer	Mayaka Health Center
Solomon Maonga	Nurse Midwife	Mayaka Health center
Mayamiko Kayuzga	Senior Nursing Officer	Zomba DHO
Zenus Banda	Education and Training Officer	Nurses and Midwives Council of Malawi
H. Semu Banda	Clinical Officer	Zomba Central Hospital
Chikondi Selemani	Clinical Coordinator	ONSE Project Zomba
Titha Office	Senior Nursing Officer	Matawale Health Centre
Grace Mwenyekondo	Senior Nursing Officer	Zomba Central Hospital
Kupatsa Chigona	Nursing Officer	Matawale Health Centre
Mercy Mwausegha	Senior Nursing Officer	Ethel Muthalika Maternity Wing -LL
Humphres Gwedemule	Nurse midwife	Zomba DHO
Symmington Nyondo	Nurse Midwife	Nasawa Health Center
Fortune CHipatala	Clinical Officer	Ngwelero Health Center
Hlapapi Kunkeyani	Chief Nursing Midwife Officer	Ethel Munthalika maternity Wing-LL
Rozma Banda	Lecturer	Malawi College of Health Sciences – Blantyre
Fumbanani Mkandawire	Nurse Midwife	Ngwelero Health Centre
Gift Msafili	Senior Medical Officer	Matawale Health Centre
Alexander Chabwera	Senior Nurse Midwife	Nasawa Health Centre
Fikile Singano	Senior Nursing Officer	Zomba Central Hospital
Mlera Kasola	Nursing Officer	Makwapala Health Centre
Mika Kodi	PRONTO Trainer	PRONTO
Chriscencia Oweko	PRONTO Trainer	PRONTO
Danica Larson	PRONTO Trainer	PRONTO
Jennifer Okore	PRONTO Trainer	PRONTO
Heidi Breeze-Harris	PRONTO Trainer	PRONTO
Jenny Rose	PRONTO Trainer	PRONTO

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Breakthrough RESEARCH
Population Council

4301 Connecticut Ave., NW
Suite 280
Washington, DC 20008
+1 202 237 9400
breakthroughactionandresearch.org
BreakthroughResearch@popcouncil.org

USAID's Health Evaluation and Applied Research Development
URC

5404 Wisconsin Ave
Suite 800
Chevy Chase, MD 20815
www.heardproject.org
heard@urc-chs.com

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