A CASE STUDY OF A SKILLED BIRTH ATTENDANT TRAINING PROGRAM IN A RURAL HOSPITAL: WHAT ARE THE BARRIERS AND FACILITATORS TO INCREASING SKILLED BIRTH ATTENDANTS IN HAITI?

Jennifer L. Burns

A dissertation submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Public Health in the Department of Health Policy and Management of the Gillings School of Global Public Health.

Chapel Hill
2023

Approved by:

Karl Umble

Herbert Peterson

Laura Hoemeke

Stephanie Watson-Grant

William Oscar Fleming

ABSTRACT

Jennifer L. Burns: A Case Study of a Skilled Birth Attendant Training Program in a Rural Hospital: What are the Barriers and Facilitators to Increasing Skilled Birth Attendants In Haiti? (Under the direction of Karl Umble)

Background

Every day, more than 800 women die from complications related to pregnancy and childbirth.[1] Many, if not most, maternal deaths would be preventable by ensuring women have quality, respectful, and equitable care. The shortage of midwives in the global healthcare workforce is believed to be one of the biggest impediments to women's access to care.[2]

Significance

Intensive interventions in most of the world have significantly lowered maternal mortality ratios, yet in low- and middle-income countries, where 99% of maternal mortality occurs, the proportion of maternal mortality ratio remains unchanged.[3,4] Haiti, among the poorest countries in the world, has the highest maternal mortality ratio in the Western Hemisphere at 521 per 100,000.[5] The U.N. identified Haiti as one of the nine countries facing the most severe midwifery workforce shortage.[6]

Research Question

A case study of a skilled birth attendant (SBA) training program in a rural hospital: What are the barriers and facilitators to increasing skilled birth attendants in Haiti?

Methods

This study used an explanatory mixed-methods methodology to examine the Midwives for Haiti (MFH) SBA program and the impact of increasing skilled SBAs at Saint Therese

Hospital. Qualitative analysis used a case study design based on key informant interviews to understand the barriers and facilitators to increasing SBAs.

Findings

The organizational history provided context in which MFH operates and allowed for recognition of patterns that may influence organizational change within the lifecycle of nonprofits. The qualitative analysis of MFH datasets revealed that as the MFH SBA training program grew, there was an increase in SBAs at Saint Therese Hospital and improved maternal and infant mortality rates. By 2021, MFH had trained 223 SBAs, representing 33% of all trained birth attendants then working in Haiti, including midwives, gynecologists, and maternal-fetal medicine specialists. The key informant interviews exploring the barriers and facilitators to increasing SBAs in a rural hospital in Haiti identified critical factors. The primary barrier identified was the fragile context of Haiti and strongest facilitator was engagement of partner organizations.

To my husband and my children, with their love and support, all things are possible.

ACKNOWDLEGEMENTS

I acknowledge the invaluable support of Karl Umble, chair of my committee, who supported and challenged throughout the process. I also thank and acknowledge my committee members, William Oscar Fleming, Laura Hoemeke, Herbert Peterson, and Stephanie Watson-Grant, each of whom provided encouragement, guidance, and useful insights, which were needed and appreciated, throughout the process. I am also grateful for the support of my Midwives for Haiti colleagues, who shared with me their time, insight, and passion to end preventable maternal mortality in Haiti. I would like to mention Nadene Brunk Eads, whom without her passion, vision, and skill for storytelling there would be no midwives for Haiti. Additionally, I am grateful for Jane Dritcha, whose leadership and passion for Midwives for Haiti is nothing short of inspirational.

I am grateful to my fellow Cohort 16 mates, who have made me laugh, cry, and grow over the past few years beyond my wildest dreams. There are not enough words to describe the journey we've shared. I would particularly like to acknowledge my fellow cheetah, Emily Taylor, whom without I would not have made it across the finish line.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

CDC	Centers for Disease Control and Prevention
CFIR	Consolidated framework for implementation research
D&I	Dissemination and implementation
EPMM	Ending preventable maternal mortality
ETATMBA	Enhancing Human Resources and Use of Appropriate Technologies for Maternal and Perinatal Survival in Sub-Saharan Africa
FIGO	International Federation of Gynecology and Obstetrics
HRH	Human resources for health
ICM	International Confederation of Midwives
INGO	International non-governmental organization
KI	Key informant
KII	Key informant interview
LMICs	Low- and middle-income countries
MAMOCWA	Maternal mortality and obstetric care in West Africa study
MDGs	Millennium development goals
MFH	Midwives for Haiti
MMR	Maternal mortality ratio
MOMA	Gambia and the Morbidité Maternelle en Afrique de l'Ouest study
MSF	Midwifery Services Framework
MSPP	Ministry of Public Health and Population
NGO	Non-governmental organization
NPC	Non-physician clinician
PCORI	Patient-Centered Outcomes Research Institute

PRISMA	Preferred reporting items for systematic reviews and meta-analyses
SBAs	Skilled birth attendants
SDGs	Sustainable development goals
SRMNH	Sexual, reproductive, maternal, and neonatal health
STH	Saint Therese Hospital
TBAs	Traditional birth attendants
UN	United Nations
WHO	World Health Organization

CHAPTER 1: BACKGROUND AND INTRODUCTION

Background

Every day, more than 800 women die from complications related to pregnancy and childbirth.[1] This means a woman dies every two minutes. As noted in the abstract, almost all maternal deaths would be preventable by ensuring women have quality, respectful, and equitable maternity care.[1] Intensive intervention strategies in most of the world have significantly lowered maternal mortality ratios (MMRs), yet in low- and middle-income countries (LMICs), where 99% of maternal mortality occurs, the proportion of MMR remains unchanged.[4,7] The inequity in maternal mortality is evident: ratios range from less than one death per 100,000 live births in Iceland to 1,763 in the Central African Republic. The highest income countries (defined by the socio-demographic index, or SDI) had an 18.9 MMR, compared to 560 among the lowest income countries in 2016.[5] The geographic disparity of maternal mortality is also clear, with two-thirds of deaths occurring sub-Saharan Africa and 22 percent occurring in South Asia. A woman in Nigeria was 200 times more likely to die in pregnancy or childbirth than a woman in Sweden in 2013.[8]

The United Nations (UN) attempted to address this critical problem with its 2000-2015 Millennium Development Goals (MDGs). MDG 5 set a target to reduce the MMR (number of maternal deaths per 100,000 live births) by 75%.[5] To build on the momentum of the MDGs, the UN also launched its 15-year Sustainable Development Goals (SDGs) in 2015 and released a consensus statement on ending preventable maternal mortality (EPMM).[9] The EPMM strategy to reduce the global MMR was defined in SDG target 3.1: reduce global MMR to less than 70 per

100,000 live births by 2030.[9,10] The two key indicators for SDG Target 3.1 are MMR (3.1.1) and proportion of births attended by skilled health personnel (3.1.2). While only 10 countries achieved goal MDG 5, 122 of 195 countries have already met the technical criteria for SDG 3.1, demonstrating the wide geographical disparities in maternal mortality (Figure 1).[5]

Figure 1: Country Achievement of SDG Target 3.1[8]

Maternal mortality has been defined as "the death of a woman whilst pregnant or within 42 days of delivery or termination of pregnancy, from any cause related to, or aggravated by pregnancy or its management, but excluding deaths from incidental or accidental causes."[11] Effective policy and health program interventions require understanding of the causes of maternal mortality.[12] There are direct (73%) and indirect (27.5%) causes of maternal mortality. The top five direct causes are hemorrhage (27.1%), hypertensive disorders (14.0%), infection (10.7%), abortion (7.9%), and embolism and obstructed labor (12.8%).[8,11] The underlying causes are inadequate, inaccessible, and unaffordable healthcare; poverty; unequal access to resources;

low status of women; and illiteracy.[3] Maternal mortality in developing countries is directly correlated to inadequate access to skilled prenatal and delivery care.[2,13]

The shortage of midwives in the global healthcare workforce has been well documented and is believed to be one of the biggest impediments to women's access to care.[2] Only 54 percent of women have access to a skilled birth attendant (SBA) in developing nations, and in the poorest nations the number drops to 29 percent.[14] Figure 2 demonstrates the geographical disparity in access to SBAs, which mirrors the map of MMRs by nations in Figure 3.[8] Survival of pregnancy and childbirth related complications is directly dependent upon access to timely management by skilled healthcare providers.[15]

Haiti is the poorest country in Western Hemisphere and is among the poorest countries in the world, with a Human Development Index ranking of 170 out of 189 countries in 2020.[16] Haiti has the highest MMR in the Western Hemisphere at 521 per 100,000.[5] The U.N. has identified Haiti as one of the nine countries facing the most severe midwifery workforce shortage.[6] In order to meet the SDG 3.1 target to reduce the global MMR below 70 per 100,000 live births, the proportion of births attended by skilled health personnel in Haiti would have to increase dramatically.[6,17] Understanding the barriers and facilitators of a Haitian SBA training program will help guide future policies and funding for future programs.

Figure 2: Share of Births Attended by Skilled Health Staff, 2017[8]

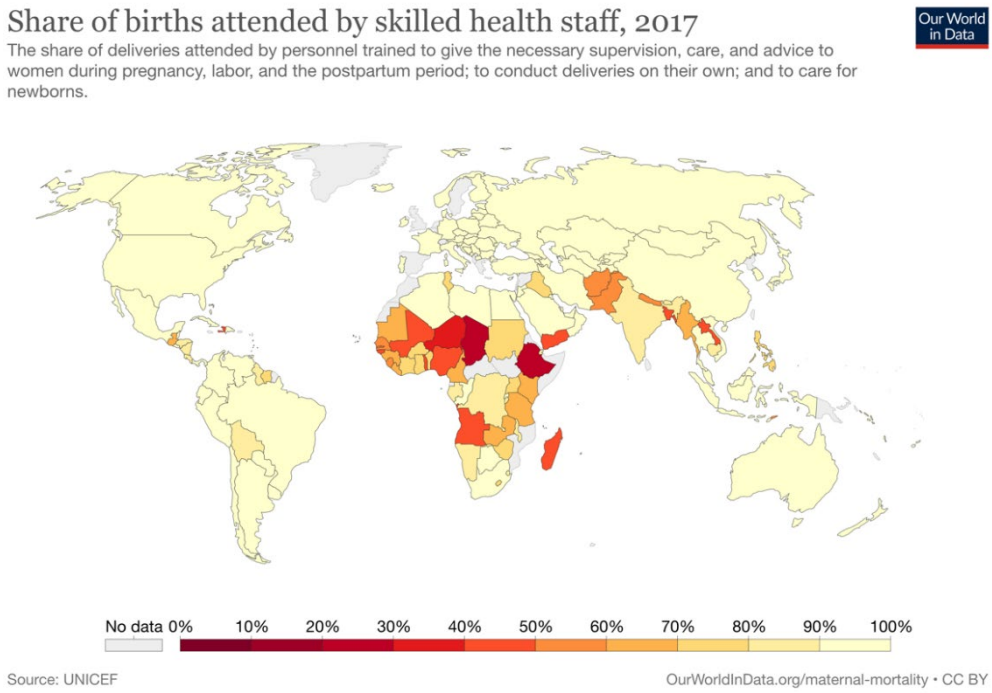
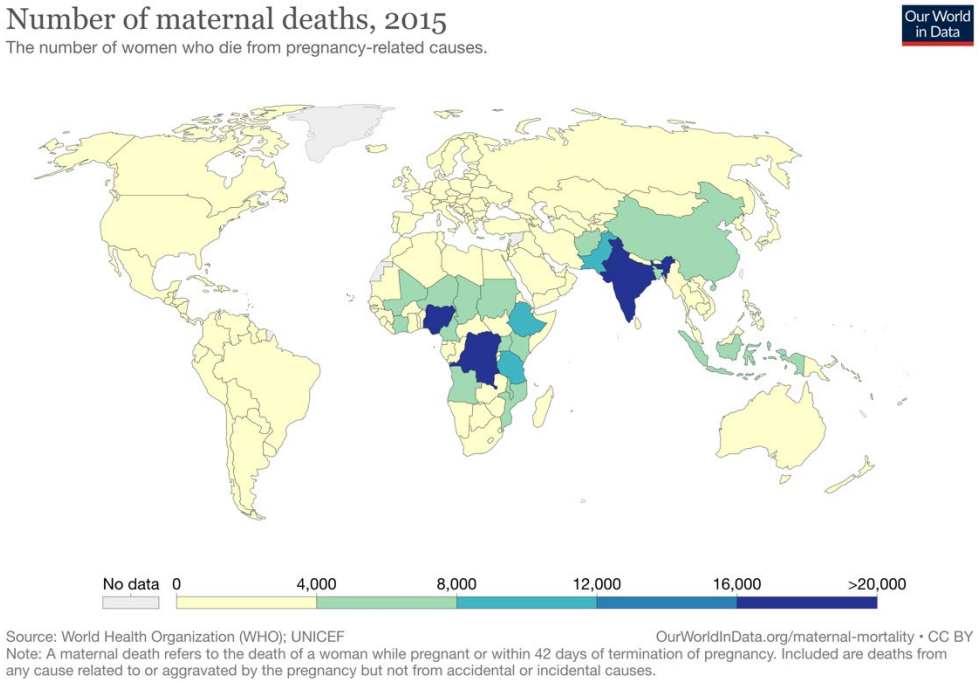


Figure 3: Number of Maternal Deaths, 2015[8]



Definitions

For the purpose of this research, midwives were defined using the International Confederation of Midwives (ICM) definition:

> A midwife is a person who has successfully completed a midwifery education program that is based on the ICM Essential Competencies for Basic Midwifery Practice and the framework of the ICM Global Standards for Midwifery Education and is recognized in the country where it is located; who has acquired the requisite qualifications to be registered and/or legally licensed to practice midwifery and use the title 'midwife'; and who demonstrates competency in the practice of midwifery.[18]

SBAs are commonly referred to as skilled health personnel and were defined by the World Health Organization (WHO) as "competent maternal and newborn health (MNH) professionals educated, trained and regulated to national and international standards."[19] Low- to middle-income countries (LMICs) have been defined by the World Bank as low-income economies ($1,035 or less gross national income [GNI] per capita) or lower-middle-income economies ($1,036 to $4,045 GNI per capita).[20]

Research Question

This research sought to understand the impact on MMRs of a SBA training program focused on increasing SBAs in Haiti. It has been estimated that over 290,000 women's lives worldwide could be saved annually with equitable and accessible maternity services.[8] With Haiti having the highest MMR in the Western Hemisphere, as well as one of the largest shortages of midwives in the world, it is imperative to identify and understand current programs for increasing SBAs. This study addressed this by evaluating the following overarching research question:

- What are the barriers and facilitators to increasing skilled birth attendants in Haiti? A case study of a skilled birth attendant training program in a rural hospital.

This case study was based on a comprehensive literature review as well as quantitative and qualitative methods. It identified barriers and facilitators to increasing SBAs in Haiti by exploring an SBA training program in a rural hospital.

Context/Setting

WHO has estimated that a minimum of 23 healthcare workers (midwives, doctors, nurses) would be required per 1,000 people to meet the needs of a population. Haiti has an estimated 0.5 doctors, nurses, and midwives per 1,000 people.[5] With a population of 11 million, Haiti has approximately 400 obstetricians and 200 midwives. The slow progress being made toward EPMM in Haiti was completely derailed by a devastating earthquake in 2010. Haiti's only government recognized nurse-midwifery school, in Port au Prince, was destroyed by the earthquake, which killed most of its faculty and students. In 2011, a new midwifery school opened in Port au Prince. It is a four-year direct entry program in which graduates earn nurse-midwifery credentials. However, workforce attrition became a critical problem: up to 80% of the school's nurse-midwife graduates migrated to other countries where they could earn more and have a better quality of life.[5]

Saint Therese Hospital (STH) was a Ministry of Public Health and Population (MSPP) hospital located in the Central Plateau, the poorest region of Haiti. The hospital served a catchment zone of approximately 250,000 residents. Prior to 2006, only one midwife and one doctor served the entire Central Plateau catchment zone, and they did not work nights or weekends. Countless women in the area were left to die without access to reliable maternity care. To fill the gap, Midwives for Haiti (MFH) began training SBAs in the Central Plateau in 2006. Over 30% of the maternal healthcare workforce in Haiti at the time of this research were graduates of MFH. They provided safe, skilled care to women although they were not qualified

to work outside of Haiti. STH and its catchment zone reflected the demographics and challenges of Haiti generally, and thus served as an ideal setting for a case study of a post-graduate SBA training program in Haiti.

Research Interest

I began my public health career working as a certified nurse midwife at a county hospital in Phoenix, Arizona, serving a large immigrant and indigent population. From there I shifted to caring for Native American women through the Indian Health Service. Both experiences brought an awareness of the impact of social determinants of health on outcomes for women and their babies. As I became more aware of the inequities in the access to care and resultant outcomes for women in the United States based on socioeconomic and geographic barriers, I began to shift my focus to the even greater disparities faced by women in LMICs. I began searching for an organization that was aligned with my personal values so I could make a difference in maternal health outcomes internationally. Haiti caught my attention when I learned it had the highest maternal and infant mortality ratio in the Western Hemisphere. Going on a medical mission trip that would improve outcomes for two weeks was not enough. I wanted to find an organization invested in public health strategies that would make a meaningful and sustainable impact on outcomes for mothers and babies. I found MFH, which is an international non-gonvernmental organization (INGO) working in collaboration with Haiti's MSPP and other partner organizations to deliver culturally appropriate, high impact health interventions. MFH programs focus on educating and empowering Haitian women and men to become SBAs, improving the health of their communities and creating lasting change in their lives and the lives of the mothers and babies they care for. I hope exploring this model of SBA training in a rural hospital in Haiti

will provide insight for increasing access to SBAs that can be generalizable and applicable throughout Haiti.

The plight of maternal mortality became deeply personal when I experienced my first maternal death in Haiti in 2012. I worked for two days trying to save the mother's life, but it was too little, too late. We were able to save her son, but her family was unable to care for him due to their deep poverty. My Haitian translator and friend ended up adopting him and I still stay in close contact with them today. His name is Benjamin, and his story is my why.

CHAPTER 2: LITERATURE REVIEW

Literature Review Objective

This systematic review aimed to understand the effect of interventions focused on increasing the number of SBAs in LMICs on MMRs. There is a large body of research on the topic of maternal mortality, including large-scale systematic reviews, as well as literature on effective interventions to address the problem and yet maternal mortality disproportionately persists in LMICs. It is estimated that more than 290,000 women's lives could be saved annually with equitable and accessible maternity services.[5] Identifying existing programs aimed at increasing access to SBAs and their effectiveness would help clarify which interventions have the greatest impact on preventable maternal death.

Literature Review Question

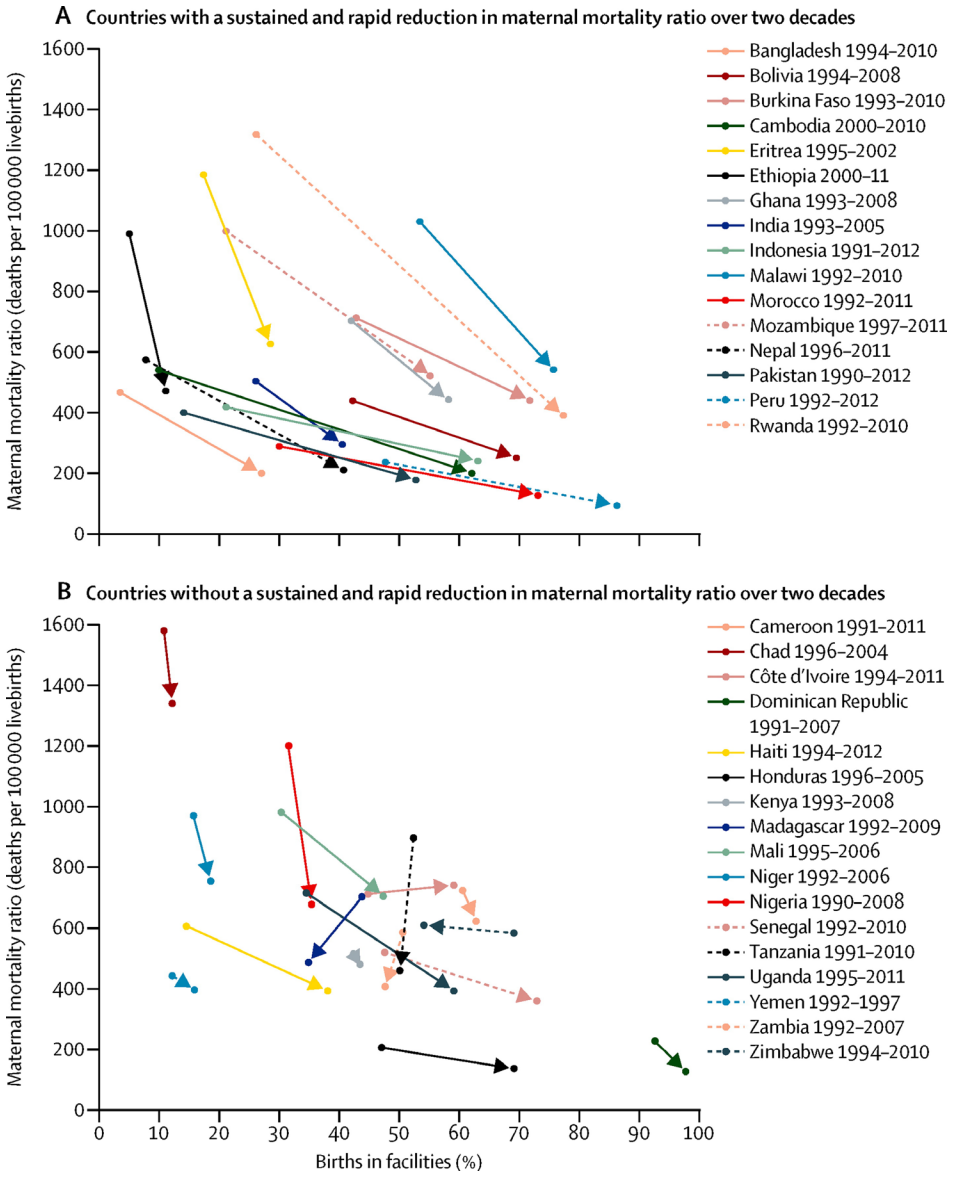
The literature review question was as follows: What is the effect of MMRs on interventions focused on training SBAs in LMICs?

Literature Review Conceptual Framework

Measures to strengthen health systems to improve maternal health outcomes in countries with high MMRs must take a systematic approach that factors in the inter-linkages among various measures.[21] The Lancet documented the experience of LMICs that deployed midwives as one of the core constituents of their strategy to improve maternal and newborn health outcomes in a published series of papers on midwifery. This included the evaluation of LMICs that had achieved a sustained and rapid reduction in MMR over two decades and those that have not (Figure 4).[21] Exploration of the various diverse health-system strengthening

interventions deployed, including the scaling up of the pre-service education of midwives resulted in the creation of the health system strengthening model (Figure 5).[21]

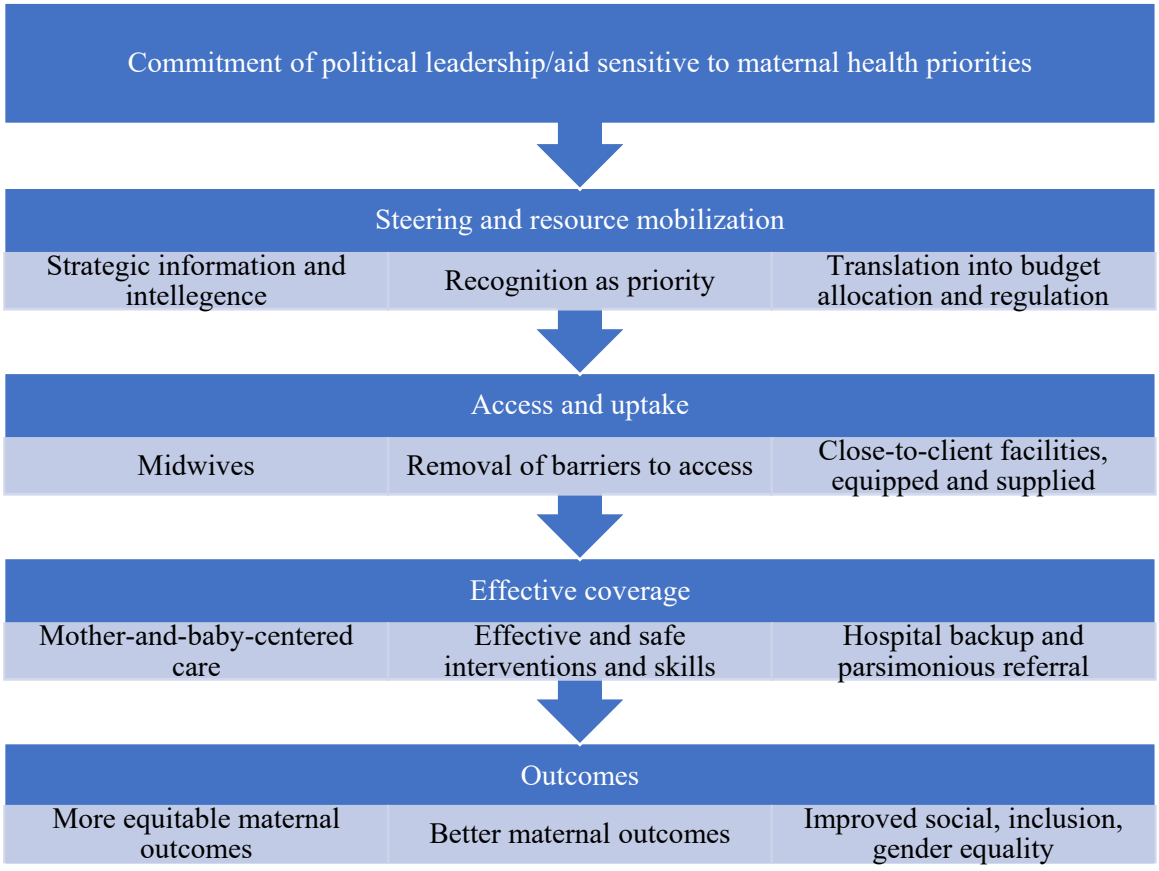
Figure 4: LMICs Reduction in Maternal Mortality Ratio Over Two Decades[21]



The first stage of the model requires the commitment of political leadership and the procurement of aid sensitive to maternal health priorities. From there, the measures focus on steering the process and resource allocation. This involves strategic information and intelligence and the establishment of improving maternal mortality as a priority, translating into budget

allocations and regulations. The next stage focuses on access and uptake: midwives, removal of barriers to access, and close-to-client facilities appropriately equipped and supplied. The third stage involves effective coverage, including mother- and baby-centered care, safe interventions and skills, hospital backup, and parsimonious referral. The final stage focuses on the outcomes produced by the measures, viz., more equitable maternal outcomes, better maternal outcomes (including decreased maternal mortality), and improved social, inclusion, and gender equity.[21]

Figure 5: Health System Strengthening Model[21]



Methods

Selection of Databases/Search Terms

The literature review entailed a defined search strategy with three databases: 1) MEDLINE/PubMed (health literature); 2) Global Health (international and community level

public health literature); and 3) CINAHL (nursing and allied health literature). The search included three concept blocks: 1) midwives; 2) maternal mortality; and 3) low- and middle-income-countries (Appendix 1). The strategy was designed for PubMed, then adapted for Global Health and CINAHL. Manual citation tracking was used to identify additional articles.

Eligibility Criteria

Standardized inclusion and exclusion criteria guided study selection. These are listed in Table 1.

Table 1: Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria	Rationale
Date		
2000-2021	Studies prior to 2000	The MDGs addressing maternal mortality targeted the years 2000-2015; the SDGs began in 2015 and continue through 2030.
Exposure/outcome of interest		
Maternal mortality	Maternal near miss, maternal morbidity, positive maternal outcomes	The primary measurable outcome of maternal outcomes, MMR, is the primary indicator for SDG 3.1.1
Midwives or SBAs or skilled health personnel	Not midwives or SBAs or skilled health personnel	Midwives have been defined by ICM and are primary indicators in SDG 3.1.2 to increase the proportion of births attended by skilled health personnel.
Traditional birth attendant (TBA)	Family member or lay person	While WHO explicitly excludes TBA in its definition of a SBA, half of all births in developing countries are attended by TBAs so they will be included in this review.
Geographic location of study		
LMICs	Not LMICs	Over 99% of maternal mortality cases occur in LMICs. LMICs as defined by the World Bank.
Language		
English language text	Non-English language text	Reviewer only speaks English fluently.
Reported outcomes		
Objective measures of maternal mortality as defined by the authors	Self-reported rather than using objective measures	To evaluate research quality (validity and reliability), objective measures are needed.
Setting		
Hospital births, healthcare facility births, community health center births, birth center births, home births	No exclusions for place of birth	Birth takes place in a variety of settings around the world.
Types of Publications		
Full text article	Full text not available	To examine study quality, the full text article was required.
Empirical studies including quantitative and qualitative studies	Not empirical, gray literature, books, commentaries, dissertations	Empirical studies are categorized as peer-reviewed and provide scientific evidence.
Original research using primary or secondary data	Not original research, systematic reviews, literature reviews	The purpose of this review is to summarize original research to support the research objective.

Data Abstraction and Analysis

The summary information in the included articles was systematically abstracted using pre-defined categories. These were:

- Article ID (assigned by reviewer)
- Frist author and publication year
- Study design, population, and setting
- Sample size and country
- Methods: data collection, analysis
- Intervention and outcomes measured
- Results
- Limitations and conclusions
- Quality rating and overall risk of bias

The data were recorded in a data abstraction spreadsheet which was based on an extraction table from the University of North Carolina Gillings School of Global Public Health (Appendix 2). The spreadsheet was tailored to the objectives of this review but was not pilot tested. Additional data analysis was based on themes from the Health Strengthening Model (Figure 5). Themes for analysis focused on the second and third health strengthening stages (access and uptake and effective coverage) and included each of their associated measures (midwives, removal of barriers to access, close-client facilities, effective and safe interventions and skills, and hospital backup and parsimonious referral).

Quality Rating and Risk of Bias

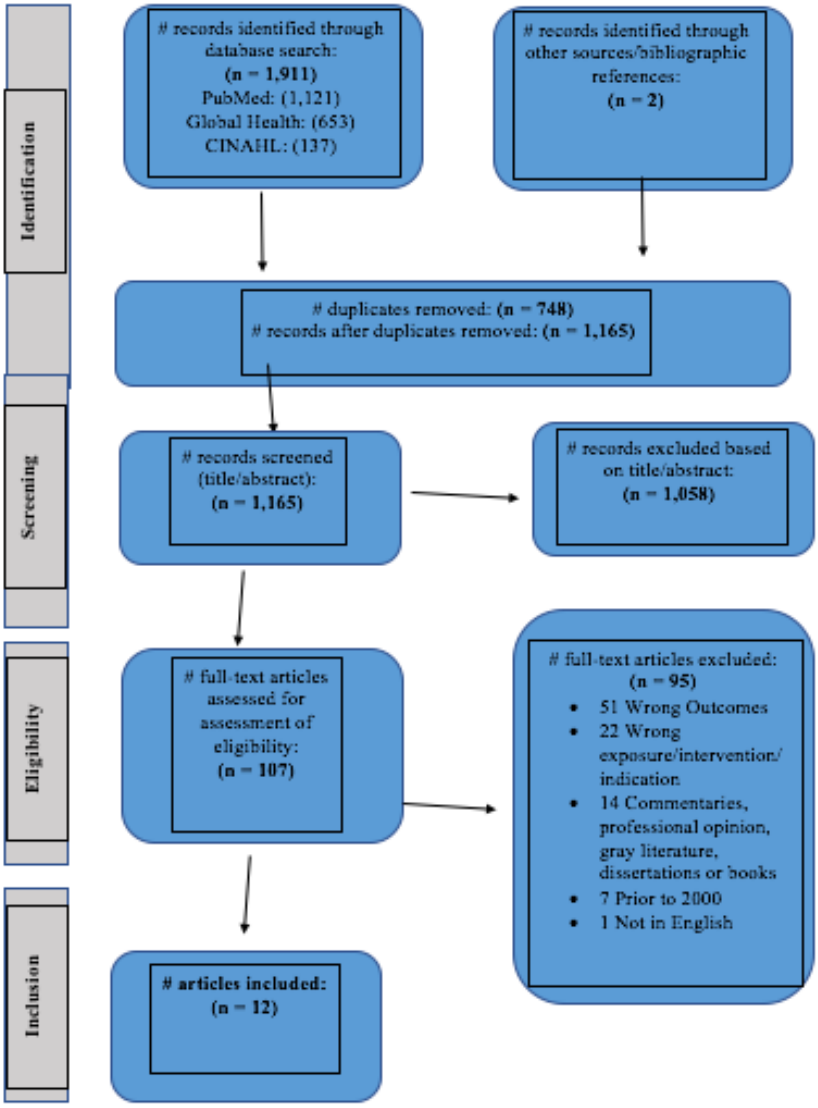
The Study Quality Assessment Tools developed by the National Heart, Lung, and Blood Institute (NHLBI) were used to assess study quality.[22] The specific quality assessment tool was

selected based on the study design (i.e., controlled intervention, case controlled, or observational). In the study limitations and design type categories, overall risk of bias was assessed and categorized as low, medium, medium-high, or high based on the data compiled in the abstraction spreadsheet (Appendix 2).

Results

The results of the literature search are in Figure 6 below, which was adapted from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.[23]

Figure 6: PRISMA Diagram



Database searches resulted in a total of 1,911 references, including PubMed (1,121), Global Health (653), and CINAHL (137). Two additional hand-searched references were added, and 748 duplicates were removed. The resulting 1,165 articles were screened by title and abstract. One hundred and seven references were identified as eligible for full-text review; the remaining 1,058 studies were deemed irrelevant to the focus of this study. The author reviewed the full texts of the107 articles and removed 95 articles based on the exclusion criteria (Table 1). The majority of the exclusions were due to the exposure/outcome of interest criterion (51 were "wrong outcomes-not maternal mortality" and 22 were "wrong exposure/intervention/indication-did not involve increasing skilled birth attendants/attendance"). Fourteen articles were excluded under the empirical study criterion; they were either commentaries or professional opinion pieces about maternal mortality in LMICs or were gray literature, dissertations, or books. One reference was excluded because it was not in English. Seven articles were excluded because they were conducted prior to 2000. Of the 107 articles reviewed, therefore, a total of 12 articles met the inclusion criteria.

Study Characteristics

This systematic review explored the effect of interventions designed to train SBAs and their impact on maternal mortality in LMICs. Four of the 12 studies included assessed the effect of training SBAs on maternal outcomes.[24–27] Two studies examined both training SBAs and the continued monitoring and supervision of SBAs after their completion of training.[27,28] Two studies considered the assessment of competencies of SBAs as well as the relationship of those competencies to maternal outcomes.[29,30] Four studies assessed the effect of programs that increased the utilization, availability and/or access to SBAs.[28,31–33] Three studies examined interventions from a health facility perspective, focusing on utilization,[34] upgrading the

institution,[27] or distance to the health facility[35] in relation to skilled birth attendance and impact on MMR. The education of mothers about the importance of skilled birth attendance[33] and the determinants of maternal mortality[34] were also assessed. In summary, of the 12 studies that met inclusion criteria, two main study perspectives emerged: SBAs and healthcare facilities. Eight studies focused on SBAs[24–26,28–31,33] (Table 2), two focused on health facilities[32,34] (Table 3), and two studies addressed both SBAs and health facilities[27,35] (Table 4).

Table 2: Skilled Birth Attendant Studies

Author (Year)	Country	Intervention	Participant Type	Study Design	Study Population/Sample
Ellard, D., et al. (2016)	Malawi	Training	Non-physician clinicians (NPCs)	Cluster-randomized controlled trial	46 NPCs
Ellard, D.R., et al., (2016)	Tanzania	Training, post-training mentoring, and supervision	Medical officers, senior clinical officer, nurse-midwives, nurses	Mixed-methods: pre- and post-examination and survey	36 trainees, including 19 assistant medical officers, 1 senior clinical officer, and 16 nurse-midwives/nurses
Huang, J., et al., (2020)	China	Assessment of competencies	Midwives	Cross-sectional survey design	2,022 midwives
Jokhio, A.H., et al. (2005)	Pakistan	Training	TBAs	cluster-randomized controlled trial	10,114 women in intervention group; 9,443 women in control group
Nove, A., et al., (2020)	88 LMICs	Increased coverage of health interventions by professional midwives	Midwives	Modeling study	Population wide sample of childbearing women
Rajbhandari, R., et al., (2019)	Nepal	Assessment of SBAs knowledge, clinical skills, deliveries	SBAs	Quantitative cross-sectional analysis	511 SBAs
Ronsmans, C., et al., (2009)	Indonesia	Assess effect of program to increase use of SBAs	Midwives	Mixed-methods: capture-recapture, case control analysis and cohort analysis	458 cases of maternal death and 1234 unmatched controls
Zerfu, T.A., et al., (2018)	Ethiopia	Training and provision of SBAs	SBAs (CORN)	Cluster-randomized community trail	2,147 women

Table 3: Healthcare Facilities Studies

Author (Year)	Country	Intervention	Participant Type	Study Design	Study Population/Sample
Montgomery, A.L., et al., (2014)	India	Health facility admission	SBAs	Unmatched population-based case-control analysis	Cases identified from India's Million Death Study (MDS) 1,096 maternal deaths. Controls identified from India's District Level Health Survey (DLHS-2) 147,001 women
Ronsman, C., et.al., (2003)	Senegal, Guinea-Bissau, Gambia, Burkino Faso, Cote d'Ivoire, Mali, Mauritaine, Niger	Access to obstetric services	Doctor, midwife, nurse, or TBA	Ecological study	58,595 women who had given birth

Table 4: Both Skilled Birth Attendant and Healthcare Facilities Studies

Author (Year)	Country	Intervention	Participant Type	Study Design	Study Population/Sample
Hanson, C., et al., (2015)	Tanzania	Distance to health facility, and SB attendance	SBAs	Secondary analysis of cross-sectional georeferenced census data	71,198 women who had given birth
Lindtjorn, B., et al., (2017)	Ethiopia	Upgrading institutions, training non-clinical physicians and midwives, monitoring, and supervision	Doctor, midwife	Implementation/ observational study	38,312 births

Studies were conducted in 104 countries (Table 5). One modeling study included data from 88 LMICs based on their Human Development Index scores.[28] The remaining 11 studies were conducted in 16 countries. Among those 11 studies, the majority of the research took place in Africa (n = 6), which had the highest MMRs.[25–27,32,33,35] Studies from Asia, the continent with the second highest MMR, focused on China,[29] Nepal,[30] Indonesia,[31] and India.[34]

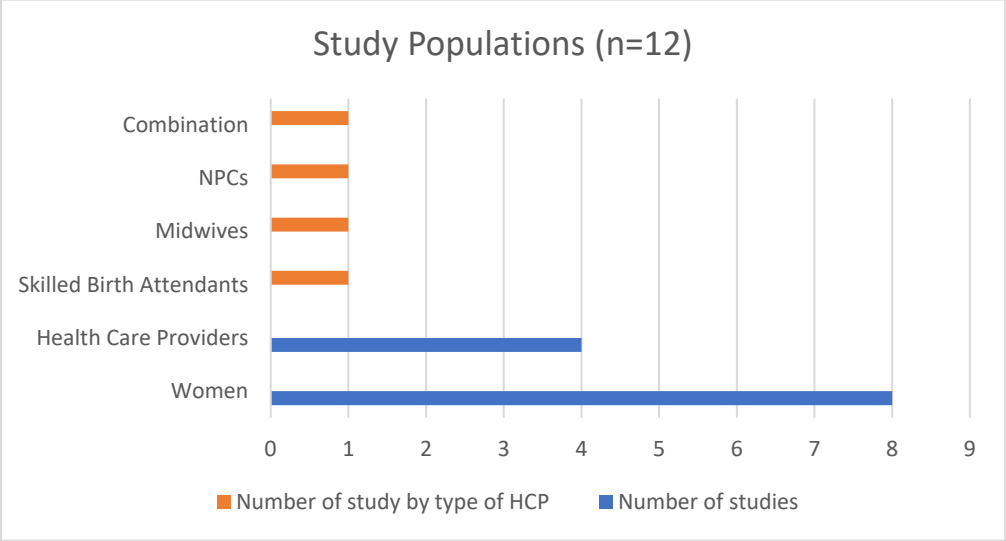
Table 5: Study Countries and System Foci

Country	SBA	Health Facility	SBA and Health Facility	Total
Tanzania	1	0	1	2
Ethiopia	1	0	1	2
Malawi	1	0	0	1
Senegal, Guinea-Bissau, Gambia, Burkina Faso, Cote d'Ivoire, Mali, Mauritaine, Niger	0	0	1	1
China	1	0	0	1
Nepal	1	0	0	1
Indonesia	1	0	0	1
India	0	1	0	1
Pakistan	1	0	0	1
88 LMICs	1	0	0	1
Totals	9	1	3	12

Study Population Samples

Most of the 12 studies (n = 8) gathered information about the women's experiences and their birth outcomes from birth registries, health records, census data and/or from the women's experiences.[24,27–29,31–35] Four studies focused on healthcare providers, categorized as SBAs (n = 1),[30] midwives (n = 1),[28] NPCs (n = 1),[25] or a combination of trainees (including medical officers, senior clinical officers, nurse midwives and nurses; n = 1)[26] (Figure 7).

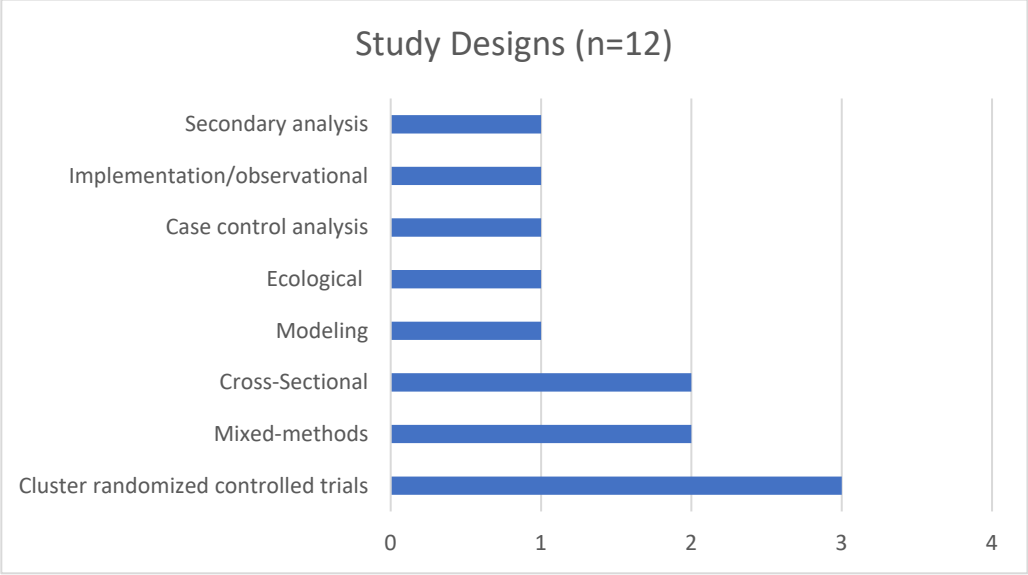
Figure 7: Study Populations



Study Designs

The study designs included cluster-randomized control trials, pre-and post-examination, survey, modeling, cross-sectional survey, cross-sectional analyses, capture-recapture, ecological study, case-control analysis, implementation/observational, and secondary analysis. Three studies used cluster-randomized controlled trials (RCTs).[24,25,33] Two studies used mixed methods, one with pre- and post-examination and surveys[26] and the other with capture-recapture, case control analysis and cohort analysis.[31] Two other studies used cross-sectional designs.[30,32] One study used modeling,[28] one was an observational study,[32] one was an unmatched population-based case-control analysis,[34] one was implementation/observational,[27] and one was a secondary analysis of cross-sectional georeferenced census data[35] (Figure 8).

Figure 8: Study Designs in Reviewed Studies



Overview of Results

Most of the results from the 12 studies focused on the second and third stages of the Health Strengthening conceptual model (the access and uptake, and effective coverage). Access and uptake and effective coverage were addressed by specific measures identified in the conceptual model, including midwives, removal of barriers to access, and close-client facilities, equipped and supplied. Measures to address effective coverage themes included effective and safe interventions and skills, and hospital backup and parsimonious referral. No studies in this review examined the third measure, mother- and baby-centered care.

Access and Uptake Theme: Midwives

Five of the 12 studies focused on the access and uptake of midwives as a strategy to address the first and third delays (deciding to seek care, and receiving adequate and appropriate treatment, respectively).[28,31–34] All five studies found a relationship between low access and utilization of SBAs and high MMR. In an Indonesian study, programs in two districts were assessed to determine their effect on increasing the number of births attended by health

professionals. Only 33% of women gave birth with an SBA and maternal mortality remained high at 435 per 100,000 births.[31] An ecological study based in eight West African countries assessed five indicators of access to obstetric services including, access and uptake of midwives. The study used data from the Maternal Mortality and Obstetric Care in West Africa study (MAMOCWA) and the Gambia and the Morbidité Maternelle en Afrique de l'Ouest study (MOMA). In all areas with MMRs in excess of 450 per 100,000 births, fewer than 30% of births had skilled attendants. In rural areas, 80% of women gave birth at home without any skilled care.[32]

An Ethiopian study assessed the effect of deploying trained community-based nurses to rural communities on the uptake levels of SBAs. After nine months of intervention, the coverage of SBA services increased by 81% in the intervention arm located in villages with providers deployed to health posts, and by 129% in villages with providers deployed to health centers.[33] This study did not directly measure MMR but addressed the correlation in the study conclusions. A study of maternal mortality in India considered access to SBAs and found the probability of maternal death decreased with increasing SBA coverage among women who were and were not admitted to a health facility.[34]

The modeling study considered the impact of midwives in preventing and reducing maternal and neonatal mortality and still births by exploring several intervention coverage strategies. The study classified 88 countries into three groups based on their HDI scores and determined that relative to current coverage, a substantial increase in coverage of midwife-delivered interventions could avert 41% of maternal deaths and a shift to universal coverage of midwife delivered interventions could prevent 67% of maternal deaths.[28]

Access and Uptake Theme: Removal of Barriers to Access

The barriers to access to SBAs contributed to all three delays identified in the model (deciding to seek care, identifying, and reaching health facility, and receiving adequate and appropriate treatment). The potential impacts on maternal mortality of removing barriers was considered in two studies; both found a correlation between removal of barriers to access and lowering MMR.[31,33] In the Indonesian study, most births took place at home (83%), only one-third of births (32.8%) were attended by a health professional, and the overall MMR was 435 per 100,000. Among the women in the poorest quartile range, only 10.3% utilized SBAs and the MMR was 706 per 100,000. The results indicated that economic barriers are key deterrents to the uptake of skilled birth attendance. When economic barriers were removed, women in the wealthiest quartile in Indonesia were three times less likely to die.[31] In Ethiopia, barriers to quality SBA services were similar to those in many LMICs and are socio-economic and gender related. These included distance, low education status, lack of women's autonomy, and absence of trained human resources for health (HRH). One Ethiopian study addressed these barriers by training and deploying trained nurses to rural villages, bringing access to women, which significantly decreased utilization barriers and resulted in increased SBA utilization. The intervention arm of the study that deployed nurses to villages with health centers found SBA use increased by 122.9%, which continued to be a key intervention to lower MMRs.[33]

Access and Uptake Theme: Close-to-Client Facilities, Equipped and Supplied

One study in rural Tanzania assessed the impact distance to health facilities had on maternal mortality. Deaths due to direct causes of maternal mortality were strongly related to distance. Among women who lived within 5km of a health facility, the MMR was 111 per 100,000 births, but among women who lived more than 35km from a hospital, the MMR was

significantly higher, 422 per 100,000.[35] Another study, based in Ethiopia, used multiple interventions, including providing institutions with essential and basic equipment, which helped decentralize comprehensive and basic obstetric care. The overall MMR fell by approximately 60% over the four-year period. This study also looked at the impact of road access on MMR and found that households living close to all-weather roads, dry-weather gravel roads and no roads had MMRs of 220, 348, and 598 per 100,000 births, respectively.[27]

Effective Coverage Theme: Effective and Safe Interventions and Skills

Two studies focused primarily on training SBAs.[24,25] In Pakistan, researchers trained TBAs and integrated them into the healthcare system. Three of seven subdistricts in rural Pakistan were randomly assigned to the intervention group. The TBAs were trained and provided disposable delivery kits; Lady Health Workers linked TBAs with established services and documented processes and outcomes. The MMR in the control group of women was 360 per 100,000; in the intervention group, which received care by the trained TBAs, the MMR decreased to 268 per 100,000.[24] Similarly, in Malawi, researchers evaluated the impact of training on obstetric health outcomes. Eight of 14 districts in Malawi were randomly assigned to receive the Enhancing Human Resources and Use of Appropriate Technologies for Maternal and Perinatal Survival in sub-Saharan Africa (ETATMBA) training program, which included knowledge, skills, and clinical leadership training. MMRs consistently decreased in the intervention districts (from 157 to 80 per 100,000), while increasing in control districts (from 195 to 218 per 100,000).[25]

Two studies assessed interventions of SBAs that both trained and provided post-training mentorship and/or supervision.[26,27] In Tanzania, researchers recruited 36 trainees from rural districts and provided them with ETATMBA training. Post-training mentoring and supervision

was provided at the participants' places of work. A pre- and post-examination of maternal and neonatal health indicators and a survey of health facilities was completed. The MMR declined (from 282 to 232 per 100,000) but the trend was not statistically significant.[26] The *Reducing Maternal Deaths in Ethiopia* study used a multi-intervention approach to strengthen the healthcare system included three districts. Health institutions were upgraded by training non-clinical physicians and midwives and by providing hospital institutions with essential and basic equipment. The trainees were regularly monitored and supervised by staff who were competent in emergency obstetric work. Among the 38,312 births during the two-year study period, the MMR declined by 64% during the intervention period (from 477 to 219 per 100,000 live births).[27]

In Nepal, 511 SBAs from 276 health institutions in 15 districts were assessed for knowledge, clinical skills, and deliveries. On the written knowledge assessment, SBAs mean score was 75%. The SBAs performed poorly on the clinical skills assessment, with a mean score of 48%. The WHO guidelines recommended a minimum of 15 deliveries per month to maintain competence, but an average of only 9% of SBAs met that target.[30] Researchers in China compared regions with different MMRs based on midwives' self-perceived essential competencies. A questionnaire was completed by 2,022 midwives. Midwives from regions with higher MMRs reported poorer self-perceived essential competencies than those from regions with lower MMRs. The greatest deficits were reported to be in detecting and treating pregnancy and childbirth complications.[29] Both studies identified effective training and sufficient practice as necessary for staying competent and knowledgeable as SBAs.

Effective Coverage Theme: Hospital Backup and Parsimonious Referral

An optimal functioning health system includes a system for basic (BEmOC) and comprehensive emergency obstetric care (CEmOC), with options for supportive referrals and transfers to a hospital when critical services are required. The Reducing Maternal Deaths in Ethiopia study focused on multiple interventions for strengthening the health system. These involved upgrading existing institutions, so they were capable of BEmOC and CEmOC. While the MMR was the primary outcome (which, as noted earlier, declined by 64% during the intervention period), other variables were assessed including place of delivery and referrals. During the intervention period, home deliveries decreased from 89.8% to 69.2%. Referrals to hospitals increased by 3.3%. The increases in facility-based births and referrals demonstrate the relationship between effective coverage measures and decreases in maternal mortality.[27]

Discussion

This literature review attempted to answer the question: What is the effect of MMRs on interventions focused on increasing SBAs in LMICs? The literature was examined in the context of the Health Strengthening Conceptual Model (Figure 5). The studies in this review suggest that interventions focused on increasing skilled birth attendance in LMICs lower MMRs. Among the 12 studies conducted in 104 countries and published between 2003-2020, 10 reported lower MMRs when the intervention focused on increased access to SBAs.[24–29,31,32,34,35] The two studies that did not explicitly consider MMR as a primary outcome considered the uptake and competencies of midwives, both known to improve maternal outcomes.[30,33]

Two main study systems emerged in this review based on the foci of interventions, i.e., the dependent variables. The two main foci identified as study systems were SBAs and health facilities. The interventions and corresponding studies were analyzed within the Health

Strengthening Conceptual Model (Figure 5). Two levels of measures were considered as themes: Access and Uptake, and Effective Coverage.

Access and Uptake

EPMM is a global priority, as evidenced by the issue's prominence in the MDGs and SDGs. Midwives, a primary intervention target for addressing MMRs, have become a critical component in the complex challenge of lowering MMR in LMICs. In 1999, a joint statement from WHO, UNFPA, UNICEF, and the World Bank called on countries to ensure all women and newborns have skilled care during pregnancy, childbirth and the immediate postnatal period.[36] Skilled birth attendance by midwives has become a global initiative supported by WHO, as highlighted by Indicator 5.2 of the MDGs, which addresses the proportion of deliveries attended by SBAs in order to meet MDG 5.A (Reduce by three quarters, between 1990 and 2015, the MMR).[37] Ten of the reviewed articles discussed SBAs as the primary intervention in relation to MMR outcomes, but access and uptake of SBAs is not as simple as increasing their numbers.[24–31,33,35]

Several grey literature and position statement papers have supported the critical role of SBAs for making pregnancy safer. A joint statement by WHO, ICM and the International Federation of Gynecology and Obstetrics (FIGO) noted that despite overwhelming evidence from developed countries on the crucial role of SBAs for saving the lives of mothers and babies and lowering MMR, the number of SBAs continues be inadequate in developing countries.[38] This critical lack of trained SBAs in LMICs must be addressed in order to end preventable maternal mortality. The study by Nove et al. (2020) specifically considered the impact on maternal mortality of increasing the coverage of midwives. The authors noted that midwives can substantially reduce MMR in LMICs, but to achieve the SDGs, LMICs would have to attain

universal coverage of midwives.[28] The commitment to increase the number of SBAs in LMICs will require large-scale interventions focusing on adequate training, access, and uptake.

Access is a common concern about health systems and a major focus of health policy. In McLaughlin and Wyszewianski[39] discussed the five A's of access to care: affordability, availability, accessibility, accommodation, and acceptability. Even when midwives exist in the community, the five A's must be taken into account to determine if and how they will be utilized. The majority of births in LMICs occur at home without SBAs, so the uptake of midwives must be a priority. The ability to assimilate midwives into the healthcare system will be dependent on the five A's. To foster the acceptability of midwives in LMICs, it will be imperative to integrate TBAs in the healthcare system. Jokhio et al.[24] found that integrating TBAs into the healthcare system was achievable and ultimately effective for reducing MMRs. Similarly, Zerfu et al.[33] concluded that the deployment of trained community-based nurses at the grassroots level significantly improved utilization of SBA services. These community level approaches may promote the acceptability of SBAs and could potentiate a rapid uptake of midwives.

While a skilled and competent birth attendant may provide lifesaving care to mothers and their babies, SBAs must have the necessary equipment and the support of a functioning health system, including transport and referral facilities for emergency obstetric care. Prevention and identification of women at risk for complications are key primary interventions but once treatment is required for complications, the level of skill and infrastructure required is routinely unavailable in LMICs. Nove et al.[28] take this a step further and supports the idea that SBAs must have skills and competencies in line with the recommendations of ICM, be part of a team with sufficient size and skill and have an enabling environment. Achieving equitable coverage for all

births by SBAs is an important goal but as Ronsman et al.[31] found, even among women who had received professional care, MMRs remained surprisingly high, which indicates the complex systematic factors that affect this relationship (including poverty, transportation, and lack of healthcare infrastructure). Sustainable solutions for removing barriers to care for all women must include fee exemptions and transport initiatives.

Geographic distance in LMICs means the difference between life and death for many. Transportation and roadways can make accessing facilities difficult, if not impossible. Two of the studies in this review discussed distance to health facilities and its impact on maternal mortality.[32,35] Large distances to hospitals contributed to high levels of direct obstetric mortality. The authors also noted that high levels of pregnancy-related mortality among those living close to a hospital suggest deficiencies in quality of care.[35] For example, even if a woman can access a healthcare facility, it may not have proper equipment or supplies to save her life. Each of these factors may contribute to a delay in a woman seeking care, identifying, and reaching a health facility, and, therefore, in her receiving adequate and appropriate treatment to prevent her death.

Another relevant variable affecting access and uptake are the wide urban-rural disparities. When wide differentials in access to high quality maternity care exist, women die needlessly. Ronsmans et al.[32] found that women in rural areas had an MMR almost three times greater than women living in urban areas. The proportion of women birthing in a health facility or with a skilled provider was also correlated with this urban-rural disparity. Sixty-nine percent of women residing in urban areas gave birth in a health facility or with a skilled provider, compared with 20% of the women residing in rural areas. The disparities in urban and rural MMRs are due to a combination of distance and deficiencies in quality of care. Both must be addressed to make a lasting impact in communities.

Ensuring healthcare facilities are strategically located within LMICs and are properly equipped and supplied are key components of any effective health strengthening model to address MMRs. These concepts were addressed in the four key strategic objectives found in the "Strategies Toward Ending Preventable Maternal Mortality (EPMM)" paper by WHO, HRP, UNICEF, the United Nations Population Fund (UNFPA), USAID, FIGO, et al.[9] The strategic objectives addressed inequities in access to and quality of healthcare for sexual, reproductive, maternal and neonatal health (SRMNH) and ensuring such coverage is universal. The objectives also aimed to address all causes of maternal mortality and reproductive and maternal morbidities, while strengthening health systems to respond to the needs and priorities of women and girls.

Effective Coverage

Ensuring that SBAs are competent and can provide safe and effective care is imperative for addressing the third type of delay in receiving adequate and appropriate treatment. Training and assessing the competency of SBAs are key interventions within the effective coverage theme of strengthening health systems. Studying these interventions in relation to maternal mortality is thus crucial for understanding the effect that increasing the number of SBAs could have. Five of the reviewed studies considered the impact of training SBAs on maternal outcomes. All found positive correlations between the training interventions and lower MMRs.[24–27,33]

Although the upscaling of the maternal healthcare workforce through structured training varied by type of birth attendants participating and the nature of the training, each found a positive correlation with MMRs. For example, Jokhio et al.[24] found that training TBAs and integrating them into the healthcare system was not only achievable but also reduced perinatal mortality. Two additional studies found that structured training increased knowledge and skills of SBAs, which had positive impacts on health outcomes, particularly maternal mortality.[25,26]

Another study considered the impact of training combined with other well-known interventions including upgrading healthcare institutions to carry out Basic and Comprehensive Emergency Obstetric Care, which dramatically decreased MMRs.[27] This multi-dimensional approach combining training with basic and essential equipment, regular monitoring, and supervision is the type of systematic change that results in effective and sustainable reductions in MMR. This finding is consistent with a finding in the systematic review by Munabi-Babigumira et al.[40] that found many factors influence the care that SBAs are able to provide mothers. These include access to training and supervision, staff numbers and workloads, and access to well-organized healthcare facilities with water, electricity, and transport.

In 2011, the ICM released the Global Standards for Midwifery Regulation (GSMR). The goal was to promote regulatory mechanisms that protected the public by ensuring that safe and competent midwives provided high standards of midwifery care to every woman and baby.[41] In addition to the GSMR, ICM provided Global Standards for Midwifery Education (GSME) and Essential Competencies for Basic Midwifery Practice (ECBM). ICM recognized that in order to strengthen midwifery globally, fully qualified midwives would need to be prepared to provide high quality, evidence-based health services for women, newborns, and families. Setting global education standards helps set benchmarks based on global norms that define the expectations for competencies and the scope of midwifery practice.[42]

ICM has produced a wide range of documents to provide a framework for the globalization of a safe and effective midwifery model. Beginning with the ECBM, ICM outlined the minimum knowledge, skills and professional behaviors required to use the designation midwife.[43] In addition, ICM has produced resources including "Definitions,"[18] "Philosophy and Model of Midwifery Care,"[44] "Bill of Rights for Women and Midwives,"[45] "International Code

of Ethics,"[46] "ICM Anti-Racism Statement,"[47] and ICM position statements.[48] WHO also supports a globalized framework for safe and effective midwifery with clinical practice guidance documents based on the ICM standards.[49–54] In conclusion, there is broad consensus in the literature that skilled birth attendance decreases maternal mortality, and the standardization of education and training will result in higher levels of effective and safe care. Using a standardized global framework will increase the access and uptake of skilled birth attendance and provide effective coverage that is so desperately needed.

The competency of skilled birth attendance has not been well defined in many LMICs and is complicated by the varying levels and types of SBAs in these countries. Moving towards a model in which there is standardization in the definition, education, and licensure of SBAs across LMICs, based on the standards set forth by the ICM, would ensure a competent and skilled maternal healthcare workforce. Huang et al.[29] found that improving essential competencies and standardizing SBA assessment and regulations were key priorities for improving MMRs. Further elucidating the importance of effective training and monitoring of competency, Rajbhandari et al.[30] found that SBAs with a deficiency in knowledge and clinical skills resulted in poor maternal health outcomes. Their findings were consistent regardless of how recently the SBAs had completed their training, which indicated a failure of the program to effectively train the SBAs which in turn may be attributable the failure of the training methodology to meet basic standards.

Gaps in Literature and Need for Future Research

Overall, there is sufficient scientific literature identifying the causes of maternal mortality and the interventions to effectively address the issue. However, existing evidence is insufficient for concluding which implementation strategies are most effective and how other contributing factors impact interventions and outcomes. The literature examined identified variables that

contribute to increased access, uptake, and effectiveness of SBAs to improve MMRs but fell short of identifying specific strategies that can be implemented on a broad scale to meet MDGs or SDGs in LMICs.

High-quality grey literature (e.g., Bulletins of the WHO and ICM Resource documents) has also discussed global standardization and regulation of midwifery issues that are relevant to the research question this systematic review attempted to address.[9,36,38,40–43,49–54] These types of articles provided a framework from which LMICs might attempt to address the critical shortage of SBAs. However, they were omitted from this review due to the exclusion criteria. In addition, several systematic reviews were identified that considered midwives and their impact on outcomes in the LMICs and were also not included in this review due to the exclusion criteria. One systematic review identified gaps in primary research related to the applicability of the evidence about interventions for improving outcomes in LMICs, including midwife-led care.[55]

Another gap in the literature involved studies measuring the impact of determinants of health and healthcare infrastructure on access and effectiveness of SBAs. While some studies considered the effects of specific barriers and determinants on MMR (e.g., distance to facility and quality of roads to access healthcare facilities), further research is needed to understand how such factors intersect and interact. The impact of poverty and its resultant sequalae have a large impact on the individual, community, and society with regard to access and effectiveness of intervention strategies in LMICs. Further research is indicated to determine how to best tackle these pressing issues.

In addition, the implementation factors regarding SBA training programs have not been adequately researched. Without adequate explanation about how SBA training programs are implemented, it is challenging for meaningful implementation frameworks to be created for

widescale use and impact. The feasibility and sustainability of increasing access to SBAs has not been adequately researched although it has far reaching implications for both policies and projects. Identifying baseline levels of healthcare infrastructure and political support for policies that effect change also needs further investigation. The design and investment of the overall network of service delivery to successfully meet the SDGs by 2030 will require consideration of research on the strengthening of the healthcare system to create evidence-based interventions.

Study Quality and Limitations

The NHLBI Quality Assessment Tools were used to assess the quality of the 12 articles in this review.[56] Four of the 12 articles were determined to be "good" quality; the remaining eight studies scored "fair." In the studies that scored fair, challenges noted included an inability to maintain internal and external validity due to potential errors or bias introduced into sampling, measurement, data collection, and/or data analysis. The measurement of primary outcome measure, maternal mortality, was also a limitation and a potential quality issue. The accuracy of maternal mortality data was a potential source of bias, particularly in studies that relied on postmortem verbal autopsies from family members.[34] One study noted there were no data to ascertain the accuracy of the reports of death or of the reported causes of maternal death.[24] Ellard, Shemdoe, et al.[26] noted that maternal outcomes are sometimes poorly reported or not recorded at all. Methodologies such as capture-recapture used to produce estimates of maternal death may be biased.[25] Ultimately, the measurable outcome of maternal mortality was noted as a limitation because it is difficult to accurately capture the true number.

Utilizing the ROBINS-I and RoB-2 tools, two studies were determined to have a "low" risk of bias, seven studies were rated "medium," and three were rated "medium-high."[56,57] The two studies rated low risk were randomized controlled trials and therefore low risk of

susceptibility to bias based on the hierarchy of study designs. The randomized controlled trials (RTC) designs, by enhancing internal validity, increase the likelihood that the study interventions are causally related to the observed outcomes.[24,29] Three studies rated medium-high risk used study designs that ranked higher on the hierarchy of susceptibility to bias (viz., pre-posttest study, cross-sectional study, and case reports [ecological model]).[26,32,35]

Generalizability was a common challenge for all 12 studies in this review. The underlying issue was a lack of uniformity in the definition of types of providers and birth settings. While each study presented its definition of a "skilled birth attendant," they varied greatly and included traditional birth attendants, midwives[28,29,31] and SBAs.[30,34] Other studies identified multiple provider types as SBAs. These included NPCs (clinical officers, midwives, community health workers);[25] medical officers, senior clinical officer, nurse-midwives, and nurses;[26] doctor and midwife,[27] doctor, midwife, nurse, or TBA;[32] and skilled care provider (midwives, doctors, or other trained professional).[33] One study did not directly consider the type of provider but inferred that skilled birth attendance was available at the health facility.[35] The location of the birth setting varied greatly across the studies and included homes, hospitals, and healthcare facilities. While this is representative of the varied settings in which women give birth in LMICs, it was inconsistent across the studies as a whole. Although two studies looked at one particular birth setting, e.g., health facility[25] or hospital,[29] the majority looked at varied combinations of birth settings including home and hospital,[25,29] home and health facility,[31,32] health center/facility and hospital,[26,30] any health facility,[27,32] and home, hospital and health center.[35] This lack of uniformity in the definition of SBAs and birth setting makes the results difficult to generalize.

Limitations of this Review

This literature review has a number of limitations despite the author's attempt to complete a review following the comprehensive systematic review methodology. First, only studies in English were used, which limits the author's ability to consider some research conducted in certain LMICs. Second, there was a limited number of peer reviewed articles that identified maternal mortality as the primary outcome of study. Even fewer studies identified midwives as the primary intervention for the primary outcome of maternal mortality. Therefore, the reviewer also considered studies with a primary intervention focused on health facilities; skilled birth attendance was thus inferred or secondary. Third, no studies were identified that specifically considered implementation factors regarding SBA training programs.

The focus of this review on LMICs resulted in the exclusion of studies that measured the effect of SBAs on maternal mortality in high-income countries. High-income countries have made tremendous strides, most meeting maternal related MDGs and SDGs, yet these valuable lessons could not be considered due to the exclusion criteria. In addition, this review's focus on SBAs as the primary intervention for lowering maternal mortality excluded evidence of other interventions that address maternal mortality.

Conclusion

This is the first review to critically examine the effect of interventions designed to increase the number of SBAs on maternal mortality in LMICs. The review found that increasing the number of SBAs lowered MMRs in LMICs. However, this review also identified the need for additional research to examine the role of increasing skilled birth attendance within the context of the healthcare infrastructure, including feasibility and sustainability issues. Future research should thus provide a framework for addressing issues of access, uptake, and effectiveness in

LMICs to ensure that interventions target the SDG and MDG goals. Additionally, this review identified the need for additional research to study implementation factors of SBA training programs. Focusing policy and programmatic resources into evidence-based interventions, like increased skilled birth attendance, within the context of a strengthened healthcare infrastructure, would help end preventable maternal mortality.

CHAPTER 3: METHODOLOGY

Dissertation Research Question and Aims

Research question: A case study of a skilled birth attendant training program in a rural hospital: What are the barriers and facilitators to increasing skilled birth attendants in Haiti?

Dissertation Aims:

- **Aim 1:** Explain the history and the current iteration of the MFH SBA training program and the subsequent increase in SBAs at STH.
    - **Methods:** Key informant interviews (KIIs) using a structured, open-ended questionnaire and document reviews of organizational annual reports. Targeted interviewees included those with first-hand knowledge of the history and current iteration of the SBA training program.
- **Aim 2:** To explore how the growth of the MFH SBA training program relates to increased availability of SBAs and changes in birth outcomes at STH.
    - **Methods:** Quantitative data analysis of MFH secondary datasets of key variables from STH.
- **Aim 3:** To explore the experiences of key MFH staff members and MFH SBA graduates working at STH to identify barriers and facilitators of implementing the SBA training program.
    - **Methods:** KIIs were conducted to saturation.

- **Aim 4:** Develop a plan for change that supports MFH in its effort to expand and sustain the program in collaboration with MSPP and other partner organizations.
    - **Methods:** Facilitate a series of meetings with MSPP, HSU, and MFH. Exploration of MFH merger with HSU. Utilization of PCORI framework for communication and dissemination of findings.

Research Conceptual Model

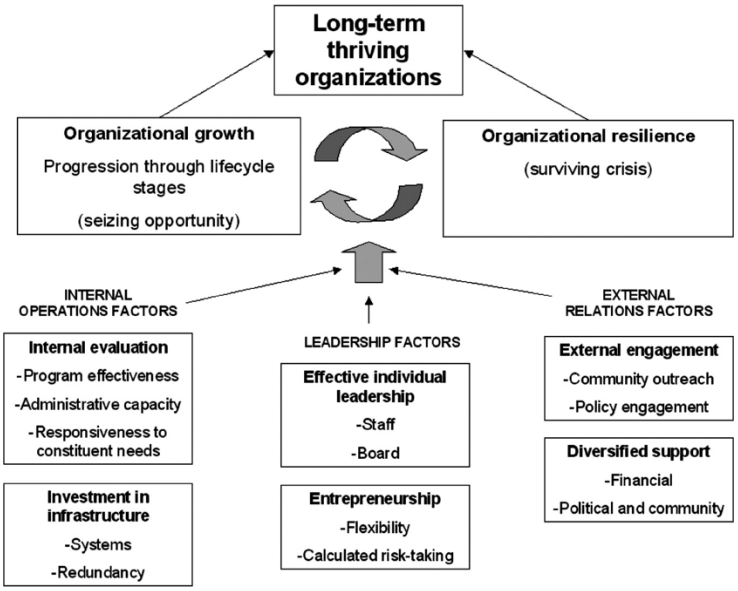
The Theory of Change conceptual model explores how and why an initiative or program works. It allows for empirical testing by measuring indicators at each step on a causal pathway to impact. A key component to developing the conceptual model is the engagement and collaboration of stakeholders. Models are modified throughout the process to reflect the exploratory nature of the process of evaluation. Generally, a theory of change conceptual model uses a visual representation of the causal pathways of an intervention or program in the context of its intended outcomes.[58]

The foundational scientific goal of any research is to be able to generalize and build upon the study findings. The use of a theoretical framework when conducting implementation research increases support for the application of the findings in broader contexts.[59] Aims 1 and 3 were approached with unique theoretical frameworks to support the analysis and discussion of the findings.

Aim 1 explored the context of MFH within the lifecycle of a nonprofit, which is the process by which organizations grow and/or decline through changes in systems, processes and elements that support the organization's existence. The phases of the nonprofit lifecycle reflect systemic benchmarks in organizational life, ranging from idea, startup, growth, maturity, and decline and crisis.[60] Studying the history of organizational development and change over time

has educational value,[61] yet most research on organization history has centered on only one or two key events in mature organizations, thus lacking a longitudinal perspective. Kimberlin et al., attempted to fill this gap by documenting and analyzing the histories of 12 pioneering nonprofit organizations across their lifespans. Their study consisted of a thorough literature review on organizational growth, including lifecycle models and growth management. This resulted in a conceptual model that synthesized key factors influencing organizational growth, resilience, and ability to survive and thrive over time (Figure 9).[62]

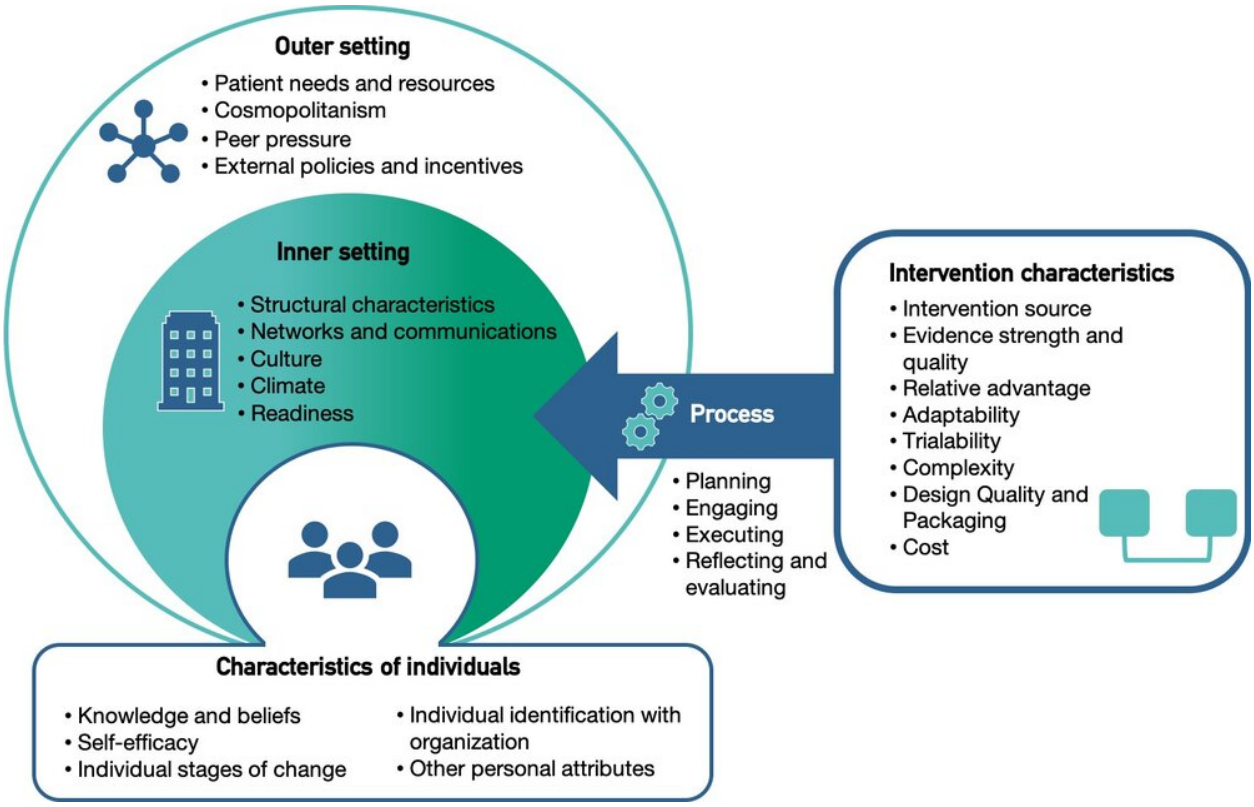
Figure 9: Key Concepts for Understanding the Organizational Histories of Pioneering Nonprofit Human Service Organizations[62]



Aim 3 identified the barriers and facilitators of implementing the MFH SBA training program and utilized the consolidated framework for implementation research (CFIR) for analysis of the findings. was developed as a practical guide to support the implementation of innovations by systematically identifying potential factors (barriers and facilitators) that may influence implementation. The CFIR provides theory-based constructs to develop context specific logic models. The five domains of the CFIR are intervention characteristics, outer

setting, inner setting, characteristics of individuals, and process (Figure 10). Within each domain are constructs that guide data collection, analysis, and interpretation of the findings.[63]

Figure 10: The Consolidated Framework for Implementation Research[63]



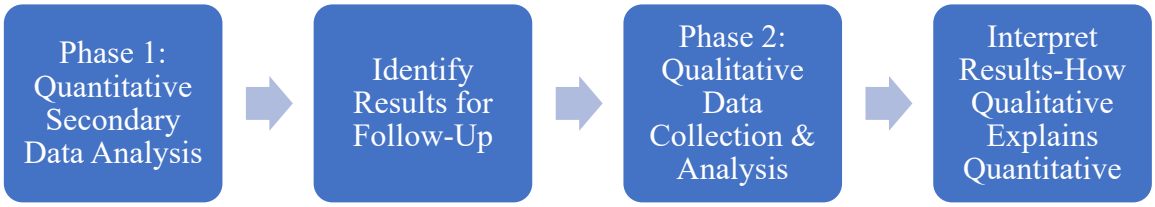
To conceptualize and evaluate the successful implementation of the MFH SBA training program, the discussion of the Aim 3 findings focused on the concepts of implementation outcomes, which are unique and distinct from the clinical outcomes evaluated in Aim 2.[64] The implementation outcomes included concepts of acceptability, appropriateness, feasibility, fidelity, implementation cost, penetration, and sustainability. Conceptualizing the barriers and facilitators of implementing the training program through the lens of implementation outcomes provided a deeper understanding of the implementation process.

Study Design

Methods

The literature review identified a clear connection between increasing skilled birth attendance and lowering MMRs in LMICs. The purpose of this study was to identify barriers and facilitators for increasing skilled birth attendance in Haiti. This research used a case study design with explanatory mixed methods including both quantitative and detailed qualitative research and analysis.[65] This study design employed qualitative research to gain a deeper understanding of the quantitative results and explain their meaning and is therefore categorized as explanatory (Figure 11).[65]

Figure 11: Explanatory Sequential Design (Two-Phase Study)[65]



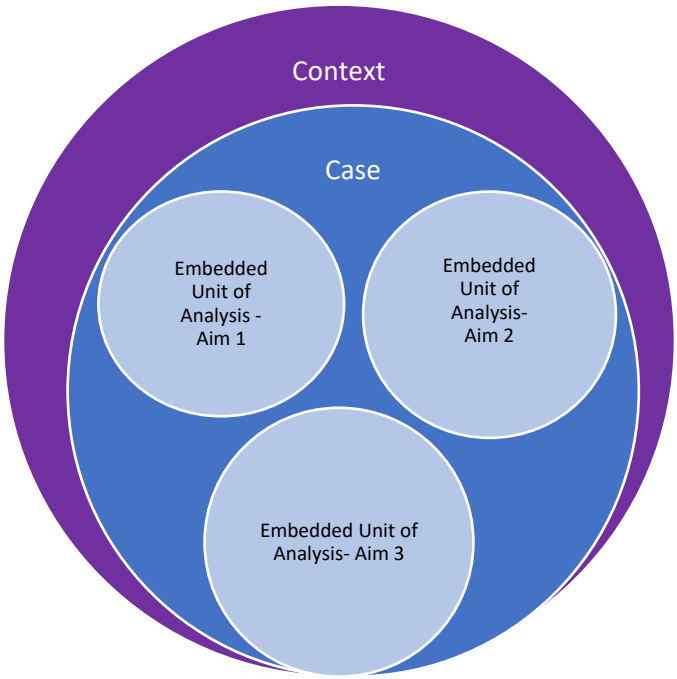
Case studies are considered the preferred method of research when asking "how" or "why" questions about a contemporary set of events over which the researcher has little or no control.[66] The specific aims asked "how" and "why" questions that correlated to the overarching research question. Case study research covers an all-encompassing mode of inquiry and has its own logic of design, data collection techniques, and approaches to data analysis. Yin provided a two-fold definition of the case study research design:

1. A case study is an empirical method that:
    a. investigates a contemporary phenomenon (the "case") in depth and within its real-world context, especially when
    b. the boundaries between phenomenon and context may not be clearly evident.

2. A case study:
    a. copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as a result
    b. benefits from the prior development of theoretical propositions to guide design, data collection, and analysis, and as another result
    c. relies on multiple sources of evidence, with data needing to converge in a triangulating fashion.[66]

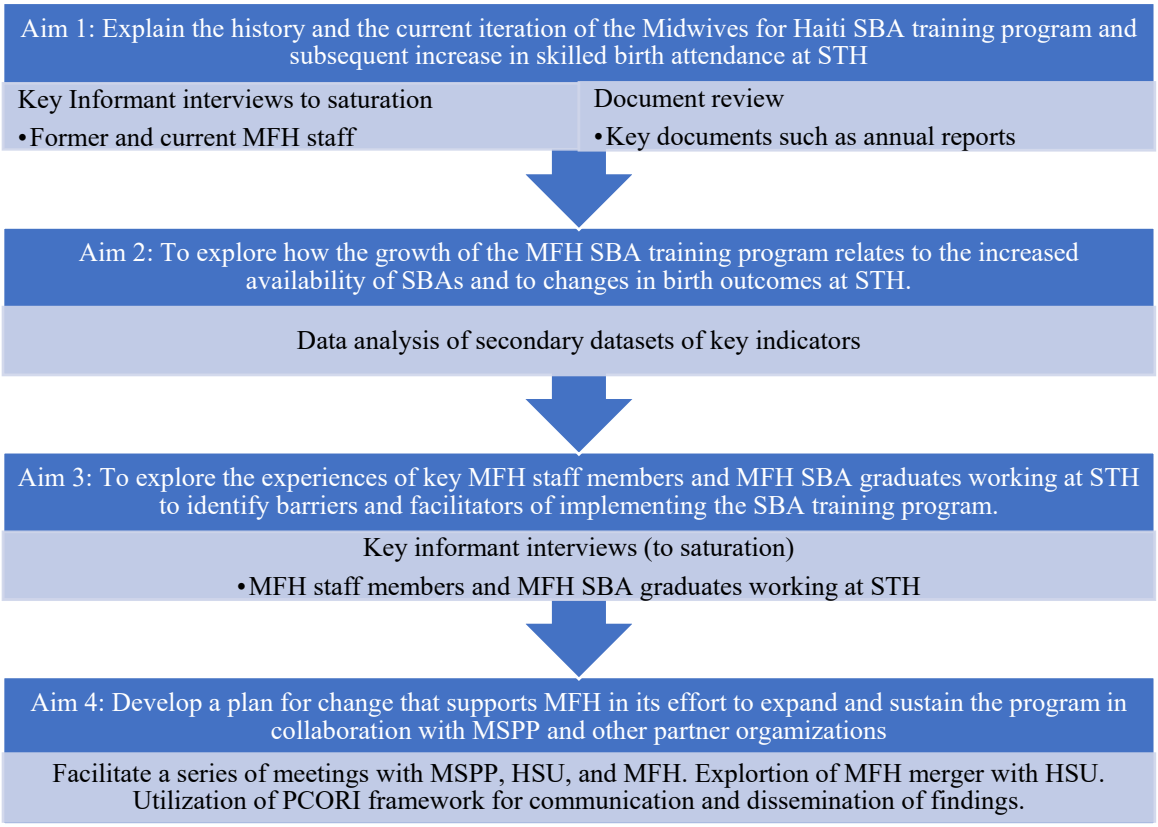
This case study of a rural hospital in Haiti used an embedded single case study design. Aims 1-3 were considered embedded subunits within the single case study (Figure 12).[66] The context was identified as the barriers and facilitators of increasing birth attendance in Haiti. The study explored the context of Saint Therese Hospital (STH), a rural hospital in Haiti. Aim 1 provided the foundational knowledge to understand the history of skilled birth attendance at STH and the MFH SBA training program from beginning through current iteration. The second embedded unit of analysis, Aim 2, provided quantitative data for birth outcomes related to skilled birth attendance at STH. The third embedded unit of analysis, Aim 3, involved gathering specific qualitative data from key MFH staff members, including graduates of the MFH SBA training program who were working as midwives at STH, about the barriers and facilitators of implementing the MFH SBA training program.

Figure 12: Embedded Case Study Design



The schema below (Figure 13) illustrates the logical flow of the aims and the corresponding data collection methods. Qualitative methods will be used to address Aim 1 and Aim 3, while quantitative methods will be used to study Aim 2.

Figure 13: Logical Flow of the Aims and Methods



Qualitative Methodology

The study began by addressing Aim 1 using key KIIs to document and understand the historical and current MFH SBA training program at STH. Additionally, Aim 3 used KIIs to identify the barriers and facilitators of increasing SBAs in a rural hospital in Haiti.

Data Collection Procedures/Data Sources

The data collection procedure followed distinct steps inherent in qualitative research including 1) setting boundaries through sampling and recruitment, 2) collecting information through interviews, and 3) establishing the protocol for recording the data.[65]

Sampling and Recruitment

KIs for Aim 1 of the study were recruited and selected based upon their first-hand knowledge of the historical and/or current iteration of the MFH SBA training program (the pool

of potential KIs is listed in Table 6). The total number of interviews conducted in this first phase of the study was six, which was determined based on the concept of saturation. Saturation comes from grounded theory and supposes that data collection stops once no new insights are gathered and the themes or information is considered "saturated."[65]

Table 6: Potential Key Informant Interviewees for Aim 1

Title	Number of Potential Participants
Current Executive Director	1
Founder and Former Executive Director	1
Former Executive Director	1
Medical Director (Former & Current)	2
Clinical Director	1
Education Director (Former & Current)	2-3
Haitian Education Director	1
Haitian In-Country Director	1
Board of Directors (Chair & Members)	2-4

The next portion of the research addressed Aim 3 and consisted of two subsets of interviews: MFH SBA graduates working at STH and MFH staff members. KIs for these interviews were recruited among the MFH staff. The total number of interviews conducted in this portion of the study was 13 and was also based on the saturation point. Aim 3 interviewees consisted of key MFH staff members and MFH SBA training graduates working at STH, who provided insight and helped the researcher identify barriers and facilitators of implementing the MFH SBA training program. Table 7 below identifies the possible pool of KIs for Aim 3.

Table 7: Potential Key Informant Interviewees for Aim 3

Title	Aim	Number of Potential Participants
MFH SBA Graduates working at STH	3	5-10
Current Executive Director	3	1
Founder and Former Executive Director	3	1
Former Executive Director	3	1
Clinical Director	3	1
Education Director (Former & Current)	3	2-3
Haitian Education Director	3	1
Haitian In-Country Director	3	1
Board of Directors (Chair & Members)	3	2-4

The KII participants for the two qualitative phases of the study were contacted via UNC email with a standardized introduction about the purpose of the research, expectations for the interview, and the plan for ensuring confidentiality of the interviews. The email explained there was no obligation to participate and that declining to participate would not impact their professional role or relationships (Appendix 3). If no response was received, the email was followed up by a second email, one week after the first attempt. A single follow-up phone call was made one week later to nonrespondents. After these three attempts, if no contact was made or if the interview candidate declined to participate, an alternate interviewee was selected.

Collecting Information through Interviews

After a participant agreed to be interviewed, an appointment was scheduled at a convenient time for the participant. The interview was conducted over the phone or via a web-based video platform, such as Zoom or WebEx. All interviews were recorded with the participant's permission. Verbal consent was obtained from each participant after the principal investigator reviewed the consent form with them. The participant was encouraged to ask any questions about the study and consent was obtained after all questions had been answered. Study participants were consented and interviewed in English, unless their primary language was

Creole, in which case a certified interpreter conducted these procedures. The interview lasted approximately 30-45 minutes and consisted of open-ended questions (see the interview guide in Appendices 4-6).

Protocol for Recording Data

The data were collected following an interview protocol, identified as the interview guide (Appendices 4-6). The interview guide consisted of the six components: 1) basic information about the interview, 2) introduction, 3) opening questions, 4) content questions, 5) probing questions, and 6) closing instructions.[65] The interviews were audio and/or video recorded via Zoom. The researcher also took notes throughout the interview and used a secondary recording device as a backup in case of failed recording. All recordings were professionally transcribed.

Informed Consent

The consent process described the study procedures in detail to ensure that each participant was fully informed of their role in the study. The study subjects were also made aware of their rights to participate in the study or decline, and that their decision would not impact their relationships or, if applicable, their employment at MFH. The potential interviewee could agree or decline to participate in the study at any time. The subjects who consented to be interviewed were interviewed by the primary investigator following the interview guide (Appendices 4-6). All participants were notified that their interviews would be confidential and would not be shared with anyone outside the research team. Participants were also told their participation was voluntary and they could take breaks or terminate the interview at any time. All interviews were conducted via phone or teleconference platform and consent was obtained verbally. When possible, a signed consent was obtained, scanned, and sent to the primary researcher prior to the interview. Due to the minimal risk involved with this study, a waiver was

obtained from the UNC non-biomedical IRB regarding the requirement for written informed consent for these interviews. Prior to the interview, all KIs received a copy of the IRB-approved informed consent along with a research project fact sheet. All consent forms were translated into Creole by a certified translator for non-English speakers. Each participant was given a unique numeric identifier so that their comments could not be directly linked to their data, ensuring confidentiality.

Delimitations/Boundaries of Research

Inclusion criteria for participation in the KIIs were: 1) persons with first-hand knowledge of the MFH SBA training program, including current and former MFH staff, MFH Board members, and graduates of the MFH SBA training program who were working at STH; 2) willingness to participate in the KII; 3) being at least 18 years of age; 4) living in the United States, United Kingdom, or Haiti; and 5) willing to provide informed consent.

The boundaries of this research project were defined as delimitations. This dissertation project was delimited to the MFH TBA training program and its implementation in a rural hospital in Haiti. This program and hospital site were selected for study because there are deep established relationships within the community that helped address cultural and ethical implications when researching a resource-limited setting. Additionally, I had focused much of my work over the prior 10 years in this community.

Data Management Plan

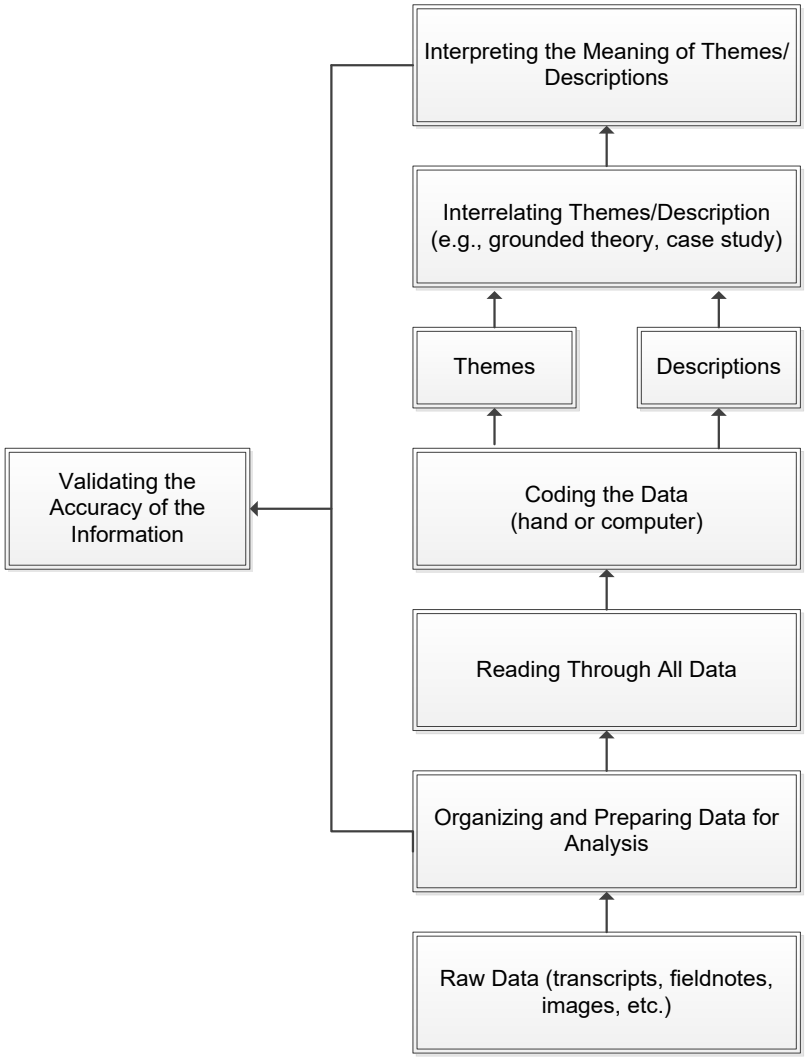
Qualitative studies by nature require the collection and storage of confidential data. This phase of the study involved confidential data in a variety of formats including audio files, video files, Word documents, transcribed documents, and data analysis software files. All data files were password protected and only the researcher had access to all the files. The KIIs were

recorded using a digital audio recorder and/or a digital video recorder. The audio and/or video recordings were shared with the professional transcription service using a password protected file share service. The handwritten notes collected by the researcher during the interviews were added to password protected Word documents. Subsequently, the handwritten notes were destroyed using a confidential shredding service. The audio/video recordings will be deleted after final acceptance of the dissertation by UNC.

Data Analysis Plan

The qualitative primary data were obtained from KIIs with three subsets of interviews (two subsets for Aim 1 and a third for Aim 3). Aim 1 provided data for descriptive analysis in which the history and current literation of the MFH SBA training program were explored in detail. For Aim 3, the analysis followed the flow of the literature review with the grouping of themes, a discussion of the findings, and the exposition of conclusions. Data analysis occurred simultaneously during data collection and the write-up of findings. The data were winnowed to aggregate it into a small number of meaningful themes. The transcribed recordings were imported into *MAXQDA* for analysis. Creswell's approach for qualitative data analysis provided the foundation for the qualitative research methodology process (Figure 14).

Figure 14: Data Analysis in Qualitative Research[65]



The overall analysis process followed Creswell's five sequential steps for qualitative data analysis:

1. *Organize and prepare the data for analysis.* The three subsets of KIIs (Aim 1 and Aim 3) were transcribed, and optically scanned, and handwritten notes were typed into a Word document, then the data were sorted and arranged into types based on the source of the information.
2. *Read or look at all the data.* This step allowed the researcher to gain a general sense of the information and provided an opportunity to reflect on the overall meaning. The

researcher wrote notes in the margins of the transcripts and explored general thoughts about the data.

3. *Start coding all the data.* The researcher examined the text data collected for Aim 1 and used an inductive coding system. The text data for Aim 3 were placed into domains and constructs, which were labeled based on the CFIR Model.
4. *Generate a description and themes.* The researcher used the coding process to generate a description of the data, as well as themes for analysis. The description provided detailed information about the MFH's SBA training program history, implementation, and impacts at STH. As a case study of this specific program at a rural hospital in Haiti, this detailed analysis provided useful codes that could be further used to generate a small number of themes for the research study. These themes were presented in the findings and applied in the CFRIR Model as the foundational basis for complex theme connections.
5. *Representing the description and themes.* The description and themes were represented in a narrative passage and supported by a detailed discussion of several themes, including subthemes, multiple perspectives from individuals, and quotations. Additionally, figures and tables were used as adjuncts to the discussions.[65]

Quantitative Methodology

Methods

The quantitative portion of the study used existing MFH data sets to complete secondary data analysis. The data sets began to be compiled in 2013 and continue though the time of this research. The researcher used all available data from 2013 through 2021. The datasets included the key outcome variables at STH, as well as MFH graduate employment records (Table 8). The

quantitative data analysis examined the impact of increasing skilled birth attendance at STH including increased number of birth attendants on staff, volume of births, and the outcomes of those births.

Table 8: MFH Data Set Variables for 2013-2020

Data Set/Variables
SBA Graduate/Employment Data by Year
▪ Number of MFH SBA Graduates by Year ▪ Number of MFH SBA Graduates Employed at STH total
Birth Outcomes by Year
▪ Number of Births Attended ▪ Maternal Deaths ▪ Infant Deaths

Data Sources

All outcome data from STH was collected by MFH and included key variables such as SBA staffing, the number of births attended, and maternal and neonatal mortality rates. On the first of each month, one STH staff SBA manually entered data from the birth logs at STH into a separate paper register. A second SBA then performed a line-by-line verification of the data entered. The paper register was then entered into the electronic data base by the MFH Clinical Director. The data was then confirmed by the Executive Director. All data sets were password protected and access was restricted to the researcher, the Clinical Director, and the Executive Director of MFH.

Definitions of Variables Used in Research

There were several variables to be explored for the secondary analysis of the dataset. Table 9 provides definitions for key independent and dependent variables in this research.

Table 9: Key Variable Definitions

Variables	Definition
Independent Variables	
MFH SBA Graduate	An SBA who has completed the MFH SBA training program and received their certificate of completion
MFH SBA Graduate Employed at STH (Total)	Total number of MFH SBA graduates who are employed at STH
Dependent Variables	
Number Births	Total number of births attended by MFH SBA graduates at STH per year
Maternal Deaths	Number of maternal deaths at STH per year
Infant Deaths	Number of neonatal deaths at STH per year

Delimitations/Boundaries of Research

The quantitative portion of the study consisted of secondary analysis of existing MFH datasets. Inclusion criteria of the MFH datasets were: 1) data available from 2013 to 2020 from the STH, 2) all SBA graduates of the MFH SBA training program, and 3) all women admitted to STH between 2013 to 2020 for pregnancy related care. Additional boundaries or delimitations of this research project included the fact that the secondary data was from a single rural hospital in Haiti and the MFH SBA training program.

Data Management Approach

The quantitative phase of the research required the utilization and storage of confidential data, primarily in Word and Excel file formats. A simple spreadsheet was developed to catalogue the various data elements, file formats, and storage location. The location of the data files was password protected and only the researcher had access.

Data Analysis Approach

The secondary analysis of the MFH data began with descriptive statistics. Crosstabulations were conducted to explore the intersection between the dependent variables and the independent variables.

Study Limitations

The case study design has several limitations which should be considered. First, single case study designs are appropriate in certain circumstances, such as a critical, unusual, common, revelatory, or longitudinal case.[66] The rationale for this research is the critical case concept. The single case study of a critical case can contribute significantly to knowledge and, ultimately, to theory building by confirming, challenging, or extending a theory. The single case study design allows the researcher to determine whether the propositions are correct or if there are alternative explanations that are more relevant.[66]

However, construct validity can be challenging in case study research. Researchers have been criticized for not sufficiently developing a set of operational measures, and thereby risking "subjective" judgements that simply confirm their preconceived notions. To strengthen construct validity, the researcher used multiple sources of evidence, including the subsets of KIIs and the MFH datasets. A few select KIs also reviewed the draft case study report. Another limitation in explanatory case studies is internal validity. Because the researcher is attempting to explain the "how" and "why" of the observed phenomena, relationships must be explored through pattern matching and explanation building, and the analysis must consider rival explanations and use logic models.[66]

Another common critique and limitation of the case study model concerns external validity. When considering whether a study's findings are generalizable beyond the immediate study, it is imperative to ground the research design phase in theory. This study used the Health Strengthening Model to support the research design. The overarching research question posed in this research is a "what" question, which exacerbates the generalizability challenge. Other study aims ask "how" and "why" questions that can lessen the generalizability problem. In addition,

the case study design also jeopardizes reliability. To mitigate that risk, this study's protocol specifies documentation methods, a case study database, and the maintenance of an evidence chain during data collection.[66]

Although in-person interviews were the preferred method, the interviews were not conducted in person due to political instability, the global COVID-19 pandemic, and safety issues, including roadblocks and kidnappings. Phone and/or video conferencing were used instead. Finally, the researcher acknowledges possible limitations related to unconscious cultural bias and language barriers. The researcher had worked in Haiti over the previous 10 years and had forged relationships in the community. To minimize cultural bias, the researcher sought to practice cultural relativism and remain cognizant of her cultural assumptions. A professional translator was employed to address the language barrier.

IRB Considerations/Confidentiality Issues

Institution Review Board (IRB) approval was required by the University of North Carolina (UNC) and MFH. MFH IRB deferred to the UNC IRB. The IRB application provided information intended to satisfy both institutions. No psychological, social, economic, or legal risk was identified for participants. This study was classified as "minimal risk," since no testing or biomedical research was performed. Confidentiality and data security guidelines were also set forth and followed by the researcher.

To ensure confidentiality, each participant in the KIIs was given a unique numeric identifier so that their comments could not be directly linked to the identity. KI names appeared on consent forms and in the audio files and written transcriptions. The identifying data was kept in password-protected files, separate from the research data, stored in a different physical location, and will be destroyed after the final dissertation is accepted. Direct quotes provided in

this dissertation were not directly attributed to the participants. In the MFH dataset, which was used for secondary data analysis, all identifiable demographics were removed during primary data collection prior to this researcher's access to the data. The data was aggregated and not tied to specific individuals.

Study results have been presented only as aggregated data. All KIs' names have been kept confidential. Only broad descriptors of the KIs have been used. Paper copies of informed consent documents were stored in a locked cabinet. Access to electronic documents was limited to the researcher and her dissertation committee.

CHAPTER 4: RESULTS

This chapter presents an overview of findings from the mixed methods research pertaining to Aims 1 to 3.[1]

Aim 1: Explain the History and the Current Iteration of the MFH SBA Training Program and the Subsequent Increase in SBAs at STH

This section provides an overview of the findings from the document review and the KIIs that provided insight into the history and the current iteration of MFH SBA training program.

Key Informant Interviews (Aim 1)

Participants in the Qualitative Research

The six KIs who were interviewed had a wide range of historical knowledge about MFH (Table 10). Five of the six participants had had integral roles in the evolution of the program. Two of the six had been with the organization since its inception and were still involved as board members. The average time at the organization was 9.8 years and ranged from 3 to 17 years. The participants included both American and British citizens. The participants were mainly leaders in the organization.

[1] All direct quotes from the KI interviews are in italics.

Table 10: Demographic Characteristics of the Key Informant Interviewees

Key Informant	Nationality	Years in the Organization
Founder, Former Executive Director, Current Board Member	American	17
Current Clinical Director	British/Naturalized American citizen	6
Current Executive Director	British	3
Former Board Member, Volunteer	American	13
Former Medical Director, Current Board Member	American	17
Former Education Director	American	3

Study Findings

The Beginning

MFH was born of compassion to address the needs of pregnant women in Haiti. The founder had traveled to Cite Soleil in Haiti on a medical mission in 2003 and had been moved by the needs of the women she cared for.

> *I just kept seeing pregnant women everywhere and learning that they had no prenatal care.… I left after my first week with my head spinning and thinking that if I was willing to give up a week of vacation and spend a week in Haiti, that there were other midwives who would be willing to do that too, for both reasons of just a learning experience and also out of compassion for what they would see and experience.… This was all just dreamed up, what we could possibly do.*

The next step involved a community assessment to determine how best to meet the needs of the women to be served. The founder traveled back to Cite Soleil in Port au Prince and held focus groups.

> *We met with groups of women and just like, "What would you like to see here if.… Here's what I do at home, and here's what a midwife does at home. If there were other midwives who came here what would you need from them?" I heard multiple, very sad stories of losing their daughters in childbirth, relatives being the only person to catch a baby, the need for birth control, the need for some kind of control over their reproductive life.*

The original program was intended to provide prenatal care in Cite Soleil and to teach classes to women who wanted to learn some basic midwifery skills using the textbook *A Book*

for Midwives. Two American volunteer midwives would work together, one providing prenatal care, the other teaching midwifery skills.

> *The prenatal care opened our eyes to a whole lot of problems that these women were facing. For example, they wouldn't let anyone into the clinic without shoes, and we learned that women were passing shoes to each other before they entered the clinic.… We would then go back to the safety of the guest house and dream again about what this could be.*

The original prenatal care and teaching was provided entirely by volunteers. The founder sent out a message through the American College of Nurse-Midwives to recruit volunteers. Within the first two weeks, she received 98 replies. Within a year of the program's inception in 2004, however, Cite Soleil had become riddled with gang violence, and it was no longer safe to transport volunteers within this area of Port au Prince. The program ended abruptly.

In 2005, the founder was contacted by a medical mission organization that was supporting a Haitian obstetrician's efforts to build a birth center. The obstetrician had selected nine *auxiliaries* (equivalent to nurses' aides in the United States) whom he wanted trained to run the birth center. The founder shifted the program focus from prenatal care in Cite Soleil to midwifery education for the nine *auxiliaries* in Hinche. In Fall 2006, the first American volunteer midwives arrived in Hinche and began training what became Class 1. This was intended to be a one-time endeavor.

> *First class, this was going to be a one-time project. They were going to be trained to the best of our ability with fairly meager resources. And then they were going to work at a birth center under the supervision of the obstetrician that was building that birth center. So, there was no intent that this would be an ongoing endeavor.*

The volunteer midwives began teaching from *A Book for Midwives*, using a local translator. The volunteers kept a journal to log what they taught each week so the next group of midwives could begin teaching from where the previous group had left off. The first class took over three years to reach competency because volunteers could not be there every week. During

this time, it became clear that the Haitian obstetrician was corrupt.[2] The founder became so frustrated with the corruption that she considered leaving. During a meeting with a community leader, he arranged for the team to meet with the local bishop, who emphasized how much the community valued their teaching and begged them not to leave Hinche.

> *The bishop said to me: "You could be so helpful to us. You have no idea what a desperate need we have for some way to keep these women alive because we have dead women. Every week I hear of more dead women, dead mothers, and it has to stop, and the hospitals don't help."*

This messaging worked and the founder along with the original group of medical volunteers agreed to keep coming to Hinche. However, they moved the class to a neutral location that was not associated with the Haitian obstetrician. It became apparent that the students would need a clinical site to gain experience and practical skills training. The founder repeatedly visited the community hospital, Saint Therese (STH), to try to speak with someone from the hospital and maternity administration, but to no avail.

> *I was looking for hospital administration. I was looking for obstetricians. I could not find anybody. There was what they called the maternity unit, but there was nobody there. There would maybe be a nurse or two and they would say "All the doctors are in Port au Prince. They only come out here once or twice a month." So, it was a really nonfunctional hospital. People would go there to die.*

The MFH volunteer midwives were asked to go to the hospital multiple times each week to try to find anyone in authority to discuss bringing the students to train at STH. Eventually, a midwife connected with a Cuban obstetrician working at STH.

> *They [MFH volunteers] literally got off the little plane and walked across the yard there into the hospital as soon as they arrived and saw a woman in labor and caught a baby within an hour. This Cuban doctor walks in and goes, "Oh great. Glad to see that somebody was here to take care of this and who are you?" Dr. (XXX) introduced himself and they said, "We're with Midwives for Haiti. We'd like to bring students here." He said "Have at it. There's nobody here but me and I'm here when I can be, but I could use help. There's no administration that lives here in Hinche. They all live in Port au Prince,*

[2] The Haitian obstetrician stole medications from the medical teams and told the *auxiliaries* he was not going to pay them to work at his birth center.

> *and they don't care about this. So just come." So that's when we started taking the students and as soon as we started taking students and the word got out in the community what we were there, people started having their babies at Saint Therese.*

Critical Shift in the Program

A critical shift in the training program occurred when a Haitian American midwife offered to provide a clinical preceptorship for six months. Three of the KI interviewees identified this as the moment when the students obtained the skills needed to reach competency and graduate. A key element of the preceptor's success was her Creole language fluency: it became clear that using translators with English-speaking volunteer midwives was not sufficient. The preceptor's ability to work consistently with the students for six months also proved to be far superior to the intermittent availability of the American volunteers. It allowed the preceptor to identify the trainees' knowledge gaps and support the development of their technical skills.

> *We saw this incredible change in the students, that suddenly lights were going on because the language, because she spoke their language, and we realized we had to have Haitian teachers.*

> *I think because of what the clinical instructor was able to do for six months, these women gained enough skills that they actually were now useful working in the hospital or working in the birth center.*

In addition, the team realized the *A Book for Midwives* textbook needed to be translated into Creole. The Virginia Women's Center provided funding for the translation. The Life Saving Skills curriculum, which included Helping Mothers Survive and Helping Babies Breathe, was also added and translated into Creole.

Progress Over the Years

As the graduates of the first class began to get jobs, the idea for the second class started to form. There was no formal application or admission process. The only requirement was that applicants be an *auxiliaire* (nurse aide). The applicants were required to submit a dossier with the

required verification documents of graduation from an accredited *auxiliaire* program and to complete an informal interview. Some women showed up on the first day with dossiers in hand and were interviewed on the spot, ultimately leading to their admission. The foundation for Class 2 was stronger: *A Book for Midwives* had been translated into Creole and MFH had hired a Haitian nurse-midwife as the education director.

> *From the beginning, that class has a book in Haitian Creole, and it had a Creole-speaking Haitian ISF [nurse midwife], as well as other Americans and other volunteers involved. So, from the beginning, we had the ability to use St. Therese Hospital as a clinical site. We actually used the hospital or MSPP [Ministry of Public Health and Population] property for classes quite a bit. They provided a classroom. It was definitely a step up and every single class was a step further into having proper teaching materials and more Haitian players and stakeholders involved.*

All six KIs spoke about the evolving nature of the program over the years. Rather than only citing pivotal moments, they discussed the evolution as an iterative process of improvement.

> *It was a more forward-moving process. Every single class, there would be the thrill of something different and better than we had. Now we have a nurse midwife. Now we have more teaching materials. We have a clinical instructor. Just as we got more funding to do more things, it became more and more exciting because we got more established and less chaotic.*

Three interviewees discussed the procurement of an MFH property as a pivotal moment in the program's implementation and long-term success. Having a space that was not dependent on community relationships, like with the bishop or MSPP at STH, provided MFH legitimacy in the community. It came to be considered a reputable school.

> *It was very pivotal to get our first house. When we got our first house instead of operating out of closets and we actually had a property that we could store our supplies and we could house our volunteers and we could eventually teach class there, that was really, really exciting.*

Critical Inflection Point: Hiring Haitian Education Director

All six interviewees discussed the hiring of a Haitian midwife as the education director beginning with Class 2 as a critical inflection point. This began a series of iterative changes that supported the growth and success of the program. Adding additional Haitian and American instructors, Haitian clinical preceptors and a full-time clinical director were all identified as critical components of this evolution.

> *The first critical inflection point was the hiring of the Haitian midwife, a university-trained Haitian midwife to come and be the instructor. So, they were now learning in their own native language. Adding additional instructors made a big difference. And I don't remember which class we added an assistant for the Haitian teacher…. But that made a big difference in having an American midwife there that was full-time to work with our Haitian teacher, so that was a big inflection point. Then on top of that, adding the clinical director was I think the next big thing that made a big difference. And as we went along, we also changed who was accepted into the program. At first it was auxiliaries and then it was a mixture of auxiliaries (nurse aides) and enfimyes (nurses). And then it was only enfimyes. And this current class they had to be licensed enfimyes.*

Evolution of the Admission Process and Programmatic Improvements

The evolution of the admission process involved both recruitment process and selection criteria. What began as a word-of-mouth recruitment and a local selection process evolved into broad advertising throughout Haiti. Selection in the early years consisted of informal interviews and the submission of a dossier. As the program grew in reputation and expectations, the admission process became more formalized. Applicants came from all over Haiti. In addition to completing their dossier, they began to take an entrance exam which focused on baseline nursing knowledge. The women (and, occasionally, men) lined up hours before the exam. One year, MFH administered over 200 exams for 24 spots. If the applicant's dossier was complete and they scored greater than 85% on the entrance exam, the applicant was offered an interview. The interview consisted of a hands-on clinical skills assessment, a panel interview, and submission of

a sample essay written in French. The biggest change to the admission process was a shift in educational requirements.

The length of the program also evolved over the years. Several KIs discussed the impact the original intermittent volunteer schedules had on the first class. Since the program became more formalized with dedicated staff, trainees have been able to complete the course in 14 months. Interviewees discussed the importance of aligning the program with competencies based on the ICM guidelines, which recommend a minimum of an 18-month training program.

Four interviewees discussed the critical curriculum shifts that occurred during Class 9, when the MFH competencies were aligned with the ICM and the WHO standards of education for midwifery. Clear didactic expectations were formalized, as well as skills competencies, including the formalization of clinical attendance and volume of births. By Class 10, the curriculum was changed from Creole to French to align with the documentation expectations in the hospital, as well as with educational standards in Haiti.

Current Iteration of the Training Program

Skilled Birth Attendant Training Program

At the time of this research, the MFH SBA training program was taught entirely by Haitian professionals and included a comprehensive curriculum aligned with ICM standards. Students were selected through a rigorous admission process, including verification of their status as a licensed *enfimye* (licensed nurse). Students were supported by one-on-one mentorship during both their didactic and clinical learning. Upon completion of the 18-month program, graduates received a Certificate in Essential Obstetrics from the MSPP and went on to work in hospitals, birth centers, and community projects throughout Haiti. Post-graduation job placement

assistance had resulted in graduates working in 54 health centers throughout Haiti, with jobs that included two heads of midwifery.

Maternity Services at STH

When MFH began working in Hinche in 2006, only one obstetrician and one nurse staffed the local STH, and they only worked the day shift. If a woman arrived at night or on the weekends, care was not available. Since many of the women only came to the hospital because they required emergency care, many mothers died. Over time, as MFH trained and graduated more students, word spread throughout the community that the hospital was now a safe place to give birth. MFH paid the salary of 18 SBAs working at STH, used the hospital as the site for clinical training, and supported the maternity center with resources and supplies. Over 3,500 births were attended in 2021 by the MFH.

Rural Community Clinics

Previously, MFH had provided mobile clinic service to 24 remote villages per month but due to safety concerns and the cost of gasoline (affected by rampant inflation), the program shifted to a community clinic model in 2019. At the time of this research, MFH midwives traveled to seven community clinics in partnership with the Ministry of Population and Public Health. These weekly clinics offered prenatal and postpartum care, immunizations, education, and limited primary care including treatment for intestinal worms. The community clinics took place in local health centers, churches, or school buildings in remote villages.

Matwon Outreach Program

Matwons (Haiti's TBAs) attended an estimated 75% of deliveries in Haiti, most of which were outside of medical facilities.[67] For mothers living in rural areas without access to medical facilities, *matwons* were crucial. While many *matwons* had learned skills from others, many had

not been formally trained to recognize danger signs in pregnancy and birth. In 2013, MFH began the *Matwon* Outreach Program which offered a 5-month formal training program for achieving clean, safe deliveries by using strategies that have been statistically proven to reduce the rate of maternal and neonatal death. MFH provided *matwons* with clean delivery kits but also worked to integrate them into existing healthcare infrastructure. This gave *matwons* and the mothers in their care access to prenatal clinics and medical facilities when complications arose, saving lives.

Document Review Findings

The document review consisted of all *Midwives for Haiti Annual Reports* for the years 2013-2021. Annual reports prior to 2013 were not available for review. Each annual report provided valuable data and a general context of the evolution of the program. The primary data provided over time included: the number of SBAs trained annually, the cumulative number of SBAs trained over time, the number of births at STH attended by SBAs, the number of *matwons* trained, the number of mobile and community clinic visits, the annual revenue and expenses, the number of individual donors and grantors, and the number of volunteers (Table 11).

Table 11: MFH Annual Report Data: MFH SBAs Graduated, Cumulative Number of SBAs Trained, Total Births at STH Attended by SBAs, Annual Total Matwon's Trained, Mobile Clinic Visits, and Community Clinic Visits (2013-2021)

Year/Class	MFH SBA Graduates	Cumulative Number of SBAs Trained	Total Births at STH Attended by SBAs	Total *Matwons* Trained	Mobile Clinic Visits	Community Clinic Visits
2013 Class 6 Begins	0	75	2,143	32	5,607	Not offered
2014 Class 6 Graduates/ Class 7 Begins	21	96	2,296	63	6,163	Not offered
2015 Class 7 Graduates/ Class 8 Begins	16	112	2,535	67	7,922	Not offered
2016 Class 8 Graduates	29	141	2,506	34	7,137	Not offered
2017 Class 9 Begins	0	141	2,587	Not Reported	13,506	Not offered
2018 Class 9 Graduates	32	173	2,706	500	9,320	Not offered
2019 Class 10 Begins	0	173	2,966	341	Not Offered	5,226
2020 Class 10 Graduates/ Class 11 Begins	30	203	3,119	Not Offered	Not Offered	6,661
2021 Class 11 Graduates	20	223	3,622	60	Not Offered	7,970

SBAs Trained Annually

The number of students trained varied annually. Only one class was trained at any given time; the next class did not begin until the prior class was complete. The number of students being trained at any given time fluctuated due to several factors, including funding and capacity. For example, Class 6 began in 2013 and consisted of 21 students; and the following year Class 7 began with just 16 students. The smallest class (in 2014) had 16; the largest (in 2017) had 32 (Table 11).

Cumulative Total SBAs Trained by MFH

By 2013, MFH had trained 75 SBAs (Classes 1 through 5). The 2013 Annual Report noted that Haiti would require an additional 563 SBAs to meet MDG 5 (reduce maternal mortality by 75%). By 2021, MFH had trained 223 SBAs, which represented 33% of all trained birth attendants then working in Haiti, including midwives, gynecologists, maternal-fetal medicine specialists (Table 11).

Births at STH

Apart from one year (2016), the number of births at STH increased each year as the program continued to grow. In 2013, 2,143 births were attended by SBAs and SBA students. By 2021, the number of births had increased further, to 3,622. This was a 69% increase in births attended by an SBA over a nine-year period at STH (Table 11).

Matwon Training

As noted above, local TBAs, known as *matwons*, attended most births in Haiti. By 2021, MFH had trained 1,097 *matwons* and also supported the *matwons* by providing clean birth kits (Table 11).

Mobile and Community Clinic Visits

In 2013, MFH was conducting mobile prenatal clinics in 16 villages and the mobile clinic midwives provided 5,607 patient visits. By 2018, the program had expanded to 24 villages. The program provided 13,506 patient visits in 2017 (an increase of 140%), but then dropped significantly in 2018 to 9,320 (a decrease of 30%). The drop was attributed to several variables including unsafe travel conditions and issues with the maintenance of the mobile clinic vehicle. Due to several barriers (including financial and safety concerns) the mobile clinic program became unsustainable in 2019 and shifted to a community clinic model in partnership with MSPP. By 2021, the community clinics included 8 sites and had grown from 5,226 visits in 2019 to 7,790 visits (Table 11).

MFH's Annual Revenue and Expenses

MFH's financial revenues (i.e., individual donations, grants, and volunteer fees) fluctuated but increased overall by 35% between 2013 and 2021. Its expenses followed a similar pattern, increasing 17% between 2013 and 2021. For example, following a significant increase in revenue in 2016 (up 9% from the previous year), 2017 saw a significant drop (by 18%). This was due to the difference in reporting periods for revenue and to a grant awarded in 2016 that was ear-marked for 2017 operations. There was also a decrease in revenue in 2020 by 19% that was related to the COVID-19 pandemic. Many non-profits reported a decrease in fundraising during the first year of the pandemic. MPH's expenses also decreased by 19% in 2020 because the training program closed for 6 months, and other programs were scaled back (Table 12).

Table 12: MFH's Annual Report Financial Data (2013-2021)

Year	Revenue	Expense	Individual Donors (*n*)	Grantors (*n*)	Volunteers (*n*)
2013	$697,768	$657,724	924	5	95
2014	$685,590	$560,876	1,467	6	157
2015	$771,123	$743,875	2,200	9	126
2016	$840,996	$777,440	2,667	7	96
2017	$684,376	$818,662	1,590	6	79
2018	$844,722	$847,893	1,786	7	134
2019	$889,294	$896, 821	2,311	8	119
2020	$719,028	$719,621	1,871	14	N/A
2021	$889,294	$733,398	1,997	19	N/A

Individual Donors, Grantors, and Volunteers

Individual donors were the cornerstone of MFH revenue and for many years represented the largest portion of their funding. The number of donors more than doubled from 924 in 2013 to 1,997 in 2021. In 2016, the number of individual donors skyrocketed to 2,667. The largest funding increase, however, came from a significant increase in grants, which grew more than 280% (from 5 grants in 2013 to 19 in 2021). Volunteers traditionally brought in revenue through their volunteer fees but also by inspiring new donors after sharing their experiences with others. The volunteer program ended in 2020 due to the COVID-19 pandemic and had not restarted due to political unrest and safety concerns (Table 12).

Aim 2: Explore how the Growth of the MFH SBA Training Program Relates to the Increased Availability of SBAs and to Observed Changes in Birth Outcomes at STH

The secondary data analysis of the MFH data was based on the MFH SBA training program data as well as data collected from STH. Descriptive statistics were calculated to explore the intersection between the independent variables (number of MFH SBA training program graduates and number of graduates working at STH) with the dependent variables (the number of births, maternal mortality, and infant mortality).

Independent Variables

SBAs Trained Annually

The data on the number of SBAs trained were consistent with the annual reports. As noted in the Aim 1 "SBAs Trained Annually" section above, the size of the student cohorts varied between 2013 and 2021. In some years, no additional students were added. The number of students in each class also fluctuated, averaging 25 and peaking in 2017 with 32 students. The smallest class (in 2014) had 16 students. Additionally, classes are not run concurrently so there is only one cohort at a time (see discussion under Aim 1 for further details) (Table 13).

Total SBAs Trained

As noted in Aim 1 ("Cumulative Total SBAs Trained by MFH"), MFH had trained 75 SBAs by 2013. Between 2013 and 2021 an additional 148 SBAs were trained, bringing the total to 223 (see discussion under Aim 1 for further details) (Table 13, Figure 15). Those 223 graduates found work in over 60 health centers and clinics across Haiti.

MFH SBA Graduates Working at STH

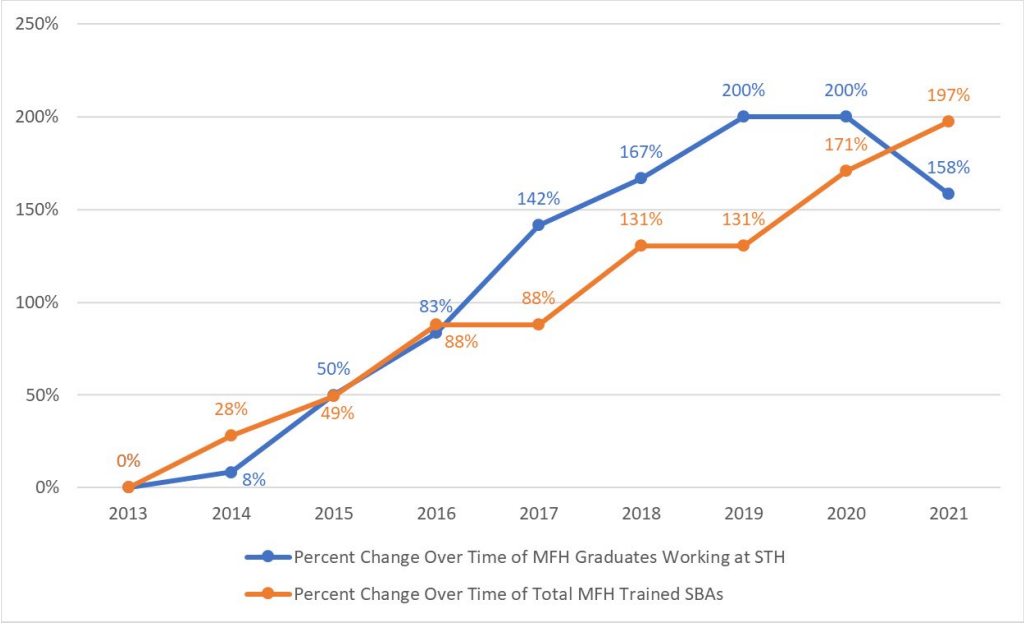
In 2013, only 12 SBAs worked at STH, but by 2020 that number had jumped to 36, a 200% increase as calculated by the cumulative percent change over time formula[3]. In 2021, however, the number decreased to 31 due to the closure of one of the birthing centers (the Carrie Wortham Birth Center in Cabestor) and the transition from the mobile clinic to the community clinic model, which reduced staffing needs and funding (Table 13, Figure 15).

[3] Cumulative percent change over time formula = (V2-V1)/V1 X 100 where V2 = 36 and V1 = 12.

Table 13: Independent Variables: Number of MFH SBAs Graduated, Cumulative Number of SBAs Trained by MFH, and Cumulative Number of MFH SBA Graduates Working at STH, by Year (2012-2021)

Year/Class	Number of MFH SBAs Graduated	Cumulative Number of SBAs Trained by MFH	Cumulative Number MFH SBA Graduates Working at STH
2013 Class 6 Begins	0	75	12
2014 Class 6 Graduates/ Class 7 Begins	21	96	13
2015 Class 7 Graduates/ Class 8 Begins	16	112	18
2016 Class 8 Graduates	29	141	22
2017 Class 9 Begins	0	141	29
2018 Class 9 Graduates	32	173	32
2019 Class 10 Begins	0	173	36
2020 Class 10 Graduates/ Class 11 Begins	30	203	36
2021 Class 11 Graduates	20	223	31

Figure 15: Cumulative Percent Change Over Time of MFH Trained SBAs in Relation to Graduates Working at STH (2013-2021)



Dependent Variables

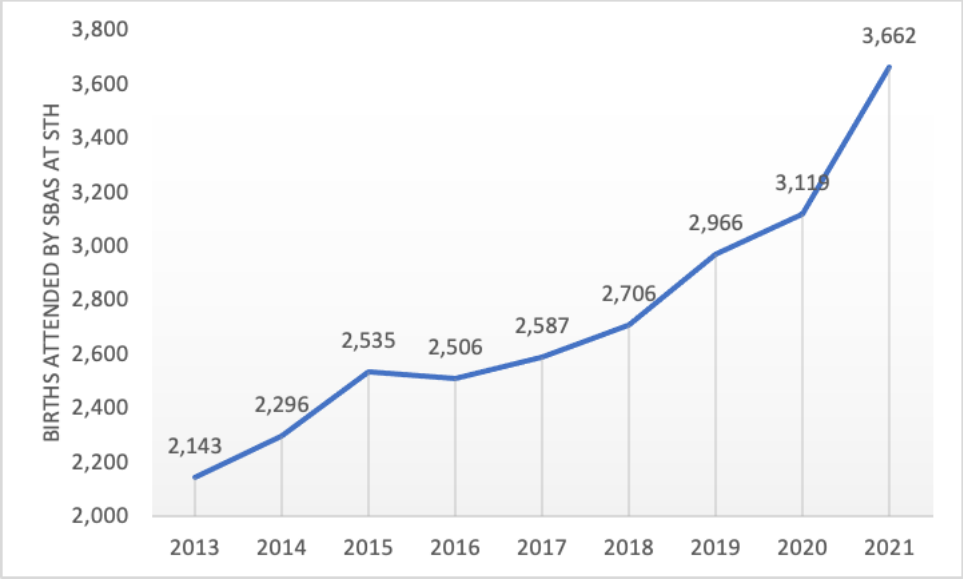
Births at STH

Apart from one year (2016), the number of births at STH increased each year as the program grew and accessibility to SBAs increased. Births were defined as the number of infants born. Between 2013 and 2020, all births were attended by an SBA. In 2013, 2,143 births were attended by SBAs. By 2021 the number of births had increased to 3,622. This is a 69% increase in the number of births attended by a SBA at STH over a nine-year period (Table 14, Figure 16).

Table 14: Number of Births Attended by an SBA and, Maternal and Infant Mortality at STH (2013-2021)

Year	Number of Births Attended by an SBA at STH	Maternal Deaths at STH	MMR at STH per 100,000 Births	Infant Deaths at STH	Infant Mortality Ratio at STH per 100,000 Births
2013	2,143	48	2,239	336	15,678
2014	2,296	44	1,916	318	13,850
2015	2,535	37	1,459	309	12,189
2016	2,506	28	1,117	271	10,814
2017	2,587	22	850	256	9,896
2018	2,706	20	739	218	8,056
2019	2,966	15	506	183	6,169
2020	3,119	21	673	165	5,290
2021	3,662	19	519	241	6,581

Figure 16: Births Attended by SBAs at STH

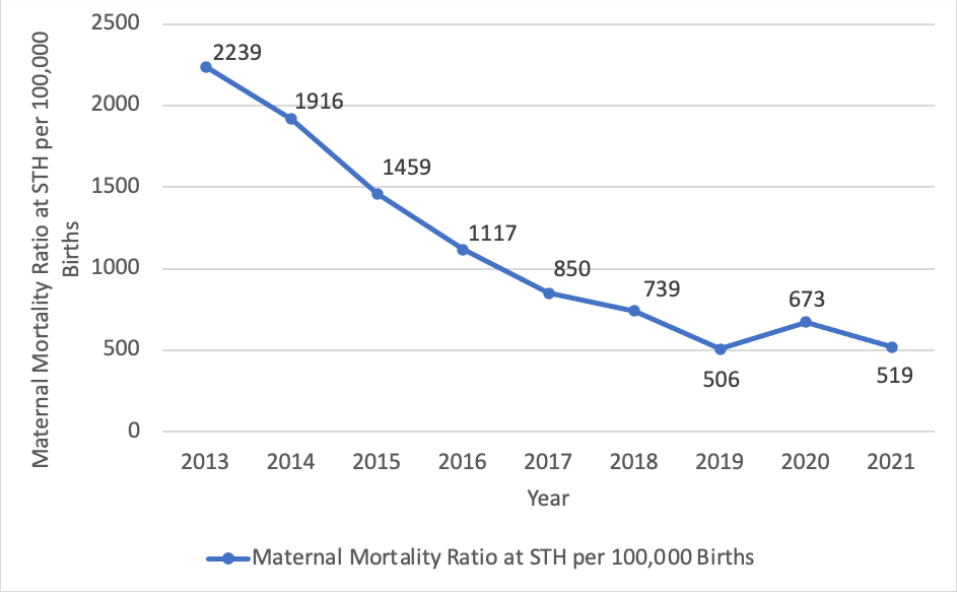


Maternal Deaths/Mortality Ratio at STH

WHO defines the MMR as the number of maternal deaths during a given period of time period per 100,000 live births during the same time period.[68] Haitian MMR in 2015 was reported at 521 per 100,000 live births.[5] The STH data began with an MMR of 2,239 per 100,000 in 2013

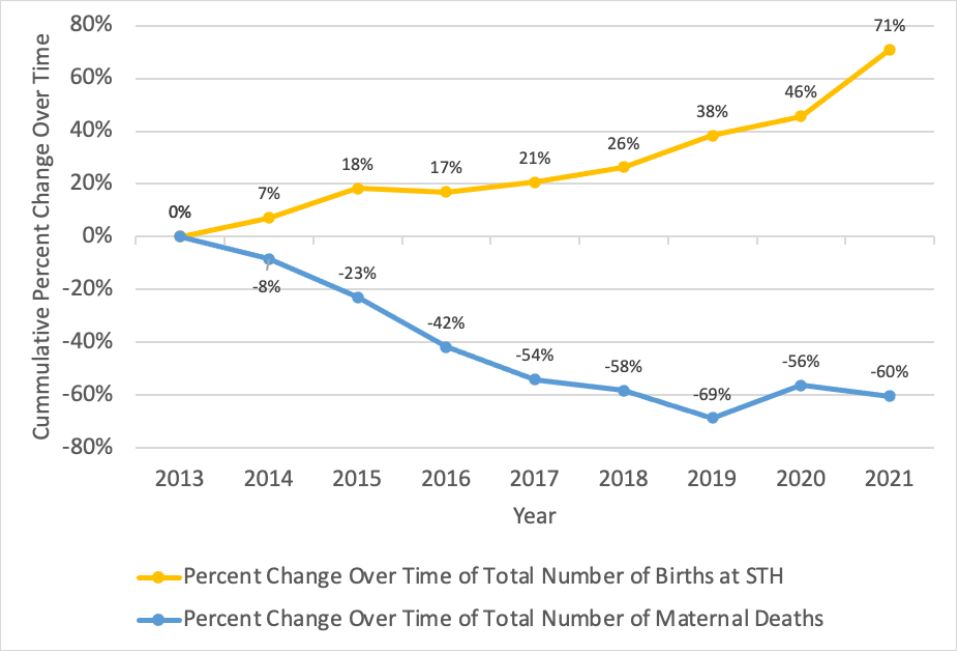
and decreased over time to 519 per 100,000 in 2021, using the standard MMR formula[4] (Figure 17). Between 2013 and 2019, the number of maternal deaths at STH decreased dramatically from 48 to 15).[5] This was followed by an increase between 2019 to 2020 to 21 deaths. One KI attributed this primarily to the COVID-19 pandemic and the extreme political unrest that year, which decreased access to prenatal care and other maternity services. Unfortunately, critically ill women would arrive at STH for care, often too late. The number of maternal deaths began to trend back down, totaling 19 in 2021, which was a 60% decrease from 2013 (Table 14, Figure 18).

Figure 17: Maternal Mortality Ratio at STH (2013-2021)



[4] Maternal Mortlatiy Ratio = the number of maternal deaths in a calendar year divided by the number of live births for the same period, multiplied by 100,000.
[5] Cumulative percent change over time formula = (V2-V1)/V1 X 100.

Figure 18: Cumulative Percentage Change Over Time of Births Attended by SBAs and Maternal Mortality at STH (2013-2021)



Infant Deaths/Infant Mortality Rate at STH

The Centers for Disease Control and Prevention (CDC) defines infant mortality ratio as the number of infant deaths for every 100,000 live births. [69] The infant mortality ratio at STH in 2013 was 15,678 per 100,000 live births, decreasing to a low of 5,290 in 2020, followed by an uptick in 2021 to 6,581 per 100,000 live births (Figure 19). Infant deaths consistently and dramatically decreased at STH between 2013 and 2021. In 2013, infant deaths numbered 336, and the infant mortality ratio was 15.67%. By 2020, the number had decreased to 147 and the ratio had dropped to 5.79%. This represents a 56.25% decrease over the seven-year period as calculated with the cumulative percent change over time formula[6]. The number of infant deaths increased in 2021 to 241. This rise was reportedly associated with the decreased access to

[6] Cumulative percent change over time formula = (V2-V1)/V1 X 100.

prenatal care and timely maternity services related to the political unrest and COVID-19 pandemic (Table 13, Figure 20).

Figure 19: Infant Mortality Ratio at STH (2013-2021)

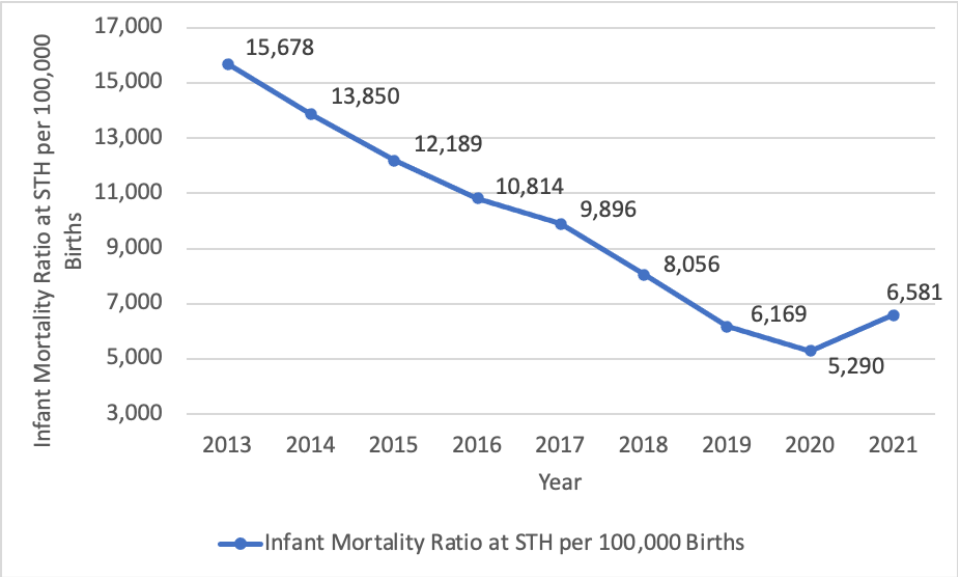
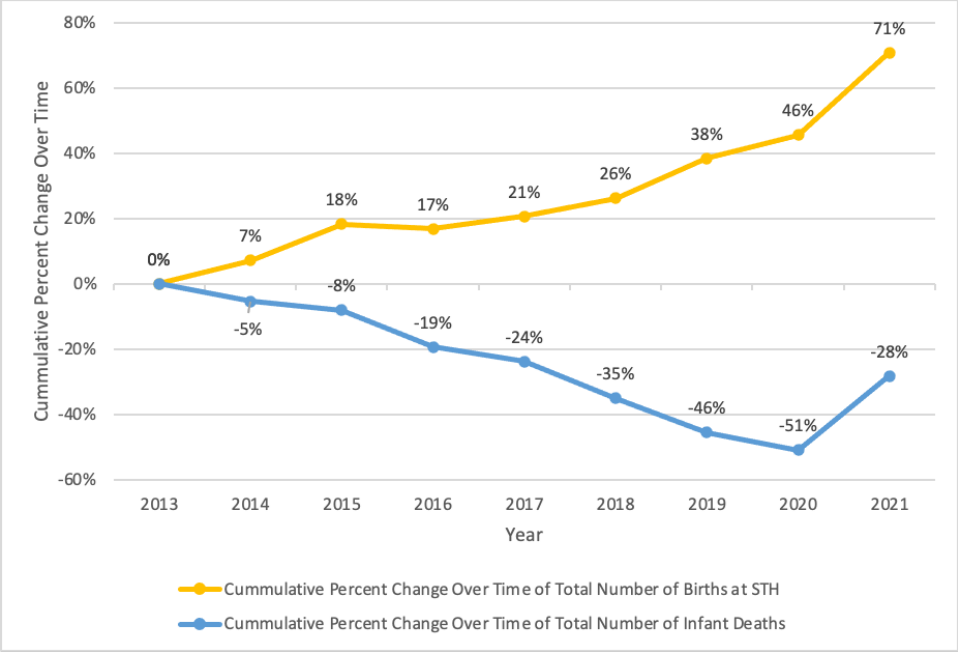


Figure 20: Cumulative Percentage Change Over Time of Number of Births and Number of Infant Deaths at STH (2013-2021)



Aim 3: Explore the Experiences of Key MFH Staff Members and MFH SBA Graduates Working at STH to Identify Barriers and Facilitators of Implementing the SBA Training Program

Key Informant Interviews

Participants in the Qualitative Research

Thirteen KIs were interviewed for Aim 3. They represented a wide variety of experiences implementing the MFH SBA training program. Their average time in the organization was 9.8 years and ranged from 3 to 17 years. Their nationalities were American, British, and Haitian. Their roles in the organization included leadership, staff (current or former), board member, volunteer, and MFH SBA graduate working at STH. Two of the six had been with the organization since its inception and were still involved as board members (Table 15).

Table 15: Demographic Characteristics of the Key Informant Interviewees (Aim 3)

Participants	Nationality	Years with the Organization
Founder, Former Executive Director, Current Board Member	American	17
Current Executive Director	British and Naturalized American Citizen	3
Current Clinical Director	British	8
Former Board Member and Volunteer	American	13
Former Medical Director, Current Board Member	American	17
Former Education Director	American	3
Former Education Director and Volunteer	American	13
Former Education Director and Volunteer	American	8
Current Medical Director and Volunteer	American	11
Current Education Director	Haitian	8
MFH SBA Graduate Working at STH	Haitian	7
MFH SBA Graduate Working at STH	Haitian	10
MFH SBA Graduate Working at STH	Haitian	10

Study Findings

The study findings were organized by the CFIR framework using deductive codes selected from the CFIR domains and constructs. In addition to the CFIR codes, inductive codes

were identified. The deductive and inductive codes were identified and defined in Appendix 7. Table 16 below summarizes the key findings from the Aim 3 interviews.

Table 16: Deductive Codes: Key Findings from KIIs within the CFIR Domains and Constructs

Domains	Constructs	Facilitators	Barriers
Intervention Characteristics	Evidence Strength and Quality	• Community stakeholders' belief in the quality and need for the program • MSPP leadership's belief MFH program is having the desired effect of high-quality care and improving outcomes	• None noted
	Relative Advantage	• The curriculum is based on and supported by international midwifery education standards • The support of MSPP leader for the Central Plateau was reflective of the perceived advantage of the MFH SBA training program • The MFH SBA training model using Haitian educators, preceptors, and healthcare ancillary professionals is unique and differentiates the program from others	• None noted
	Adaptability	• The MFH training program able to adapt international standardized curriculum to meet the needs of adult learners in the context of local culture and customs. • The adaptability of the program over the years helped establish the trust required to build the imperative relationship with MSPP	• None noted
	Design Quality and Packaging	• The perceived excellence was described within the context of the impact the program has had at STH and was reflective of how the training program was implemented • Haitian organizations began to trust the design quality and eventually hired MFH graduates, which legitimized the program within Haitian healthcare systems	• Each shift in program admission requirements (from *auxilliares*, to *enfimyes*, to licensed *enfimyes*) resulted in short term resistance
	Costs	• None Noted	• All revenue must be procured through continuous fundraising and grant procurement

Domains	Constructs	Facilitators	Barriers
			• Finances limit programs' ability to expand and requires thoughtful prioritization of programming • The pandemic, supply chain issues, and inflation greatly reduced ability to procure supplies • Political instability and the resultant safety issues has closed the volunteer program eliminating that funding source
Outer Setting	Cosmopolitanism	• Networking and relationships with external organizations has been crucial for financial viability, as well as implementation • Networking with international organizations has been the cornerstone of the largest sources of funding • The relationship with the Haitian MSPP has provided MFH with legitimacy as a reputable program	• The changeover of people in powerful positions within MSPP is frequent and politically motivated
	External Policies and Incentives	• The lack of Haitian policies regarding how foreigners work in the country helped to integrate foreign trained midwives into STH as volunteer preceptors	• Haiti had not defined what constitutes a midwife and never developed accreditation policies for the education of midwives or to regulate the profession of midwifery, making accreditation of the program difficult

Domains	Constructs	Facilitators	Barriers
Inner Setting	Structural Characteristics	• As staffing continuity improved it began to stabilize the implementation of the program and provided consistency for the staff and students, ultimately building trusting relationships	• Early project volunteers had medical and midwifery expertise, lacked business or organizational leadership expertise • The lack of formal organizational structure in the early years resulted in challenges as the organization evolved into a more formal and professional program
	Implementation Climate	• None Noted	• Change in admission requirements for students was a barrier as it was impossible for applicants to obtain their license due to MSPP cancelling the exam for two years • Preceptors who were graduates of the program had a lower education level than the students they were precepting resulting in friction
Characteristics of Individuals	Knowledge and Beliefs about Intervention	• Extensive relationship building, including consistency and time, occurred over the years gain the trust of key stakeholders • Positive outcomes of improving access to skilled birth attendance and decreasing maternal and infant mortality rates improved attitudes toward and value placed on the program	• Both internal and external individuals associated were not always clear about the facts and principles related to the intervention • There was distrust within the Haitian community and healthcare infrastructure about MFH intentions
	Individual Identification with Organization	• Midwives committed their time and resources to start the program and keep it running • Short-term volunteer experiences resulted in long-term commitment of time and finances • Program gained credibility in the community with improved outcomes, and perceptions of key individuals improved • Commitment of individuals to the program increased resulting in retention of long-term staff	• None Noted

Domains	Constructs	Facilitators	Barriers
Process	Planning	• The inclusion of Haitian educators and preceptors, and the formation of a respected Haitian Board resulted in improved planning of the program	• Program was not formally planned, but organically formed over time and no formal needs assessment was completed • Structure of the admission process and curriculum were not formally planned during early iterations of the program • Early iterations of the program were created by foreign midwives who lacked insight to Haitian educational systems and cultural expectations.
	Engaging	• The founder was a convener of people with the skillsets she lacked • Support of MSPP provided the program with legitimacy in the community and provided the primary clinical training site for the students (STH) • Engaging with locally and respected organizations in Haiti has strengthened community trust and support for the program	• None Noted
	Executing	• MFH obtaining a permanent structure to house staff and provide classrooms and skills labs for the students	• The lack of a clear process or pathway to accreditation negatively impacts the perceived legitimacy of the program • Larger systems issues related to the supply chain and political unrest, making acquisition of supplies and fuel difficult
	Reflecting & Evaluating	• Motivation and commitment to the mission • Growing acceptance of the MFH SBA training program by Haitian healthcare organizations • Compassionate care has been embraced by the community and is the foundation of the community's support	• Challenges of working with the Haitian government and healthcare infrastructure • Strong desire to obtain accreditation but process has been challenging

Deductive Codes: CFIR Domains and Constructs

Domain 1: Intervention Characteristics

Intervention characteristics are the characteristics of the intervention being implemented in a specific setting, including the intervention's core components and its adaptable elements, structures, and systems related to the intervention and the setting where it is being implemented.[63] Here, the intervention characteristics of the MFH SBA training program are in relation to the facilitators and barriers of implementing the program. The specific setting is STH in Hinche, Haiti. The specific constructs within this domain include evidence strength and quality, relative advantage, adaptability, design quality and packaging, and costs.

Evidence Strength and Quality

Evidence strength and quality generally is defined as the stakeholders' perceptions of the quality and validity of evidence supporting the belief that the intervention will have desired outcomes.[63] For this study, the definition is the stakeholders' perceptions of the quality and validity of the MFH SBA training program and the belief that implementation of the program increases the availability of SBAs, resulting in the desired outcome of improving maternal and infant mortality at STH. Four KIs referred to the evidence strength and quality as an implementation facilitator. Their belief in the quality and need for the program was cited as critical to the successful implementation of the program.

> *The first thing that comes to mind for me is the presence of cultural and community support for the program. There has always been a strong desire to see this happen in Haiti, just community support within the religious and community population, including local government. And even the desire of just the Haitian people in the community to see this happen…. If we didn't have that, it would not have happened.*

Belief in the quality of the MFH training program was also reflected in the KIIs, specifically by the MFH SBA graduates working at STH. They reported that the MSPP Directors

at the hospital believed the MFH program was having the desired effect, producing high-quality care and improved outcomes.

> *They [MSPP directors] always say good stuff about MFH, because they know we are doing a good job. It's because of us that the maternal mortality rate has gone down…Dr. XXX always says when he has interns come to the maternity unit, he always tells them that the maternity staff for Midwives for Haiti are very competent, and…you can learn from them. Everything they tell you; you can trust them.*

Relative Advantage

Relative advantage was defined as stakeholders' perceptions of the advantage of implementing the intervention versus an alternative solution.[63] The alternative options in Haiti include the 6-year government direct entry nurse-midwifery program and small training programs run by small INGOs, like Mama Baby Haiti. Interviewees spoke about the relative advantage of the MFH SBA training program, noting the curriculum was based on and supported by international midwifery education standards; this was identified as a key facilitator. The curriculum was created using evidence-based methods for low resource settings, which had been appropriately adapted for the local environment, culture, and resources.

> *Certainly, the people who write the standards, the international standards, the Haitian standards, we couldn't do our work without them either…. We definitely exceed all of those standards with what we have.*

One interviewee said that support from the MSPP director for the Central Plateau had been a primary facilitator, and that his support reflected his belief in the advantages of the MFH SBA training program. The MSPP director was an OB/GYN physician who understood the magnitude and implications of the maternal and infant mortality crisis in Haiti.

> *On the micro level, we are personal good friends with the head of MSPP in the Central Plateau…. Professionally, he has been extraordinarily supportive. I do not think we would be where we are without his help, Dr. XXX. He is the head of MSPP in the Central Plateau, but he is also an OB/GYN. So, he does get what we are trying to do. I do not know if we would've made quite as much success with a vascular surgeon…. But we did*

luck out in that Dr. XXX is an OB/GYN. So, he gets the problem, the problem statement is very clear to him. He's bought into our solution of it. So that's very helpful.

A few of the interviewees (n = 5) also said the program's use of Haitian educators, preceptors, and healthcare ancillary professionals was a unique and strong facilitator. This differentiated the program from others and was repeatedly cited as advantageous.

So, our preceptors take a very, very large hands-on role with our students. Ms. XXX [Haitian Director of Education] does a lot of the didactic teaching supplemented by Haitian professionals, Haitian medical professionals. Whether that's mental health people, just the auxiliary care that wraps around midwifery. We like to expose them to all of those too. And all of those are done by Haitian nationals.

I think that one of our strengths is the fact that we are able to allocate students to a [Haitian] preceptor who is able to follow that student throughout their educational journey. I think that makes a huge difference in our effectiveness and we wouldn't be able to do that if we were working in the same way as the other universities, so I think that really helps. I think that's a huge facilitator.

Adaptability

Adaptability was defined as the degree to which an intervention could be adapted, tailored, refined, or reinvented to meet local needs.[63] This also encompassed applying andragogical concepts to the curriculum within the context of the Haitian adult learner. The MFH training program was able to take an international standardized curriculum and adapt it to meet the needs of the adult learners within the context of local culture and customs.

We take those standards and we do apply different learning styles to them…. That's actually been a great facilitator too because they enjoy it and if you enjoy your studies, you're obviously going to do better in them and then you're going to remember them more and you're going to become a more well-rounded practitioner. Which is good for the country. It's good for the women, it's good for communities. It's good for everybody…. The curriculum itself is an area of facilitation of good midwifery skillsets.

Interviewees repeatedly discussed the relationship that had development with MSPP as a critical facilitator for successful implementation of the training program. The adaptability of the program over the years helped establish the trust required to build this imperative relationship.

> *Getting MSPP on board is essential for anybody who wants to operate in Haiti. It's absolutely crucial that those relationships happen. That [relationship] was hard fought and trust had to be developed and established over the past few years. Because we are making a huge stride in bringing all of our operations into alignment with the community in which we are operating.*

Design Quality and Packaging

Design quality and packaging was defined as the perceived degree of excellence in how the intervention was bundled, presented, and assembled.[63] The KIs noted this construct was both a facilitator and at times a barrier to implementation. The perceived excellence was described within the context of the impact the program has had at STH, which in turn reflected how the training program had been implemented.

> *The program helped because before we had the program a lot of women used to die from delivering babies at Saint-Therese. People used to be scared to go to the hospital because the people who were taking care of them didn't have the qualification. When the woman used to come to the hospital, if they have difficulty, like a hemorrhage...the people didn't know what to do. With the Midwife for Haiti training, when there's a checklist, we know what to do. We know what kind of problem the woman has, and we try to manage it, because we learned that.*

The training program evolved over time, as discussed in the Aim 1 results section. These included changes in the curriculum and staffing models, as staff strove to improve and align the program with international standards. One of the largest shifts in the program was the shift in the level of education required for admission to the program. Initially the applicants were required to be *auxiliaries,* then it shifted to *auxiliaries and enfimyes,* and at the time of this research, licensed *enfimyes.* These changes in the design of the program were identified as both a facilitator and barrier. In the short term, change was always hard and could result in resistance.

> *With that class being nurses, we shifted the program into, this is higher-level program…. And so with any change, that can cause some difficulty while people get used to it.*

The quality of the program evolved and improved over the years; the perceived excellence of the graduates was validated as the SBAs began to obtain jobs with Haitian

organizations. Initially, the MFH SBA graduates were primarily being employed by other U.S.- and other foreign-led INGO healthcare organizations. Haitian organizations began to trust the design quality and eventually hired MFH graduates, which legitimized the program within Haitian health systems and reinforced the design quality.

> *We've always been able to give our students to foreign NGOs because American NGOs trust Americans…. They [international NGOs] don't care whether [programs are] good or not, but when you start getting [trusted by] Haitian organizations [it is a turning point]. The fact that they [Haitian organizations] are taking us into the hospital as students and then employing our students and begging us for graduates, that's huge because that not only legitimizes our program, but it's very motivating for the students. Psychologically, it's motivating for the employees.*

Costs

Costs were defined as the direct costs of the intervention plus the costs associated with implementing that intervention (including investment, supply, and opportunity costs).[63] Because MFH was a U.S.-based non-profit organization, the costs were considered a financial barrier. All revenue had to be procured through continuous fundraising and grant procurement. Ten of the interviewees identified costs associated with implementing the program as one of the largest barriers facing implementation. Finances limited the program's ability to expand and required thoughtful prioritization in programming.

> *Then, a barrier is obviously money because it takes money to implement all these things. We always need more money. It is impossible to maintain this level of programming without a robust budget to back it up. It's always a struggle the same way it is for every single NGO in the entire world. I think we're certainly not unique in this, which is bad. Because the program has a tendency—as all programs do, all good programs anyway—to keep growing. You got to put the brakes on that sometimes. You can't just grow indiscriminately.*

MFH provided a full scholarship to each student that covered tuition, books, uniforms, and supplies. MFH also supported the educational, preceptor and midwifery staff implementing the program. Other employees who depended on the MFH included security, cooking, cleaning,

and leadership staff. MFH furnished many of the supplies needed to provide care at STH, including items like sutures, IV fluids, gloves, and antibiotics. The pandemic, supply chain issues, and inflation greatly reduced the availability of all these supplies. Many supplies were unattainable in-country due to the political unrest and resultant closure of critical supply chains. For many years, MFH volunteers and staff would hand deliver supplies needed in-country. But due to safety issues since 2020, volunteers had not been able to travel to Haiti. One interviewee spoke about the negative budget impact these changes had on the program.

> *We're severely under-resourced. That has gone downhill in the time that I've been here…. It's been a massive change. We never had a shipping budget. Now we are spending $15-20,000 a year on shipping. What are you going to do, not use gloves? You got to use gloves. I mean, for a while we were reusing gloves, we were dipping them in bleach and hanging them out to dry…. So, trying to get things into the country is difficult.*

Outer Setting

The *outer setting* domain has been defined as the economic, political, and social context within which an organization resides.[63] The outer setting of MFH included the economic and political instability plaguing Haiti and the resultant social unrest. INGOs traditionally operate in difficult settings but conditions in Haiti in the few years prior to this research had deeply impaired the implementation of the program. Within the outer setting domain, the constructs of cosmopolitism and external policy and incentives were identified as both barriers and facilitators during the KIIs.

Cosmopolitanism

Cosmopolitanism has been defined as the degree to which an organization is networked with other external organizations.[63] Twelve of the 13 interviewees identified cosmopolitanism as a critical facilitator for successful implementation of the program. From the inception of the training program to the point of this research, networking and relationships with external

organizations were crucial for financial viability as well as implementation. Early in the program, fostering the relationship with the Catholic Church helped establish trust with local community leaders as well as material support for housing and classroom space. Networking and learning from organizations that had established relationships in Haiti, particularly Partners in Health (PIH) (also known as Zamni Lasante - ZL) helped facilitate relationship building with the Haitian MSPP. One interviewee said the early guidance and support of Partners in Health: "Partners in Health gave us guidance. PIH was the organization we wanted to try and emulate to some extent and showed us some of the real challenges of working within Haiti."

Other international organizations working in Haiti were identified as key supporters of the MFH SBA training program and included Ohio State University (OSU), with which MFP had established a partnership. This OSU partnership resulted in a small neonatal intensive care unit being built at STH. This provided basic life support for premature infants needing feeding or mild oxygen support that previously would not have survived due to lack of resources. Other partnerships were established with the Red Cross, Caritas, and Save the Children, among others.

Networking with international organizations was the cornerstone for the largest sources of funding. The first organization to financially support the training program was Bon Secours. The support was procured after a nun visited STH and then wrote the first grant on its behalf to Bon Secours. Another early financial supporter was the Rotary Club which supplied MFH with their first Jeep, and was necessary for transportation, particularly for mobile clinics to remote areas. Early partnership with a smaller non-governmental organization (NGO), Haiti Healthcare Foundation, resulted in a grant to pay for the first preceptor of the program.

The 12 interviewees who spoke of the benefits of partnership identified the relationship with Every Mother Counts (EMC) as critical, one calling it a "game changer." With this stable

funding source, the program was able to expand. EMC was a well-known and respected maternal-child health INGO, and their support provided legitimacy to the program, which opened connections to other funding sources. The support of EMC was also cited as "feeding the spirit" of the organization.

> *And then Every Mother Counts has just been, not only financially, but in every way, fed our spirit for keeping going. To have someone like Christy Turlington Burns and the people associated with her, see what we're doing is really important, has been really, really helpful and their long-term commitment to us has been wonderful.*

The relationship with the Haitian MSPP also provided the MFH SBA training program legitimacy. Without the partnership forged with MSPP, it would have been impossible to implement the program because STH is an MSPP operated hospital. As one interviewee stated, "Getting MSPP on board is essential for anybody who wants to operate in Haiti. It's absolutely crucial that those relationships happen." It has been particularly important to gain the support of key people in leadership positions at MSPP who facilitated access to clinical sites for the integration portion of the training.

> *MSPP, the Ministry of Public Health and Population, is extremely supportive of our work in the central plateau. The head of that organization, Dr. XXX, is an extraordinary ally for us. It's nice to have that arm of the Haitian government recognize what we're doing. Although we're not a degree granting institution, we do give a certificate and that is endorsed and signed by the ministry account.*

The partnership with MSPP was mostly identified as a facilitator but a turnover of people in powerful positions was frequent and politically motivated, which could also be a barrier, particularly when the program was collaborating with MSPP to obtain accreditation. The lack of staff continuity at MSPP repeatedly slowed progress. Decisions would be made regarding the steps to accreditation one month, and the next month new staff would arrive, and there would be no documentation of the previous meeting, so the process would need to start over.

> *And that same thing happens in the turnover of Haitian staff and any of the offices we interacted with it, everything just dropped when the person you were dealing with left.*

Yeah, I guess that's another barrier. That would be another one of the barriers was the lack of continuity.

External Policy and Incentives

External policies and incentives is a broad construct that includes external strategies to scale up interventions including governmental policy and regulations, external mandates, recommendations and guidelines, and collaboratives.[63] The political and economic instability that plagued Haiti over the years made navigating the external policies and regulations exceptionally challenging. The lack of infrastructure and resultant lack of Haitian policies was initially considered a facilitator for implementing the program. One interviewee noted that "probably the lack of policies regarding how foreigners work in the country probably helped us." This was particularly true when navigating the integration of foreign trained midwives into STH as volunteer preceptors.

Saint Therese didn't know the difference between a CPM (Certified Professional Midwife) and a CNM (Certified Nurse Midwife) and an RM (Registered Midwife) from Canada or LM (Licensed Midwife) from Britain. We had them all and we would pass on these copies of all these credentials, and they didn't even know how to read them so the lack of policy was probably helpful. And probably to this day because, but it's really hard in a country that's so needy for them to say, we don't want you to come unless you are the top of the top of the cream of the crop of the profession.

Over time the lack of formal policies became a barrier to implementation. Haiti had not defined what constituted a midwife or developed accreditation policies for the education of midwives or to regulate the midwifery profession. As one interviewee noted, "Haiti had never decided what a midwife was, had never adopted their own definition and policy around skilled birth attendants or midwives and it didn't have accredited programs." As the MFH SBA training program attempted to gain accreditation from the Haitian Department of Education and from MSPP to legitimize its program, the lack of policies became an insurmountable barrier.

I don't think we ever came close to being able to gain accreditation because there was not a set accreditation protocol. They were able to say, here, this is the requirement that

> *you must meet. We would get instructions or advice, and it changed constantly. And so, I don't think we had any chance of being accredited because the Ministry of Health didn't know how to do it.*

Some interviewees cited the lack of a pathway to accreditation as the largest barrier to implementation which lasting impacts on the graduates. The KIs identified the lack of accreditation as a barrier to getting hired in Haitian healthcare facilities. The SBA graduates were awarded a certificate in advanced obstetrical skills. The graduates of the program also noted that the lack of accreditation decreased their ability to receive equitable compensation.

> *When Partners in Health was hiring MFH graduates, they gave their nursing license more priority than the certificate they got from Midwives for Haiti, even though they're hiring them as a qualified birth attendants. Other specialists get paid better. The biggest obstacle the program has so far is the accreditation problem.*

Inner Setting

Inner setting has been defined as the features of structural, political, and cultural contexts through which the implementation process will proceed.[63] The inner setting for MFH included the organizational structure, internal politics, and cultural context. Within the inner setting domain, the constructs of structural characteristics, culture, and implementation climate were identified as both facilitators and barriers to implementation during the KIIs.

Structural Characteristics

Structural characteristics have been defined as the social architecture, age, maturity, and size of an organization.[63] The structural characteristics of an organization reflect the lifecycle of a nonprofit organization and correlate with sustainability of the organization. It is imperative for an organization to mature over time to succeed. MFH began as a project then evolved into a program. The early project volunteers had medical and midwifery expertise but lacked business or organizational leadership expertise.

> *It started as a project, not even a program, but in the beginning, it was nothing but midwives, and a few doctors and nurse practitioners that went to Haiti and did this work. And that's the cadre of people who were willing to do go and what was needed. But nobody had an MBA, not one of us.*

There was consensus among the interviewees that the lack of formal organizational structure in the early years was a disadvantage as the organization evolved into a more formal and professional program. For example, the lack of standard processes to replace the founder upon her retirement with a new executive director led to significant organizational turmoil. Also, for many years the program was mostly run by volunteers who would only visit the country for one to two weeks, and this intermittency produced discontinuity. As the organization matured, though, the longer-term staff, including the education director and clinical director, made longer commitments that allowed them to work through an entire Class. Greater staff continuity stabilized the program, ultimately building trusting relationships among the students and staff.

> *I think that having a base that has been much more consistent and having continuity has helped in more recent years. I think continuity has been a big factor in how much we've been able to improve and hone the program not just from a practical point of view… but psychologically, for the people involved, both on our side and with our partners, having something consistent really helps to improve access, to improve the way that we are perceived.*

Implementation Climate

Implementation climate has defined as the absorptive capacity for change, shared receptivity of involved individuals to an intervention, and the extent to which use of that intervention will be rewarded, supported, and expected within their organization.[63] Each evolving iteration of the MFH program fostered improvements in the system. One of the most important shifts in the program that interviewees discussed repeatedly was the evaluation in student admission requirements from *auxiliaries* to *enfimyes* to licensed *enfimyes*. This was considered a barrier because it was impossible for applicants to obtain their license under the

political unrest, gang violence, and constant threat of kidnapping in Port au Prince. This caused MSPP to cancel the licensing exam for the two years prior to this research. Therefore, successful candidates were limited to those who had previously obtained their license. There was a licensing exam scheduled for 2023 which would expand the applicant pool for the following incoming class.

An additional barrier identified by the KIs was that some of the long-serving preceptors who had graduated from the program had a lower level of education than the students they were precepting. Many of the preceptors had begun in an early iteration of the program as *auxiliaries*. They had all subsequently completed their additional *enfimye* education but due to the cancellation of the licensing exam, only one of the preceptors was a licensed *enfimye* at the time of this research. This produce discord which resulted in lower receptivity to ideas from these critical staff members.

> *We've moved away from having auxiliaries, we've moved toward having licensed enfimyes. They [the preceptors] are all less qualified than the people that they're teaching, and that is problematic because they feel threatened… I feel like in professionalizing them and formalizing the whole process of education and treating them like faculty, we have, over time, began to erode those barriers.*

Characteristics of Individuals

Characteristics of individuals has been focused on the individuals involved with the intervention and/or implementation process.[63] KIs identified the constructs of individual knowledge and beliefs about the intervention and individual identification with the organization as barriers and facilitators.

Knowledge and Beliefs about Intervention

Knowledge and beliefs about the MFH SBA training program has been defined as individual attitudes toward and value placed on the intervention as well as the individual's

familiarity with facts, truth, and principles related to the intervention.[63] Interviewees discussed the extensive relationship building that occurred over the years to gain the trust of key stakeholders. Early in the program implementation, both internal and externally situated individuals were not always knowledgeable about all the facts and principles related to the intervention. There was distrust within the Haitian community and healthcare infrastructure because of their experience with the countless NGOs that had come and gone in Haiti, leaving behind unfinished projects. Consistency and time were identified as facilitators for gaining trust with those individuals. KIs also identified the positive outcomes from improving access to skilled birth attendance and decreasing maternal and infant mortality rates at STH as facilitators that improved their attitudes toward and value placed on the program.

> *The program was valued because before we had that program a lot of women used to die from delivering babies at Sainte-Therese. People used to be scared to go to the hospital because the people who were taking care of them didn't have the skills to save them. Now the maternal and infant deaths keep going down and people are so grateful to Midwives for Haiti.*

Individual Identification with Organization

Individual identification with the organization is a broad construct related to how individuals perceive the organization and their relationship and degree of commitment with that organization.[63] This construct was identified as a critical early facilitator for the successful implementation of the program, particularly because the program was created and run by midwives. Interviewees discussed midwives as a uniquely passionate group of individuals who committed their time and resources to the organization. A high level of commitment was demonstrated by the U.S.-based midwives who spent one to two years living in the poorest country in the Western Hemisphere, with no hot water and only minimal electricity. Volunteers from the United States would come year after year, staying one week and sharing their

knowledge with the students. These short-term volunteer experiences would regularly result in a long-term commitment of time and finances by these dedicated individuals. For example, two of the previous education directors had been long-time volunteers committed to the organization.

> *A neonatal nurse practitioner would come down every year for three or four years straight and he would teach the neonatal course. Whenever he could come, that's when we did the neonatal course, the neonatal resuscitation and newborn exam and all that. And he died of cancer. I hadn't even known he was ill; I just knew that he stopped coming and for four years we got money from his will that he left for us. It was not a huge amount but $15,000 every year for four or five years is significant.*

As the program gained credibility in the community from the improved maternal and infant outcomes, key individuals in the community, including MSPP leadership and Haitian MFH staff, began to perceive the program as valuable. Their level of commitment and dedication to the program increased over time which resulted in staff retention. The commitment of these individual has created continuity for the program.

> *The continuity of the staff is critical to successful implementation. Those relationships that we are forging are so important because it is all down to personality in Haiti much more than anywhere. I mean, everywhere in Haiti it comes down to personality and tenacity.*

Process

Process refers to the active change process aimed at achieving individual and organizational use of the intervention as designed.[63] This domain incorporated the constructs of planning, engaging, executing, and reflective and evaluating. When exploring the barriers and facilitators of implementing the MFH SBA training program, the process construct provided extensive information.

Planning

The *planning* construct has been defined as the degree to which a scheme or method of behavior and the tasks for implementing an intervention are developed in advance along with the quality of those schemes or methods.[63] The early iteration of the MFH program lacked adequate

planning, which was identified by interviewees as a hinderance to implementation. The community standard before starting a public health program has been to complete a formal needs assessment, including a collection and analysis of baseline data. One interviewee noted,

> *Most people when they go to start a program, do this thorough assessment, whether… [the intervention] is needed or not, they have all this data and then a few years on the road they can point to all this data of how they've changed things.*

The MFH SBA training program was not formally planned; rather, it evolved organically over time and no formal needs assessment was conducted. It was noted that a small-scale focus group had been held in the early stages to learn what the women in the community identified as their needs and wants, but no formal data were collected.

> *I did one visit where I did focus groups for a week and that's all I've ever needed because the stories don't change, the story has not changed for those women. And we have always been thanked and thanked and thanked by women for what we're doing, thanked by the students, thanked by the patients.*

> *I don't regret that we jumped in when we did, even though financially it would've been easier if we'd had a bunch of money up front in order to, 10 years later, be able to show this amazing data to say what we did.*

The structure of the admission process and curriculum were also not formally planned during early phase of the program and have instead developed by trial and error. One example noted was starting the program with *auxiliaries,* who had a low level of baseline education. The auxiliaries proved to lack the baseline knowledge needed to be successful in a higher learning educational program.

> *I think over time, we've gradually realized that it was so important to have people that had a good level of education to start with because some of the people who get to become an auxiliaire don't have the most rudimentary education. So, then you're trying to teach this higher-level course and it's just not landing…. I think that was one of the biggest barriers, and continues to be to some extent, one of the biggest barriers to getting the content in.*

As the program admission requirements progressed from *auxiliaries* to licensed *enfimyes*, the improved baseline level of education allowed for the curriculum to be elevated. The curriculum planning process improved each year. Two groups identified as having had a critical role in improving program planning were Haitian educators and preceptors and the newly formed and well-respected Haitian Board. The insights from these two groups helped make the program more culturally appropriate. Early iterations of the program had been created by well-intentioned but foreign midwives who lacked insight into Haitian educational systems and cultural expectations.

> *A lot of the curriculum is based on ICM, International Confederation of Midwifery. It's also informed by the nurse midwifery standards of the US and the midwifery standards in the UK…. Mainly because that's where a lot of our international staff comes from, and they are used to working with those standards and applying those protocols.*

KIs attributed pivotal changes in the curriculum and organization to the insights of the Haitian preceptors and Board. Their insight was said to have been invaluable when planning for the accreditation process and they continued to provided support during the difficult accreditation process.

> Some of the best ideas that we've had have been generated by the preceptors, and now with the Haitian board, and who we have on the Haitian board... They are well-educated professional people who are asking hard questions about, "What are you doing here? Why aren't you doing that? What's this? This makes no sense," and it's like, "Okay, thank you," because they will push us forward. We're being put in the context of education in Haiti.

Engaging

Engaging has been defined as attracting and involving appropriate individuals in the implementation and use of the intervention through a combined strategy of social marketing, education, role modeling, training, and other similar activities.[63] All 13 interviewees identified engaging the right people as the biggest and most necessary facilitator for successful

implementation. Early in the program the founder noted that she lacked organizational and business skills, but she convener people with the skillsets she lacked to support the program. Her passion for the organization's mission attracted the attention of the appropriate people, including people with financial, legal, and business expertise. Engaging the right people started with midwives who had the passion to help make the program successful.

> *In Haiti, you're trying to get volunteers to do most of the work, which is what Midwives for Haiti does, not every medical specialty would have success. The midwifery profession is really a calling. They're not there just to make a living. They're dedicated to their patients. They're dedicated to a certain ideal… And I don't think that you're going to find many groups of doctors that would do what Midwives for Haiti has done. So, I think that the success has been because there was a deep well of people willing to come to Haiti and make this work… I just think Midwives are different. And of all the facilitators, I think that is the biggest one.*

Involving the appropriate Haitian stakeholders was critical to successful implementation. First and foremost was the involvement of individuals in leadership positions at MSPP. The support of MSPP provided the program with legitimacy in the community and provided the primary clinical training site for the students since STH is an MSPP healthcare facility.

> *MSPP, the Ministry of Public Health and Population, is extremely supportive of our work in the central plateau. The head of that organization, Dr. XXX, is an extraordinary ally for us. It's nice to have that arm of the Haitian government recognize what we're doing.*

Engaging with local, respected organizations in Haiti strengthened community trust and support for the program. The largest and most well-respected healthcare organization in Haiti was Zamni Lasante (Partners in Health). The immense impact its relationship with MFH was hard for interviewees to articulate. MFH staff knew that gaining the respect and support of Zamni Lasante would open doors throughout the Haitian healthcare system, which would give students greater opportunities for clinical training as well as post-graduate employment.

> *As far as on the ground, I feel like Zanmi Lasante was the organization that we wanted to try to emulate to some extent and showed us some of the real challenges of working within Haiti.*

Involving Haitian organizations in teaching parts of the curriculum also added depth and cultural appropriateness to the program. Haitian partner organizations including ProFamil (Haitian Planned Parenthood), the local Red Cross, the University of Notre Dame in Hinche, and local physicians from various specialties including psychiatry and pediatrics, presented relevant material throughout the program. The program also engaged other clinics (i.e., Thomasique), healthcare NGOs (i.e., Love-A-Child) and religious organizations such as the local Catholic church to provide a network of support for the program, including additional clinical sites and even storage space.

For many years, the entire MFH program was run by volunteers, who included midwives, physicians, nurses, and social workers, among others. Social marketing, through Facebook and Instagram, played a large role in engaging and recruiting these volunteers. These volunteers also became long-term donors who supported the program with both their time and resources. Engaging and attracting key individuals from large funding organizations has also garnered MFH the grants and financial support it needed to sustain its programs. These funding organizations included Every Mother Counts (EMC), Bon Secours, and the Rotary Club. Their support was obtained through MFH's deep connections with key individuals in those organizations who believed in the program's model.

Executing

Executing has been defined as the carrying out or accomplishing the implementation according to plan.[63] The KIs identified the structures, systems and people involved in executing the program as the primary facilitators. A primary facilitator mentioned was MFH because it obtained a permanent structure to house staff and provided classrooms and skills labs for the students. The consistency and permanence of the MFH building in Hinche provided a sense of

security and belief that the organization was committed for the long haul. This in turn strengthened commitment from community partners, which led to a formalized clinical partnership with STH.

> *We needed a committed central location for the training program. And a place to carry out instruction. Both the didactic portion, but also the hospital-based portion. The MFH house became the anchor of the program allowing for long-term staff to be housed and a home base for the classroom, skills lab, and supplies.*

KIs identified the dedication of the Haitian staff, international staff, and the volunteers as facilitators in executing the program.

> *Numerous Haitian employees have gone above and beyond and worked their tail off for us... Some of the volunteers and key people who have given months or even a year or more to a project in Haiti. That's an enormous gift and a huge asset.*

The combination of Haitian staff with international volunteers was described as an execution facilitator that strengthened the program. “That combination of the Haitian paid staff and some of the volunteer clinicians from the US…was a good thing. Both groups contributed very importantly to what the students ended up really understanding.” The Haitian educational and clinical staff were portrayed as really bringing the program to life. One interviewee noted, “I think that the Haitian clinical staff were key to the program. They really took what we put together and made it come alive. Mostly, it was the Haitian staff who did that.”

One aspect of the MFH program that was described as both unique and a strong facilitator for the execution of the program was the utilization of Haitian preceptors. Each preceptor was assigned a small number of students to follow in their educational journey to ensure they were gaining the skills necessary to be a competent healthcare provider.

> *I think that one of our strengths is the fact that we allocate students to a preceptor who is able to follow that student throughout their educational journey. I think that makes a huge difference in our effectiveness and we wouldn't be able to do that if we were working in the same way as the other universities, so I think that really helps. I think that's a huge facilitator.*

The KIs identified the lack of accreditation and larger systems issues as barriers to executing the program. The lack of a clear pathway to accreditation weakened the perceived legitimacy of the program in the larger Haitian healthcare infrastructure. One interviewee stated, "We are not recognized without accreditation, so we don't have legitimacy. I think that undermines and limits our options as an educational institution." The larger systems issues were related to the supply chain and political unrest. The difficulty in obtaining supplies for both training and clinical practice had been increasingly challenging over the prior few years due mostly to political unrest and related safety issues (like roadblocks, gang violence and kidnappings), as well as the pandemic. In addition, fuel became scarce, making transportation to the clinical sites challenging.

> *Basic supplies are not available in the hospital and are necessary for us to be able to do procedures and for them [students] to learn. Having safe transport to take our students where they need to go because obviously, there's a lot of work that's done in the field and it's really important that they are familiar with rural healthcare. It's not possible without good transport, and that means a vehicle with access to fuel and safe roadways, which neither is an option in Haiti right now.*

Reflecting and Evaluating

Reflecting and evaluating was defined as feedback about the progress and quality of implementation.[63] This includes both quantitative and qualitative feedback about the program. What began as an unstructured evaluation evolved to incorporate more formal evaluation processes. In the early years of the organization, only the bare minimum data needed to operate legally and complete the required annual 990 IRS filing were collected. Formal annual reports did not begin until 2013. They included basic data on the number of graduates, outcome measures (including maternal and infant deaths at STH) as well as relevant revenue and expense data. One interviewee identified this as a turning point in the professionalization of the organization and the beginning of the evaluation process.

> *Prior to 2013, we really didn't have a formal evaluation process. Sure, we collected required data for our good standing as a 501c-3 organization, but we were just a group of volunteers doing our best. But in 2013 we began to have interns and staff to do more formal evaluations of things like outcomes at Saint Therese.*

The curriculum itself was subjected to continuous quality improvement. Each cohort had a new international education director, who brought their own lens and expertise to the program. Many interviewees felt this process was too informal but that it nonetheless brought about improvement over time. Each education directors contributions to quality improvement left the program better.

> *I know I left the work of directing that program, the education program in much better condition than when I got there. It was updated, it was organized, it made sense. It was an alignment with moving towards those international standards with a lot of energy and I think the program was getting longer and was moving towards that. And growing the scope of what was taught, which was so important.*

Another area identified by KIs that underwent informal component evaluation after each cohort was the admission process. Many changes were made over the years through an informal process. One was the evolution in the admission requirements from *auxiliaries* to *enfimyes*, and eventually to licensed *enfimyes*. The admission staff also added components to the process over time. For example, the admission process began with an application, entrance exam and interview. Over time the admission committee felt a clinical skills component should be evaluated. A few years later, a French writing sample was added. All these components were added through an informal process by the admission committee as they were recognized to be a good idea.

> *The admission committee would meet and review what we were going to evaluate for the upcoming applicant pool, and someone would propose an idea. Maybe it would be good to assess the applicant's bedside manner and ability to do basic skills, like check blood pressure. And that was the start of the clinical skills assessment.*

Interviewees said the first formal evaluation of the MFH SBA training program's admission process occurred in 2020. The evaluation was based on the CDC's Evaluation Framework and included stakeholder engagement, a history and program description, a logic model, data collection, and stakeholder analysis. Recommendations from the evaluation were reported to the Board and MFH leadership team.

> *The formal evaluation of the admission process was a game changer for MFH. It really allowed us as an organization to explore if our process for admission was in line with the desired short, medium, and long-term desired outcomes. It made us think about other systems and processes we had in place that would benefit from more formal evaluation processes.*

The organization was accountable to their donors and grantors, many of which required annual formal evaluation and outcome data. As the organization evolved and grants continued to increase, the need for more formal processes of evaluation and accountability became imperative. In addition to data required for the annual reports, the in-country director became responsible for larger scale evaluations that looked at impacts of the program, including data on employment and outcomes for graduates working in Haiti. These impact evaluations demonstrated that the program was having its desired effect. For example, MFH could show that their graduates were employed in every district of Haiti, with a heavy saturation in rural areas, bringing care where women needed it most.

Inductive Codes

Inductive codes were derived directly from the KII narrative data. The codes all related to the outer setting domain but did not fit within the existing CFIR constructs. The inductive codes include political instability, infrastructure, and safety issues (Appendix 7).

Political Instability

Political instability was defined as the unstable structure of a government and its likelihood of collapsing within a short time due to unstable underlying political structures [70]. Haiti has been wrought with political instability since its inception, but the few years prior to this study brought unprecedented turmoil. As one Haitian interviewee noted, "I have lived through dark times in Haiti but have never feared for the future of our nation like I do now." Interviewees identified several factors contributing to the political instability, beginning with the government's elimination of fuel subsidies in 2018 which triggered widespread civil unrest. The protests intensified in 2019 when evidence that funds intended for infrastructure and healthcare had been embezzled. The KIs also identified the government's response to the COVID-19 pandemic and associated economic crisis as a source of instability. In 2021, President Moise proposed a constitutional referendum to allow him to remain in power and essentially shut down the legislative branch of the government. This was cited by interviewees as the tipping point in the escalating demonstrations. In July 2021, President Moise was assassinated and without a Haitian parliament, his newly appointed Prime Minister, Ariel Henry, was installed as President. One interviewee felt there were no elected officials running the government and "it is overrun with corruption, really barely functioning." Gangs had taken over the capital, Port au Prince, with impunity and frequently blocked all major roadways and ports. Political instability was repeatedly identified as the largest barrier to implementing the program.

> *The biggest barrier, I think, which we have no control over, is what's going on with the political situation and the violence that is endangering people.*
>
> *The problem with healthcare in Haiti, is they don't have a functioning government. And conditions in Haiti were bad in 2006. They're infinitely worse now because the government that they at least had then, did pretty much keep the peace. Now, there is no peace, and gangs are running Haiti.*

> *It [Haiti] has gone from a poor country with a poorly financed government to basically Somalia, where the country is just totally failed right now. But back then, it was simply, they just didn't have the wherewithal to provide services.*

Political instability infiltrated every aspect of governmental affairs, including MSPP and the Ministry of Education, making collaboration with these entities virtually impossible. The process of accreditation for a midwifery education program was not a high priority among those attempting to operate within the defunct government. This was a direct barrier, noted by several respondents, to gaining accreditation for the program. One KI noted that government instability strengthened the resolve and reaffirmed the mission of MFH.

> *I think the lack of government stability has resulted in challenges throughout all of what happens within Haiti, and certainly for our program. It has impacted the ability to get our program recognized, to have safety for our staff, and for our volunteers, for the very structure and how the hospital is run....But I also feel that that's the reason that our presence is needed. It's the lack of the government being able to create these programs and we're trying to fill that void. The MFH program has never been more critically needed.*

Infrastructure

Infrastructure was defined as the basic physical and organizational structures and facilities needed for the operation of a society (e.g., buildings, roads, and power supplies).[71] From the beginning, the lack of Haitian infrastructure slowed implementation of the program in several ways. Respondents spoke about their difficult experiences working at STH without running water or electricity. Buckets of water were brought in from the well and bleach was added to clean the dirty water. This water was used for everything from patient care to hand washing. The small operating room used a generator for power but all other care, including births at night, required light from battery powered headlamps.

> *It comes down to lack of infrastructure. You don't have running water at the hospital. You don't have electricity at the hospital, you don't have medications at the hospital. We had to bring in most of what we used in the maternity wards. Very little of it was provided by*

the hospital. Everything you needed, from antibiotics to IVs, you had to bring with you. Lack of infrastructure of all types made the job very, very difficult.

MFH collaborated with other partner organizations, such as Zamni Lasante and The Ohio State University, to correct some of the infrastructure issues at STH, and STH obtained running water and intermittent electricity.

A shortage of medical supplies in the Haitian healthcare system was cited by interviewees as a significant barrier that at times was insurmountable. MSPP did not adequately supply STH with many of the supplies necessary to provide even basic care. MFH had been the primary source for supplies for the maternity unit for the previous 10 years. It preferred to buy supplies locally, but many supplies were simply not available in Haiti. For many years, the organization relied on a steady stream of volunteers to bring critical supplies with them. Volunteers would gather donated supplies from their U.S. hospitals, friends, and family, then bring large suitcases filled with medications, blood pressure cuffs, gloves, and sutures. The Covid restrictions and political unrest resulted in the cancellation of the volunteer program starting in 2020 and continuing through the course of this study and thus ended regular arrivals of supplies.

The next barrier is just the whole supply chain and not having the support of the volunteer program, we lack the kind of equipment that you need to care for patients and teach student midwives. So that's a huge barrier.

One respondent talked about the financial impact the supply chain issues had on MFH. The budget needed to procure the supplies and ship them to Haiti increased ten-fold. This diverted funds away from the stated purpose of the program, education.

We [MFH] have traditionally supplied all the supplies for the maternity unit. And it's crazy because in my opinion it's unsustainable. We're doing the best we can, but at some point, it needs to move out of our realm and shift to MSPP. So, we can focus more on education.

Respondents also said the lack of reliable electricity and clean water hampered the program implementation. In 2020, the percentage of Haitians with access to electricity increased to 46.9% but among Haitians in rural areas the percentage was only 2.2% [72]. Hinche is in the Central Plateau and is considered a rural area. Several respondents said unreliable internet and phone services, with electricity out for days at a time, was a significant barrier to effective communications.

> *The faulty power grid and finding clean water in our community and keeping power and internet in our house, were continuous issues. Very much third world problems; developing world problems that impacted us daily.*

> *The whole barrier of telephones and computers with lack of reliable electricity, it makes communication so hard. Whether it's communication between the hospital and staff or students and educators. That was an ongoing issue for us.*

Safety Issues

The U.S. Department of State provides travel advisories based upon the safety of a given nation at any given time. At the time of this study, Haiti was designated a travel advisory level 4, which is the highest-level advisory. The State Department advisory stated "Do not travel to Haiti due to kidnapping, crime, and civil unrest. U.S. citizens should depart Haiti now in light of the current security and health situation and infrastructure challenges."[73] The State Department warned that traveling to Haiti put one at increased risk for kidnapping, hostage-taking, theft, and serious injury. All 13 respondents identified safety issues as one of the most challenging barriers to implementing the program. One respondent spoke about the impact of the violence on the people of Haiti.

> *It's also just changed the energy of the populace. It's not a happy place. People are worried, they're scared, they're sad. People are dying. They're hungry.*

The civil unrest and violence had increased dramatically over the prior few years. One respondent who had only been with the program for a few years reported only knowing Haiti in a state of violence.

> *I have only known Haiti in the state of violence and upheaval. I've only known Haiti where you can't go out at night, where you're going to get kidnapped on the road. I don't have anything to compare it to. It is the way that the political will of the people is being expressed, which comes out violently. I don't blame them, it's bad. If your life is terrible, you're going to act out. Desperate people do desperate things. I completely understand that...The violence makes it very difficult to move around the country. We would fly into Port au Prince where all of the government buildings are and where all of the good food is. We used to fly into there and it was easy. We cannot go there anymore. It's a war zone. The violence level has erupted in ways that are quite frightening.*

The safety issues hurt the program in several ways. Clinical integration sites for students were located throughout Haiti through a wide range of organizations. This provided students with optimal clinical experiences in both urban and rural settings, making them well- rounded practitioners. This clinical experience required transportation throughout the country so safety concerns were a barrier to this part of the program.

> *We have had to cancel integration sites with partner organizations. Love-a-Child birth center, which is just outside of Port au Prince, so we're not going to be sending students there this next time. Unfortunately, the violence is just too great. Profamil, which is the Haitian arm of Planned Parenthood. Again, that's located in Port au Prince, and I won't risk people. So, we won't be doing that.*

Port au Prince and the roads intersecting the regions in and out of the capital were exceedingly dangerous. Meetings with MSPP officials about the accreditation of the program took place in the capital and became increasingly difficult, adding another barrier to the accreditation pathway. The safety issues in Port au Prince worsened the students' opportunities to practice in the clinical integration sites but, equally importantly, reduced their ability to visit their families who live in the city and similarly impacted areas.

> *Kidnapping has gone up 700% in the past 19 months in Haiti. So, thinking whenever we do have to go to Port au Prince, although we rarely do. But if we do, I mean there's so*

much that goes into that logistically. Also, our students, they can't get home on the weekends to be with their families. Most of them are married, many of them have children. They leave their families during the week to come to school and stay in Hinche. Then they tend to go home on the weekend. They can't do that if there's riots everywhere. We often have people come back from Port au Prince, students that have gone home and are coming back in buses are shot at. One of our staff, a girl on the bus was shot right next to her. She bled out on her lap.

The community clinics were also affected by the violence. It became exceedingly difficult to travel safely to the various sites: respondents described roadblocks throughout the country with burning tires and men with guns demanding bribes to pass through. One interviewee found creative solutions, like having community members along the travel routes provide updates about roadblocks to be avoided and utilizing back roads.

They'll block the roads, they'll burn tires. The road from Hinche to Port au Prince is extraordinarily dangerous. So, we tend not to use those roads going to community clinic. We use the little back roads, which then is more wear and tear on the vehicles, which then takes longer. Which means that the women are waiting longer. So, you have less customer satisfaction because of this. I mean they understand, but it still sucks when you must walk six hours and then wait another three for us to get there. Because we're having to avoid all these riots and things. So that's never very pleasant.

The community of Hinche had not experienced the same level of violence as Port au Prince and other parts of Haiti. Most respondents said they felt "mostly safe" in Hinche, particularly while in their MFH uniform. Interviewees healthcare workers are respected in Hinche and that most people in the community knew they worked at STH, which afforded them some protection from violence, particularly at roadblocks. One interviewee stated, "When there's a nurse coming to the hospital in uniform, they respect that, because they know they need us." Another interviewee felt the safety issues had not hurt her ability to work and that her work afforded her some safety in the circumstances.

It [road blocks] hasn't impacted my work at the hospital because they see us walking down…. They don't try to do nothing to us. We can pass the barricades without people throwing rocks or anything at us, because they know we work at the hospital, they know

the job we're doing. People on the street know the job we're doing, so they don't attack us.

Final Thoughts and Recommendations

The KIs provided insights and recommendations about the progress and quality of the MFH SBA training program. Many interviewees spoke of the challenges of working with the Haitian government and healthcare infrastructure.

The biggest obstacle impacting the program is working with the government. We try to do our best, but Haiti is a country full of barriers. But we're going to break those barriers. We have a lot of economic, political, and social problems in Haiti. And if women keep dying from childbirth, it's going to create more societal problems. It effects our economy and devastates families, because the women are the creators of life and community.

Many KIs reflected on the difficulty of working in Haiti, but also noted that difficulty was part of their motivation to continue the mission. The need was so persistent.

I really can't think of too many countries where it would be more difficult just because the lack of government, the lack of policy, the lack of structure. There are many countries that need more midwives like Bangladesh or Rwanda. But they have policy and therefore they're easier to work with because, so why Haiti? It was where I got to first and the need remains. It's just the most difficult thing I've ever done in my life but also the most rewarding.

Some interviewees reflected on the importance of the program by noting the maternal mortality crisis in Haiti when compared to their work in the United States. These thoughts were cited as the source of their commitment to the organization.

I realized the importance of the work that we were doing. When you see what happens to women and babies that are not getting proper maternity care and you realize something as simple as taking a blood pressure can be lifesaving. It really kind of renewed my excitement. In Virginia…I never saw a maternal death. We have it so good that, you just don't expect to ever see a woman die from a pregnancy related problem. And then you go to Haiti, and you find out, no, that's not the way the world is, so that was a big lesson that made me feel different about the work we were doing.

Five of the KIs cited the growing acceptance of the MFH SBA training program by Haitian healthcare organizations as validation of the quality of the program and its tremendous

progress. Organizations like Zamni Lasante (ZL) hired MFH graduates and accepted MFH students at Mirebalais, the premier ZL teaching hospital, which legitimized the program in the eyes of other organizations throughout Haiti. This was identified as a great source of pride by staff members.

One interviewee expressed her belief that the MFH model, centered on compassionate midwifery, was what sets the program apart. The compassionate care provided at STH by the students and graduates was different from the traditional patriarchal and hierarchical models entrenched in the Haitian healthcare system. This model has been embraced by the community and was the foundation of the community's support of the program and its interconnection with the program.

> *Being embraced by the community is what makes us successful, and our compassionate care is a huge key to that. I think they go together. And if we lose one, we will probably lose the other and we would just be another organization out of many in country trying to impose itself on another community.*

The desire to obtain accreditation was frequently identified as critical for improving the quality and progress of the program but KIs noted the process had been very challenging. One interviewee stated, "If we can get accreditation, I think that will change the trajectory of Midwives for Haiti forever. I think that it would open so many doors." While some stated that accreditation would benefit the graduates because organizations would place a higher value on their credentials and would thus compensate them more, others cited accreditation as necessary for obtaining grants from certain large-scale international funders.

As the KIs concluded their reflections, many provided recommendations for improving the implementation and future of the program. Specific themes included:

- Increase continuous education offerings for graduates
- Train simultaneous cohorts of students in order to increase graduation rates

- Expand the program to additional locations throughout Haiti
- Improve obstetrical care at STH by hiring an OB/GYN with values consistent with MFH
- Obtain accreditation from MSPP and the Ministry of Education

A final statement that encompassed the sentiment of many interviewees expressed gratitude. “Thank you for having that program. Because of the program, there's less women dying from childbirth.”

CHAPTER 5: DISCUSSION

This research sought to answer the overarching question: What are the barriers and facilitators to increasing skilled birth attendants in Haiti? The question was addressed through a case study of a SBA training program in a rural hospital in Hinche, Haiti. I explored several sub-questions based on the three study aims. For the first aim, I explored the MFH SBA training program from its inception through its current iteration. Achieving the second aim involved quantitatively investigating the growth of the MFH SBA training program and its relation to the increased availability of SBAs and improvements in birth outcomes at STH. The third aim focused on the barriers and facilitators of implementing the MFH SBA training program. This chapter discusses the results of these investigations and their implications for stakeholders.

Aim 1: Explain the History and the Current Iteration of the MFH SBA Training Program and the Subsequent Increase in SBAs at STH

Exploring the history of an organization is particularly important for organizations because history provides the context in which the organization operates and allows patterns that may influence organizational change to be recognized. MFH had a nonprofit start-up story like many others, with a small group of well-intentioned people identifying a problem and deciding to do something about it. Over the years the organization evolved through the nonprofit lifecycle stages.[74]

The organizational history of MFH closely aligns with the stages in the nonprofit organization's lifecycle and is consistent with the findings from Kimberlin et al.

All the KIIs provided examples of internal operations factors, leadership factors, and external relationship factors that contributed to the growth and resilience of the organization. The culmination of these factors resulted in the long-term sustainability of the MFH SBA training program. The document review conducted for this research of the annual reports from 2013-2021 supplemented the KIIs and provided a clear picture of the programmatic and financial growth over the years.

Internal operations factors included both internal evaluation and investment in infrastructure. Interviewees said MFH's continuous process for internal evaluation resulted in on-going, iterative improvements to the program. As administrative capacity improved, the program improved by aligning the curriculum with international standards consistent with ICM, while adapting to meet local needs. Programmatic improvements included raising the admission requirements from *auxiliaries* to *enfimyes* and extending the length of program to 18 months. These changes brought about improved recognition by MSPP and were the first steps towards early requirements for accreditation. Several KIs noted that MFH had invested in the institutional infrastructure that led to improved program implementation over time. KIs also said the investment in MFH property was critical to its growth, and also provided legitimacy to the program within the community.

Leadership factors were also cited by all KIIs as critical to the organization's growth and resilience. The original founder and executive director was the foundational thread that held the staff, board, and organization together. The KIs noted that the transition from the founding executive director to an interim director was challenging. The organization learned the critical importance of strong leadership to support the organization during this transition. The executive director during the period of this research was described by many KIs as critical to the success of

the current program. The executive director's ability to navigate the last few years of crisis, including the COVID-19 pandemic, Haitian political instability, and safety issues brought stability to the program. KIs identified a critical shift in the program with the investment in Haitian staff. Having staff, particularly clinical preceptors, that spoke the language improved the experience for the students and ultimately improved the reputation and relationship of the program with the community. The concept of entrepreneurship in the organization was described as a leadership factor by interviewees, who said it was a form of calculated risk taking. The organization took several leaps of faith along the way and was able to expand programing and grow as a result, despite having little more than hope that the money would come to cover its growing expenses.

External relations factors were cited by many KIs as facilitators of organizational growth. A theme of external engagement was also reflected in the small-scale focus groups prior to the startup phase. The KIs said community outreach throughout the organization's history was critical for understanding the needs of the community and developing the trust required to work in and with the community. The community outreach was with faith-based leaders in the early days and then later, with established nonprofit organizations that became partners in the implementation of the program, such as Partners in Health. The most critical external engagement was with MSPP, because it allowed the training program to use their hospital, STH, as the students' primary integration site. Additional integration sites were procured over the years throughout Haiti through further community outreach.

External relations factors also included diversified financial, political and community support. The MFH annual reports, specifically the financial data, demonstrated an increase in revenue over time but also reaffirmed the importance of diversification. The number of

individual donors between 2013 and 2021 more than doubled. The largest funding increase came through the acquisition of grants, which grew from 5 grants in 2013 to 19 in 2021. This diversification allowed the programs to expand and has sustained the organization. MFH is a stable organization, meeting its stated mission to work collaboratively with MSPP and other organizations to deliver culturally appropriate, high impact health interventions. By training SBAs, MFH educates and empowers Haitian women and men to improve the health of their communities, creating lasting change in their lives and the lives of the mothers and children they care for.

Aim 2: Explore how the Growth of the MFH SBA Training Program Relate to the Increased Availability of SBAs and to Observed Changes in Birth Outcomes at STH

The quantitative analysis of the MFH data explored the intersection of the two independent variables (the number of graduates of the MFH SBA training program and the number of graduates working at STH) with the dependent variables (the number of births, maternal mortality, and infant mortality). The analysis revealed that as the MFH SBA training program grew, there was an increase in SBAs at STH and improved maternal and infant mortality rates, a finding wholly consistent with a wide body of evidence and the literature reviewed in Chapter 2.

Between 2006 and 2013, MFH trained 75 SBAs across five cohorts of students. Between 2013 and 2021, an additional 148 SBAs were trained, bringing the total to 223. This represents over 30% of the maternal child healthcare workforce in Haiti. As the program grew and graduated more SBAs, STH increased the availability of SBAs by employing more each year. Between 2013 and 2020, the availability of SBAs attending births at STH increased by 200%. There was a positive relationship between the percent change in total MFH-trained SBAs and the percent change in MFH graduates working at STH.

As the MFH SBA training program continued to grow and the availability of SBAs continued to increase, so did the number of births at STH. Over the nine-year period from 2013 to 2021, there was a 69% increase in the number of births at STH. Women in the community began to trust the midwives and the hospital as a safe place to give birth. Women began to come for care early and often, allowing for diagnosis and treatment of preventable causes of maternal mortality. Maternal mortality decreased by 60% from 2013 to 2021. Over the nine-year period, while births increased by 69%, the MMR decreased by 60%. The relationship between increased access and availability of SBAs and lower MMRs is well documented in the literature. As noted in the literature review, 10 studies conducted in over 100 countries and published between 2003 and 2020 reported lower MMRs when interventions focused on increased access to SBAs.[24–29,31,32,34,35]

My observations of the relationship between the growth of the MFH SBA training program, the increase in availability of SBAs at STH, and the subsequent decrease in maternal mortality are consistent with a large body of evidence. This relationship is reflected in the global initiative to increase skilled birth attendance by midwives and is commonly cited as the primary intervention to address MMR, particularly in LMICs like Haiti. The 1999 joint statement from WHO, UNFPA, UNICEF, and the World Bank called for all women and newborns to have access to skilled pregnancy, birth, and postnatal care.[36] Skilled birth attendance by midwives was further supported by WHO in its MDG 5.2 which addresses the proportion of deliveries attended by SBAs in order to meet MDG 5.A: Reduce by three quarters the MMR.[75] While increasing the number of SBAs is a critical intervention, reducing the MMR requires more, because other variables impact outcomes. As reported above, the 2020 increase in maternal deaths was attributed to two primary factors: the COVID-19 pandemic, and the extreme political unrest.

These factors reduced access to prenatal care and maternity services. Roadblocks, violence, and rampant kidnappings resulted in many women being unable to access prenatal care to identify high-risk pregnancies and led to many women only arriving at the hospital when they were already critically ill and unable to be saved. In addition to the availability of trained SBAs, efforts to continue fighting the maternal mortality crisis from a health system strengthening approach must also consider the current climate and address accessibility issues in Haiti.

A similar relationship was noted concerning the infant mortality rate at STH: the ratio decreased over the years but there was a marked increase in 2021. The WHO maintains it is possible to improve survival of newborns and prevent stillbirths by providing high coverage in quality antenatal care, skilled birth care at birth, postnatal care for mother and baby, and care of small and sick newborns. Women who receive care by professional midwives, educated and regulated to international standards, are 16% less likely to lose their baby and 24% less likely to experience preterm birth.[76] The number of births at STH increased by 71% between 2013 and 2021, while infant deaths during that period declined by 51%. In 2021 there was a spike in deaths, which reduced the percent change to from 51% to 28%[7]. This was attributed to the lack of access to prenatal care and timely maternity services related to political unrest and safety issues. To increase neonatal survival in Haiti, a broad health system strengthening approach must be considered in which women and babies have access to high quality prenatal, maternity, and postnatal care by qualified healthcare workers.

[7] Refer to analytical explanation on page 80.

Aim 3: Explore the Experiences of Key MFH Staff Members and MFH SBA Graduates Working at STH to Identify Barriers and Facilitators of Implementing the SBA Training Program

In contrast to Aim 2, which evaluated clinical effectiveness of the program, Aim 3 is concerned with assessing the effectiveness of implementing the midwife training program. An intervention is likely to be ineffective if it is not implemented well, therefore intervention outcomes provide an understanding of preconditions for attaining subsequent desired changes in outcomes.[64] The findings were organized and analyzed within the domains and constructs of CFIR, which does not explicitly incorporate implementation outcomes. Therefore, exploring the implementation outcomes with the taxonomy identified by Proctor, et al., allows for deeper understanding of the process of implementation. The results from Aim 3 identified the importance of the following implementation outcomes: acceptability, adoption, appropriateness, costs, feasibility, penetration, and sustainability. All these outcomes were considered within the overarching reality of the fragile context of Haiti.

The fragile context of Haiti permeated every facet of the training program, as identified unanimously by the KIs, as the ripple effect of the political instability, safety issues, and lack of infrastructure. An understanding of the far-reaching impacts of these constructs and how to integrate this reality with the desire to expand the training program is a key takeaway from this research. To support Haiti in reaching its goals to meet SDG 5.1, MFH and other partner organizations must account for the fragile context as they work to systematize the implementation of the program.

While UNICEF's Integrating Humanitarian Response and Development Program Framework is not specific to upscaling the healthcare workforce, it provides guiding principles that are relevant to the fragile context in Haiti.[77] The findings from this research identify Haiti as

a “fragile context” in line with the UNICEF definition: contexts where there is an accumulation and combination of risks because of context-specific underlying causes combined with insufficient coping capacity of the state, system and/or communities to manage, absorb or mitigate those risks.[77] Many of the Haitians interviewed spoke of the stress related to the political unrest and safety issues, which are causing an unprecedented economic crisis. The Haitian inflation rate in January 2023 had reached an all-time high of 49.3 percent, resulting in acute food insecurity and crisis-levels of hunger for 4.7 million Haitians.[78,79]

The intersection of this fragile context barrier and the facilitators identified is where the focus on implementation outcomes will support the expansion of the program. A significant facilitator identified by KIs was engagement of communities and partner organizations. Engagement within the fragile context of Haiti requires factoring in the lived experiences of Haitian partner organizations and individuals involved in the implementation of the program. Maintaining radical mindfulness of partners existence and realities on the ground is required for successful engagement. One must also be aware of local enabling factors when working within such a state of turmoil.

While MFH may be pursuing goals of standardization and accreditation of midwifery education, their Haitian counterparts may have differing priorities during this time of national crisis. When faced with food insecurity and civil unrest, the Haitian government, and the individuals in positions of power at MSPP, may need to prioritize more pressing issues than midwifery education. Maintaining a steadfast and supportive presence through the turmoil will help strengthen the relationships between MSPP and MFH to address long-term goals when conditions allow.

The acceptability of the MFH SBA training program was described by KIs in terms of various aspects of its content, delivery, credibility, and relative advantage. The content of the program evolved over time and is currently consistent with the ICM and WHO internationally accepted standards, which is important for credibility and potential accreditation. The delivery of the program is also aligned with international standards for duration, as well as clinical experiences such as the number of births attended. The credibility of the program is an important outcome variable, as it relates to stakeholder support, including those in the community, MSPP, and funders. MFH graduates spoke to the perceived credibility of the program at STH. The improved outcomes for mothers and babies resulted in approval of the program by MSPP leadership. These clinical results intersect with the implementation outcomes overall supporting the program.

As an implementation outcome, the adoption of the program refers to the intention to try an innovation.[64] The MFH SBA training program was created from the overwhelming need identified to provide maternal health care workers ultimately to prevent maternal and infant deaths. While the intentions were pure, the lack of systems for implementation led to some decisions that had ethical implications. For example, one KI spoke about the lack of policies at STH regarding foreign health care workers that was leveraged to allow MFH volunteer providers to work in the hospital without a formal credentialing process to expedite implementation of the program. The ethical conundrum presents itself in that if the organization had waited for the development of Haitian approved policies to implement the program, countless women would have needlessly died in the interim. Yet this implementation approach created a level of distrust between MFH and some Haitian stakeholders. Haiti's long history of unethical INGOs contributes to the overall distrust some stakeholders have towards MFH. MFH is still working to

repair trust with some critical stakeholders, and this has been identified as contributing to some of the hurdles being faced in the accreditation process. This is not to say that MFH does not have strong ties and trust with many MSPP leaders and community stakeholders, but more to acknowledge that to progress with accreditation and expand the program, MFH will need to continue to address these trust issues. Ultimately, the people of Haiti deserve a strengthen health system including better health services, coherent policies, and scrupulous INGOs.

The appropriateness of the training program refers to the compatibility and perceived fit for a given setting, in this case the setting of STH and broadly Haiti. While appropriateness and acceptability are similar, they have distinct differences, as an intervention may be perceived as appropriate but not acceptable, and vice versa.[64] During the early stages of the accreditation process, MSPP resisted the categorization of MFH's SBAs. The certificate upon graduation from the program confers the graduates the title of "nurse with advanced obstetrical training" and is signed by the Director of MSPP for the Central Plateau. Haiti lacks formal definitions for different types of maternal healthcare workers. Addressing this gap will require the formalization of the midwifery profession in Haiti with clear definitions of different types of providers. Conscious decisions were made to differentiate the graduates of the program as SBAs to address the rate of attrition of nurse-midwives from the government program. Less than 3% of the MFH graduates have left Haiti, compared to as many as 40% of health professionals trained in Haiti who leave the country.[80] MFH created a tier of birth attendants that were qualified to attend births safely but were under credentialed to work elsewhere. While this was perceived by many as a relative advantage of the MFH program, as it addressed the immediate needs of up scaling the maternal healthcare workforce, there are ethical concerns with creating a new tier of health care providers led by a foreign INGO. The lack of participatory engagement in this process with

MSPP in the early stages of development had also contributed to some challenging relationship dynamics. Participatory engagement with MSPP, early and often, would have ameliorated some of the dynamics but may have slowed the process, which would once again come at the cost of the lives of mothers and babies.

Understanding implementation costs requires exploration of the cost impact of an implementation effort.[64] KIs noted that over the years MFH expanded its programmatic reach without always having the funding procured to support it. There was a cultural belief within the organization that the money would come, and it usually did. This lack of systematized approach to implementation costs led to the organization taking on certain costs, like the salaries of midwives at STH and the mobile clinics, that were not sustainable. Programmatic changes have been made to account for these implementation costs, like the shift from mobile clinics to community-based clinics discussed in the results section of Aim 1. Infrastructural support for multilevel scale-up would require resources that may prove to be challenging to procure. The barrier of costs from the KIs perspective was a constant source of stress. With MFH's revenue being completely reliant on external sources of support including donations and grants, a financial surplus to support a multilevel scale-up is not feasible. Ideally, the up scaling of the healthcare workforce would be Haitian led and funded but the Haitian government, particularly MSPP, lacks the resources required to support an expansion of the program. Haiti has a long history of reliance of on foreign aid, which has resulted in Haitian domestic financing of total health spending to decrease since the 1990s. Additionally, economic projections indicate that economic growth is Haiti will likely remain low.[81] Exploring additional partnerships and sources of revenue from larger granting sources will be critical to address issues of expansion and sustainability.

The implementation outcome of feasibility explores the extent to which an intervention can be successfully carried out within a given setting.[64] In this case, KIs confirmed the feasibility of the MFH SBA training program at STH overall was reported by KIs as successful. The program has been operational since 2006 and ultimately has educated 33% of the maternal child health care workforce in Haiti.[80] Despite the fragile context of Haiti, MFH continues to train SBAs. Unlike countless other INGOs that have abandoned Haiti over the years, MFH persists. The KIs identified many obstacles when discussing STH as the primary clinical site for the program, yet the program has continued to successfully graduate 11 classes to date. STH serves the Central Plateau which is mostly a rural area including the Hinche Arrondissement with a population of 264,000.[82] Hinche is similar many other communities throughout Haiti in relation to demographics and infrastructure. With the proven success of the implementation of the program at STH, it appears feasible to replicate the program in other parts of the country.

The implementation outcome of penetration relates to the integration of a practice within a service setting and its subsystems.[64] When exploring the penetration of the MFH SBA training program, KIs noted that the MFH graduates work in over 60 health centers and clinics across Haiti. The graduates are employed in every Arrondissement across Haiti. These statistics indicate the successful implementation in terms of reach. Additionally, the 223 graduates of the program to date account for over 30% of the maternal child health care workforce in Haiti, including doctors, midwives, and nurses. Yet there is much more work to be done. To meet SDG 3.1 to reduce maternal mortality to 70 per 100,000 live births by 2030, will require significant increase in SBA coverage.[10] One of the key indicators for this objective is the proportion of births attended by SBAs. It estimated an additional 563 SBAs would be needed to adequately provide

coverage to meet this goal in Haiti. While the MFH program has had tremendous reach, it will need to focus on significant expansion to meet SDG 3.1.

Sustainability refers to the extent to which an implemented program is maintained within a service setting's ongoing, stable operations. It explores the integration of a given program within an organization's culture through policies and practices. The research identified the MFH program as having evolved over many years through an iterative process. It is only recently that KIs reported a shift to institutionalize the organization. As part of the professionalization of the organization, MFH would benefit from identifying goals and outcomes to clearly define what successful implementation looks like. In addition, the results identified the need for a structured ongoing plan for program evaluation and monitoring. While the CDCs Framework for Evaluation in Public Health is a well-known system for evaluation and monitoring, the MFH organization may benefit from additionally incorporating a data equity framework, like We All Count.[83,84] We All Count offers a systematic process to prioritize the lived experience of Haitians, by intentionally and individually defining equity goals, priorities, and centering their lived experiences.[83] This structured approach of ongoing monitoring and evaluation will support MFH in its quest for long term viability, allowing the innovation to settle into the organization.

Implications for Stakeholders

The researcher identified several key takeaways that may provide guidance and have lasting implications for MFH stakeholders, as well as broader stakeholders considering emulating the program.

Consolidated Framework for Implementation Research

The CFIR model helped the researcher identify and place into a broader framework the factors that shaped—and will continue to shape—the program's implementation. In addition to

identifying factors that shaped the program's implementation within the framework's domains and constructs, the researcher developed a deeper understanding of the complex relationships between the framework's domains. The intersection and interdependence of the domains was profound, particularly the impact of the outer setting on all the other domains. The outer setting of Haiti, with its current state of political instability and resultant infrastructure and safety issues, has influenced every facet of the program and its implementation.

MFH stakeholders, as well as anyone looking to implement a program in a fragile setting, should take into consideration the external setting, particularly in the context of the implementation process including the *planning*, *engaging*, *executing*, and *evaluating*. While literature consistently recognizes the influence of the "outer setting" on the other domains, there is limited research on the influence in LMICs.[85] Bruns et. al[86] studied the role of the outer setting in implementation, particularly the unmodifiable (economic, political, structural) and modifiable (policies and regulations) outer setting factors, supporting the relationship identified by the findings of this research. The researcher identified specific contextual factors for stakeholders to consider that were consistent with the literature: local leadership engagement, local capacity building, infrastructural support for multi-level scale up of the program, and cultural and contextual adaptations.[87]

Lifecycle and Effectiveness of Nonprofits

The lifecycle of nonprofits framework provided critical context for the MFH SBA training program evaluation and will prove to be an important context for stakeholders to consider.[74] As noted earlier, MFH began as an idea to address an immediate need and over time cycled through growth and maturity phases.[74] The lifecycle of nonprofits can provide a framework for organizations to identify when they are in growth, decline, or crisis cycles. This

would allow nonprofits to apply their resources and efforts appropriately and would increase the likelihood of successful long-term implementation. Haiti is often referred to as "A Republic of NGOs," with more NGOs per capita than any other nation in the world.[88] The influx of INGOs after the devastating Haiti earthquake of 2010, many of which failed during their maturity phases, provide valuable insights into the importance of identifying the decline phase in the nonprofit lifecycle. Instead of turning around and re-entering growth phases, many INGOs declined and disappeared without fulfilling their intended missions.

Researchers have postulated that the prevalence of INGOs in Haiti may have inadvertently prevented the country from developing its own institutions.[89,90] Currently, INGOs provide an estimated 80% of public services in Haiti, including healthcare and education.[89] This has been described as a parallel system of governance by which INGOs exert profound influence over the country. Many times, INGOs have lacked understanding of the local culture and accountability to the people they serve.[90] Many of these INGOs have been criticized for using aid money to hire highly paid foreign staff instead of empowering and employing locals.[90] MFH was guilty of some of these common pitfalls early in its lifecycle but has taken decisive corrective action over the past 10 years, including the extensive hiring of local staff and incorporation of a Haitian Board of Advisors. When working in countries with extreme poverty, INGOs must embrace a needs-based approach and share a long-term commitment to the communities they serve.[91] Making mindful organizational decisions during future nonprofit lifecycles that embrace concepts of holistic and participatory development will be critical for successful implementation.

Holistic and Participatory Development

In the quest to increase SBAs in Haiti, the researcher hopes that future stakeholders will embrace the principles of holistic and participatory development. The concept of holistic

development encourages a shift from short-term humanitarian aid to a model that focuses on empowering local people to implement long-term structural solutions.[90] While short-term aid is crucial responding to crises, it has proven to be an inadequate solution for sustainable development.[90] This holistic development model has been the foundation of the MFH SBA training program; its entire idea was to move away from a medical mission model and empower and educate Haitian men and women to care for their own communities. Several KIs explained that the organization's ethos was to one day to have Haitians leading the entire program. I recommend that stakeholders remain committed to this goal, although I acknowledge that it seems far off in context of the current political crisis.[90]

Research on participatory development by INGOs in LMICs supports involving stakeholders early and often.[92,93] One researcher, Makuwira, found that INGO's use of participatory development in host countries is commonly tokenistic.[94] He recommended that INGOs should relinquish their "grip on power and develop confidence in their beneficiaries and stakeholders."[94] The tokenistic engagement with host countries and lack of trust in local stakeholders' capacity can create poor relationships and barriers to successful implementation. KIs discussed these concepts relating to the barriers to obtaining accreditation for the MFH SBA training program. In the early years, MFH leaders engaged with community stakeholders to the best of their ability, but a lack of cultural and system awareness created some challenging relationship dynamics with the Haitian government. The relationship dynamics between MFH and some individuals controlling the accreditation process created barriers that might have been avoided had participatory development concepts been applied throughout the development process.

One way to circumvent these barriers moving forward is to focus on relationships that are mutually beneficial. Researchers have found that weak health systems tend to have inadequate monitoring and outcomes data. INGO-academia collaboration could enhance the generation of quality evaluation outputs from LMICs and allow the strengths of each organization to support mutual goals. Academia could provide sound theoretical, methodological, and technical expertise, while INGOs are able to align evaluation efforts with local needs and political realities and to communicate research findings to policymakers.[95]

One promising avenue that has recently emerged is a potential partnership with a Haitian academic institution, Haiti State University (HSU), which could provide a pathway to expansion of the MFH SBA training program and accreditation. For broader context, in 2015 HSU entered partnership with Columbia University's School of Nursing to begin Haiti's first Nurse Practitioner program. Then, in 2022, the MFH ED signed a memorandum of understanding to explore a partnership between MFH and HSU that would incorporate the MFH SBA training program under the umbrella of HSU. Given that the researcher found that a key facilitator of implementing the MFH SBA training program was engagement and partnership with organizations, the partnership with HSU may be a practical solution to some of the identified barriers related to the political instability and infrastructure.

Heroism of Individuals

The inductive themes identified in this research were related to systems-level barriers including political instability, infrastructure, and safety issues. Working within a fragile context requires a level of dedication and often heroism from individuals. Some researchers suggest heroism involves prosocial, altruistic actions that involve an element of personal risk or sacrifice.[96] Researchers Franco, Blau, and Zimbardo characterize heroism as acting voluntarily

for the service of others in need, performing actions without any expectation of reward, and recognizing and accepting the potential risk or sacrifice.[97] The concept of heroism is in line with the findings of this study. These characteristics of individuals involved in the program were identified as facilitators. KIs spoke about their individual experiences of accepting risks, sometimes life-threatening, to continue the work of MFH. The belief that the mission is worth the risk reflects the commitment of the individuals involved, including international staff, as well as local staff and students. It is important to note that while the deep commitment of the founder and actors was crucial, successful implementation depended on the relationships with previously existing organizations and institutions. KIs repeatedly spoke of these crucial relationships and that the program would not exist without them.

To successfully implement the program, the intersections of the domains must be considered and integrated within the context of the nonprofit lifecycle. The domains are relational and there must be cooperation between the *individuals*, *intervention*, *inner setting*, *outer setting*, and *process*. The CFIR constructs and domains identified as applicable to the implementation of the program were not set in any moment of time but live in an evolving spectrum and require active collaboration between the elements. This has been a story of people and a program, and its sustainability will be dependent upon the intersection of these factors. The organization will continue to require heroism and engagement to survive in the fragile context of Haiti.

Conclusion

This case study of the MFH SBA training program at STH demonstrated that when the number of SBAs increased, maternal and infant mortality decreased. The implementation of the program has been difficult and overcome many barriers, specifically related to the lack of

systemization, costs, and the fragile context of Haiti. While the program has succeeded and sustained for many years, the organization is at a crossroads, given the current expanded instability and the goals to sustain and scale up the program. After the research interviews and analysis were completed, MFH was approached by Haiti State University (HSU) in the Fall of 2022. HSU as an accredited Haitian university has the only family nurse practitioner program in the country. HSU is passionate about also addressed the need to up scale the midwifery workforce in Haiti and would like to partner with MFH to meet this need. A potential merger of the two programs is being explored and may provide a pathway to overcome many of the barriers identified in this research.

CHAPTER 6: PLAN FOR CHANGE

This chapter consists of two core components: the plan for change and the communication of findings. The plan for change consists of two core elements. The first element, I will be convening and leading a series of meetings with leaders from MFH, MSPP, and HSU to plan the development and strengthening of midwifery in Haiti. The second element will be to facilitate the process of merging the MFH SBA training program with the Haiti State University (HSU) Nurse Practitioner program. The plan for the communication of the findings will include sharing of my research at the annual American College of Nurse-Midwives meeting and in various online forums and publications.

Element One: Series of Meetings

When, Where, and Who

The first meeting is planned for September 2023 in Hinche, Haiti and will be attended by representatives of MFH, HSU, and MSPP. I plan to present the findings of this research at the meeting to provide valuable insight into factors that have facilitated and impeded the MFH SBA training program's implementation. The research findings identified several barriers and facilitators that were categorized based upon the domains and constructs of CFIR. This allowed for a deeper understanding of the relationships and intersectionality of the barriers and facilitators. Meetings will be scheduled quarterly and will be on-going during the process of formalizing the education and regulation of the midwifery profession in Haiti.

Throughout this case study, KIs identified the fragile context of Haiti as the most significant barrier to implementing the program, including political instability, infrastructure, and

safety issues. KIs identified engaging and collaborating with partner organizations as the strongest facilitator. Incorporating these findings into the Midwifery Services Framework (MSF) will require careful consideration. Haiti's fragile context is particularly relevant when addressing the need to develop midwifery educational and professional standards and regulation in Haiti.

Goals

The main objectives of the meetings with HSU, MFH, and MSPP will be to:

- Plan the development and strengthening of the midwifery workforce in Haiti
- To deliberate the strengthening capacity and training of midwives in Haiti
    - The standardization and accreditation of midwifery education
        - Standardized policies regarding institutions, faculty, and curriculum
    - Regulation, regulatory bodies, roles, and responsibilities of the midwifery profession
- Long-term strategic plan to address:
    - Required number and distribution of midwives
    - Recruitment, deployment, and retention of midwives

Why

The purpose of this meeting is to support MFH and partner organizations as they address the workforce shortage and resultant maternal and infant mortality crisis in Haiti. The Ending Preventable Maternal Deaths initiative identified a value of 5.9 skilled health professionals per 1,000 population to reduce maternal deaths to 50 per 100,000 live births by 2035.[9] The need to upscale the midwifery workforce in Haiti is well documented, with only 0.65 skilled health

professionals per 1,000 population.[98] Training midwives is an evidence-based, cost-effective intervention to lower maternal and infant mortality rates.

In 2016-2017, an assessment was completed in Haiti to describe the characteristics of first level maternal care providers and to identify their training needs and priorities to inform planning of HRH interventions. The assessment found that Haiti relies on community level health workers and TBAs, who are under qualified and not regulated by MSPP. The main challenge to reducing maternal mortality remains access to providers qualified to identify and treat obstetric emergencies.[99]

How

My Findings

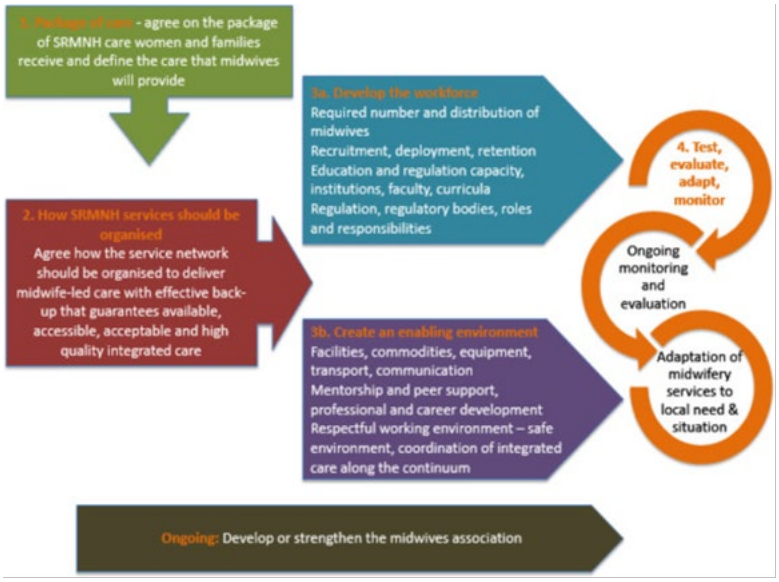
KIs identified the fragile context of Haiti as the most significant barrier to implementing the program, including political instability, infrastructure, and safety issues. KIs identified engaging and collaborating with partner organizations as the strongest facilitator. Incorporating these findings into the MSF will require careful consideration. Haiti's fragile context is particularly relevant when addressing the need to develop midwifery educational and professional standards and regulation in Haiti.

MSF Framework

The ICM MSF provides a systematic and evidence-informed process for countries to address their midwifery workforce shortages (Figure 21). Developed in response to a historical lack of investment in midwifery, the MSF encourages countries' progress towards universal coverage of SRMNH services and supports their progress towards the targets set forth in the SDGs and the Global Strategy on HRH.[100] The MSF provides greater practical implementation guidance than other valuable tools such as the *H4+ handbook for conducting a workforce*

assessment [101] and the WHO *Strengthening Midwifery Toolkit.*[102] Integration of the findings from my research within the MSF will contextualize the framework specific to Haiti.

Figure 21: ICM Midwifery Services Framework[100]



The MSF framework (Figure 9) will support MFH, MSPP and collaborative partners, such as Haiti State University, to upscale birth attendants in Haiti to work towards SDG 3.1 and MDG 5.2. A multi-sectorial approach, in which relevant stakeholders (MFH, HSU, MSPP) come together to address the complex challenges and interrelated goals, will be required to address the HRH needs of Haiti. The primary focus will be on section 3a- the development of the midwifery workforce - including:

- Required number and distribution of midwives
- Recruitment, deployment, and retention of midwives
- Education and regulation capacity, institutions, faculty, and curriculum
- Regulation, regulatory bodies, roles, and responsibilities

UNICEF Guidance

Approaching the MSF framework with the guiding principles designed by UNICEF, in the integrating humanitarian response and development program framework, will ensure proper integration of critical barriers identified to the solutions proposed within the MSF. The guiding principles of the UNICEF framework include a commitment to remain guided by longer-term goals that address the structural causes of fragility while addressing urgent needs of mothers and babies in Haiti. Prioritizing understanding local contexts, and where possible, enabling local actors to take principled action is crucial. Another element is overcoming delivery challenges through innovative partnerships that allow immediate and sustained support to be given. Approaching the process with an openness to informed redirection, by making planning instruments and systems that work for programming in this difficult operating environment will be key.[77]

UNICEF recommends four specific priority areas when enhancing programs in fragile contexts: 1) invest in contextual analysis 2) enhance priority programming approaches 3) enhance partnerships for more effective results 4) expand and adapt internal procedures, capacities, and operational support.[77] These four priority areas are consistent with the findings of the study of the MFH SBA training program and will be relevant working with the MSF. Table 17 below integrates and aligns the findings from the MFH/STH case study, the MSF Framework, and the UNICEF priority areas.

Table 17: Integration of MFH/STH Study Findings, MSF, and the UNCEF Priority Areas[77,100]

MSF	UNICEF Priority Areas	Relevant Findings from MFH/STH Case Study
Package of care Agree on the package of SRMNH care women and families receive and define the care that midwives will provide	Invest in contextual analysis	Holistic and participatory development Engagement and collaboration with relevant stakeholders and partner organizations Empower Haitian leadership
How SRMNH services should be organized Agree how the service network should be organized to deliver midwife-led care with effective back-up that guarantees available, accessible, acceptable, and high-quality integrated care	Invest in contextual analysis Enhance priority programmatic approaches	Holistic and Participatory Development Engagement and collaboration with relevant stakeholders and partner organizations Empower Haitian leadership
Develop the workforce Required number and distribution of midwives Recruitment, deployment, retention Education and regulation capacity, institutions, faculty, curricula Regulation, regulatory bodies, roles, and responsibilities	Enhance priority programmatic approaches Enhance partnerships for more effective results	Curriculum in line with international standards and guidelines Model utilizing Haitian educators and preceptors Support of MSPP and other partner organizations is crucial (HSU, PIH)
Create enabling environment Facilities, commodities, equipment, transport, communication Mentorship and peer support, professional and career development Respectful working environment – safe environment, coordination of integrated care along the continuum	Enhance partnerships for more effective results Expand and adapt internal procedures, capacities, and operational support	Model utilizing Haitian educators and preceptors Support of MSPP and other partner organizations is crucial (HSU, PIH) Foster trusting relationships with relevant stakeholders and partners
Test, evaluate, adapt, monitor Ongoing monitoring and evaluation Adaptation of midwifery services to local need and situation	Expand and adapt internal procedures, capacities, and operational support	Adaptability of MFH program helped establish trust Utilize both continuous quality improvement, as well as formal evaluation processes

Element Two: Potential Merger of MFH with HSU

The merger is in the very early stages of exploration. The results of the study will help provide valuable information about the MFH training program to help facilitate successful implementation as the program expands with HSU. The potential merger is not a result of my study may help facilitate it by providing data about the MFH outcomes and provide insight into what has worked and what has not worked in the past. As noted in the discussion section, the MFH executive director has signed a Memorandum of Understanding (MOU) with HSU to begin exploration of merging the two programs. HSU is a Haitian university that has collaborated with Columbia University to create the first Haitian accredited nurse practitioner program in Haiti. It is financially supported by the W.K. Kellogg Foundation. HSU approached MFH as they wanted to incorporate a nurse-midwifery program but lacked the expertise.

This potential partnership and merging of the programs is an example of a mutually beneficial relationship that could support both organizations to meet shared goals. The partnership offers MFH the potential to overcome many of the barriers identified in the case study. The first being the challenge of obtaining Haitian accreditation. Merging with HSU would provide MFH with an opportunity to receive accreditation status under the umbrella of HSU with MSPP. MFH would truly become a Haitian led and approved midwifery program. The program's graduates would be awarded a master's degree from HSU, which would provide greater employment opportunities and higher salaries. Also, a major barrier identified in the study was the costs of implementing the MFH program, and the merger would allow MFH to receive support from the W.K. Kellogg Foundation. This financial support would provide a pathway to sustainability.

HSU would benefit from MFH's expertise in implementing a successful SBA training program. The findings from this study will provide quantitative data supporting the effectiveness of the model in increasing SBAs and decreasing the incidence of maternal and infant mortality. MFH would provide HSU with an internationally supported curriculum and training model that has a proven record of accomplishment. MFH has faculty, preceptors, clinical sites, and classrooms to accommodate the expanded midwifery program.

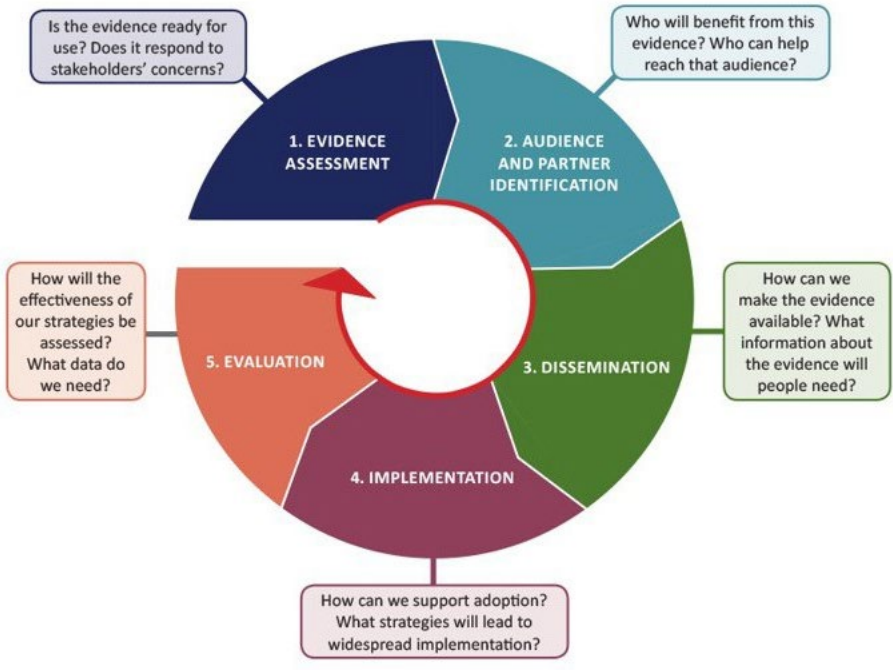
Plans for Communication of Findings

Communicating the findings and recommendations will include a structured plan that will follow the 2015 Patient-Centered Outcomes Research Institute's (PCORI) dissemination and implementation (D&I) framework. The PCORI D&I framework was developed to facilitate strategic planning for information sharing, but also to speed change by putting new evidence into practice. The PCORI D&I framework defines dissemination as

> the intentional, active process of identifying target audiences and tailoring communication strategies to increase awareness and understanding of evidence, and to motivate its use in policy, practice, and individual choices. Implementation is the deliberate, iterative process of integrating evidence into policy and practice through adapting evidence to different contexts and facilitating behavior change and decision making based on evidence across individuals, communities, and healthcare systems."[103]

Within the PCORI D&I framework there are three key concepts that inform recommendations and action steps: context, engagement, and evaluation. The framework was developed with the belief that stakeholder-informed research brings real-world relevance. The framework is divided into five interdependent levels and asks key questions throughout the process (Figure 22).[103] Utilizing the PCORI D&I framework will ensure that the communication of the findings and recommendations is both systematic and relevant to the proposed stakeholders.

Figure 22: PCORI Dissemination and Implementation Framework[103]



I plan to present the findings of the case study, including the ICM MSF adapted framework to the MFH organization, MSPP, and HSU at the joint meeting scheduled for September of 2023. The relationships between these stakeholders are critical to the long-term success of the goal to increase SBAs in Haiti. Providing a cohesive plan of action that considers these relational dynamics will be critical to the expansion and survival of the training program. Years of in-country relationship building with MSPP and partner organizations, such as HSU, will provide the foundation needed to ensure dissemination of the findings and recommendations will serve the women and children of Haiti.

Additionally, I plan to submit a proposal to present the findings of the research and their relevance to the MSF framework at the American College of Nurse Midwives annual conference in Spring of 2024. I also plan to disseminate the findings through online publication on various global health forums and journals, including the Journal of Midwifery and Women's Health, the Journal of Global Public Health, and Frontiers in Global Women's Health.

Closing

This case study has revealed many relevant findings to support the work of MFH and other partner organizations to continue to upscale the maternal child healthcare workforce in Haiti. The organizational history provided necessary context and was grounded in the lifecycle of nonprofit theory. The quantitative analysis demonstrated a relationship between the growth of the MFH SBA training program and improved outcomes in maternal and infant death rates at STH. The KIIs explored the barriers and facilitators of implementing the MFH SBA providing valuable insight to MFH and collaborating partners to work more effectively moving forward. This case study has renewed my passion to pursue the eradication of preventable maternal mortality in Haiti. I hope this study will inspire MFH and its partners to continue to work tirelessly to save the lives of mothers and babies.

APPENDIX 1: ORIGINAL SEARCH STRATEGY IN PUBMED

Concept Block	Keywords
1. Midwives	Midwives[tiab] OR midwife[tiab] OR “birth attendant*”[tiab] OR "Midwifery"[Mesh] OR midwifery[tiab]
2. Maternal Mortality	"Maternal Mortality"[Mesh] OR “maternal mortalit*”[tiab]
3. Low- and Middle-Income Countries	Deprived Countries[tw] OR Deprived Population[tw] OR Deprived Populations[tw] OR Developing Countries[tw] OR Developing Country[tw] OR Developing Economies[tw] OR Developing Economy[tw] OR Developing Nation[tw] OR Developing Nations[tw] OR Developing Population[tw] OR Developing Populations[tw] OR Developing World[tw] OR LAMI Countries[tw] OR LAMI Country[tw] OR Less Developed Countries[tw] OR Less Developed Country[tw] OR Less Developed Economies [tw] OR Less Developed Nation[tw] OR Less Developed Nations[tw] OR Less Developed World[tw] OR Lesser Developed Countries[tw] OR Lesser Developed Nations[tw] OR LMIC[tw] OR LMICS[tw] OR Low GDP[tw] OR Low GNP[tw] OR Low Gross Domestic[tw] OR Low Gross National[tw] OR Low Income Countries[tw] OR Low Income Country[tw] OR Low Income Economies [tw] OR Low Income Economy[tw] OR Low Income Nations[tw] OR Low Income Population[tw] OR Low Income Populations[tw] OR Lower GDP[tw] OR lower gross domestic[tw] OR Lower Income Countries[tw] OR Lower Income Country[tw] OR Lower Income Nations[tw] OR Lower Income Population[tw] OR Lower Income Populations[tw] OR Middle Income Countries[tw] OR Middle Income Country[tw] OR Middle Income Economies [tw] OR Middle Income Nation[tw] OR Middle Income Nations[tw] OR Middle Income Population[tw] OR Middle Income Populations[tw] OR Poor Countries[tw] OR Poor Country[tw] OR Poor Economies [tw] OR Poor Economy[tw] OR Poor Nation[tw] OR Poor Nations[tw] OR Poor Population[tw] OR Poor Populations[tw] OR poor world[tw] OR Poorer Countries[tw] OR Poorer Economies [tw] OR Poorer Economy[tw] OR Poorer Nations[tw] OR Poorer Population[tw] OR Poorer Populations[tw] OR Third World[tw] OR Transitional Countries[tw] OR Transitional Country[tw] OR Transitional Economies[tw] OR Transitional Economy[tw] OR Under Developed Countries[tw] OR Under Developed Country[tw] OR under developed nations[tw] OR Under Developed World[tw] OR Under Served Population[tw] OR Under Served Populations[tw] OR Underdeveloped Countries[tw] OR Underdeveloped Country[tw] OR underdeveloped economies[tw] OR underdeveloped

	nations[tw] OR underdeveloped population[tw] OR Underdeveloped World[tw] OR Underserved Countries[tw] OR Underserved Nations[tw] OR Underserved Population[tw] OR Underserved Populations[tw] OR Afghanistan[tw] OR Albania[tw] OR Algeria[tw] OR "American Samoa"[tw] OR Angola[tw] OR Argentina[tw] OR "Argentine Republic"[tw] OR Armenia[tw] OR Azerbaijan[tw] OR Bangladesh[tw] OR Belarus[tw] OR Byelarus[tw] OR Belorussia[tw] OR Belize[tw] OR Benin[tw] OR Bhutan[tw] OR Bolivia[tw] OR Bosnia[tw] OR Botswana[tw] OR Brazil[tw] OR Bulgaria[tw] OR Burma[tw] OR "Burkina Faso"[tw] OR Burundi[tw] OR "Cabo Verde"[tw] OR "Cape verde"[tw] OR Cambodia[tw] OR Cameroon[tw] OR "Central African Republic"[tw] OR Chad[tw] OR China[tw] OR Colombia[tw] OR Comoros[tw] OR Comores[tw] OR Comoro[tw] OR Congo[tw] OR "Costa Rica"[tw] OR "Côte d'Ivoire"[tw] OR Cuba[tw] OR Djibouti[tw] OR Dominica[tw] OR "Dominican Republic"[tw] OR Ecuador[tw] OR Egypt[tw] OR "El Salvador"[tw] OR Eritrea[tw] OR Ethiopia[tw] OR Fiji[tw] OR Gabon[tw] OR Gambia[tw] OR Gaza[tw] OR "Georgia Republic"[tw] OR Georgian[tw] OR Ghana[tw] OR Grenada[tw] OR Grenadines[tw] OR Guatemala[tw] OR Guinea[tw] OR "Guinea Bissau"[tw] OR Guyana[tw] OR Haiti[tw] OR Herzegovina[tw] OR Hercegovina[tw] OR Honduras[tw] OR India[tw] OR Indonesia[tw] OR Iran[tw] OR Iraq[tw] OR Jamaica[tw] OR Jordan[tw] OR Kazakhstan[tw] OR Kenya[tw] OR Kiribati[tw] OR Korea[tw] OR Kosovo[tw] OR Kyrgyz[tw] OR Kirghizia[tw] OR Kirghiz[tw] OR Kirgizstan[tw] OR Kyrgyzstan[tw] OR "Lao PDR"[tw] OR Laos[tw] OR Lebanon[tw] OR Lesotho[tw] OR Liberia[tw] OR Libya[tw] OR Macedonia[tw] OR Madagascar[tw] OR Malawi[tw] OR Malay[tw] OR Malaya[tw] OR Malaysia[tw] OR Maldives[tw] OR Mali[tw] OR "Marshall Islands"[tw] OR Mauritania[tw] OR Mauritius[tw] OR Mexico[tw] OR Micronesia[tw] OR Moldova[tw] OR Mongolia[tw] OR Montenegro[tw] OR Morocco[tw] OR Mozambique[tw] OR Myanmar[tw] OR Namibia[tw] OR Nauru[tw] OR Nepal[tw] OR Nicaragua[tw] OR Niger[tw] OR Nigeria [tw] OR Pakistan [tw] OR Palau[tw] OR Panama[tw] OR "Papua New Guinea"[tw] OR Paraguay[tw] OR Peru [tw] OR Philippines[tw] OR Phillippines[tw] OR Philipines[tw] OR Phillipines[tw] OR Principe[tw] OR Romania[tw] OR Rwanda[tw] OR Ruanda[tw] OR Samoa[tw] OR "Sao Tome"[tw] OR Senegal[tw] OR Serbia[tw] OR "Sierra Leone"[tw] OR "Solomon Islands"[tw] OR Somalia[tw] OR "South Africa"[tw] OR "South Sudan"[tw] OR "Sri Lanka"[tw] OR "St Lucia"[tw] OR "St Vincent"[tw] OR Sudan[tw] OR Suriname[tw] OR Swaziland[tw] OR Syria[tw] OR "Syrian Arab

	Republic”[tw] OR Tajikistan[tw] OR Tadzhikistan[tw] OR Tadjikistan[tw] OR Tadzhik[tw] OR Tanzania[tw] OR Thailand[tw] OR Timor[tw] OR Togo[tw] OR Tonga[tw] OR Tunisia[tw] OR Turkey[tw] OR Turkmen[tw] OR Turkmenistan[tw] OR Tuvalu[tw] OR Uganda[tw] OR Ukraine[tw] OR Uzbek[tw] OR Uzbekistan[tw] OR Vanuatu[tw] OR Venezuela[tw] OR Vietnam[tw] OR “West Bank”[tw] OR Yemen[tw] OR Zambia[tw] OR Zimbabwe[tw]

APPENDIX 2: ABSTRACTION TABLE

ID	Author (Year)	Study Design & Methods	Setting & Population Sample	Data Collection, Analysis	Intervention-Type/ Birth Attendant-Birth Setting	Outcomes Measured	Results	Author Conclusions
1	Jokhio, A.H., et al. (2005)	Cluster-RCT	7 subdistricts (talukas) in rural Pakistan district 10,114 women in intervention group/9,443 women in control group	3 talukas randomly assigned to intervention group, TBA trained and issued disposable delivery kits; lady health workers linked TBAs with established services, documented processes, and outcomes; and obstetrical teams provided outreach clinics for antenatal care. Women in 4 control talukas received care	Training of TBAs-TBA-Home, Hospital	Maternal and perinatal mortality	Compared to control talukas, intervention talukas had cluster-adj. odds ratio for perinatal death of 0.70 and 0.74 for maternal mortality.	Training & integrating TBAs into improved healthcare system achievable & effective in reducing perinatal & maternal mortality. Model could greatly improve perinatal and maternal health in developing countries.
2	Ellard, D., et al. (2016)	Cluster-RCT	14 districts of central of northern Malawi 46 NPCs selected and enrolled in training program.	Data compared from all facilities in both intervention and control districts for the lifetime of project (3-4yrs). Process evaluation using both quantitative and qualitative to evaluate intervention implementation.	Training program for NPCs-clinical officers, midwives, and community health-workers-Health facility	Maternal and perinatal mortality	MMRs improved in intervention, worsened in control. 31% drop in neonatal mortality in intervention. MMR improved -157 to 80 per 100,000.	One of first randomized studies on effect of structured training on health outcomes in this setting. Up-skilling cadre could impact health outcomes.

3	Huang, J., et al., (2020)	Cross-sectional survey design	Five provinces/ cities of China/ Provinces 2,022 midwives	National cross-sectional study used online questionnaire; guided by STROBE (Strengthening the Reporting of Observational Studies in Epidemiology)	Assessment of competencies-Midwives-Hospitals	Midwives perceived their competencies between low and high MMR regions	Midwives rated themselves higher on essential competencies in intrapartum care and lower on essential competencies in assisting or performing the operative vaginal delivery. When compared to those from regions of low MMRs, midwives from regions with high MMRs reported comparatively poor self-perceived essential competencies, especially in the area of detecting and treating pregnancy and childbirth related complications. The factors influencing midwives self-perceived essential competencies included majors, education levels, years of experience as a midwife, participation in teaching, and access to in-service training.	In regions with high MMRs, improving midwives' essential competencies is a key priority. Recommends midwifery education be conducted in universities, and relevant regulations be developed to enable midwives to provide a wider scope of care, thereby promoting the development of the midwifery workforce in China.
4	Rajbhandari, R., et al., (2019)	Quantitative cross-sectional analysis	276 health facilities in districts of Nepal 511 skilled birth attendants (SBAs)	SBAs scores on standardized knowledge assessment, clinical skills assessment, and monthly delivery volume	Assessment of competencies-SBAs-SHP, HP, PHC and hospital	Standardized knowledge assessment, clinical skills assessment, and monthly delivery volume	SBAs exhibit a deficiency of both knowledge and clinical skills, failing to meet the 80-percent standard that is required to pass training. SBAs conduct few deliveries, with only 7 percent meeting the minimum volume recommended to maintain competence by the WHO	While countries like Nepal have made investments in SBA program, healthcare workers failing to receive effective training or sufficient practice to stay clinically competent and knowledgeable in the field. This may explain why institutional deliveries have failed to deliver better outcomes for pregnant women and their babies.

5	Ronsmans, C., et al., (2009)	Capture-recapture, case control analysis and cohort analysis	Two districts, Serang and Pandeglang districts of Banten Province, Java 458 cases of maternal death between Jan 2004-Dec 2005 and 1234 unmatched controls of women who reported a birth between Apr 2004-March 2006	Informant networks characterized all maternal deaths and capture-recapture method to estimate the total number of maternal deaths. In a survey of recent births, all midwives practicing in the two study districts were counted. Case-control analysis examined determinants of maternal mortality and cohort analysis to estimate overall maternal mortality ratios	Assess effect of program to increase use of SBAs/ examine determinants of MM-Midwives-Home, Hospital	Maternal Mortality Ratio	MMR was 435 per 100,000 live births. Only 33% of women gave birth with assistance from a health professional and among them, mortality was extremely high for those in the lowest wealth quartile range and remained very high for those in the lower and middle quartile ranges.	Achieving equitable coverage of all births by a health professional is still a distant goal of Indonesia, but even among women who receive professional care, MMRs remain surprisingly high. This may reflect the limitations of home-based care. Phased introduction of fee exemption and transport incentives to enable all women to access skilled delivery care in health centers and emergency care in hospitals may be a feasible, sustainable way to reduce Indonesia's maternal mortality ratio.

6	Montgomery, A.L., et al., (2014)	Unmatched population-based case-control analysis	India Cases identified from India's Million Death Study (MDS) 1,096 maternal deaths 2001-2003. Controls identified from India's District Level Health Survey (DLHS-2) 147,001 women with reported pregnancies 2001-2003	An unmatched population-based case-control study design to compare health-facility admission at any time in pregnancy, delivery or postpartum between cases of maternal death and control women who survived.	yes/no for health-facility admission-SBAs-Home, Health facility	Maternal Mortality	Probability of maternal death decreased with increasing skilled birth attendant coverage, among both women who were and were not admitted to a health-care facility, however, the risk of dying among women who were admitted was higher than among those women who were not; while at higher levels of coverage, the effect of health facility admission was attenuated. The probability of maternal death decreased with increasing coverage among both women admitted for delivery or delivered at home but there was no effect of admission for delivery on mortality risk, suggesting that poor quality of obstetric care may have attenuated the benefits of health-facility care.	The effect of health facility admission varied by skilled attendant coverage. Effect appears to be driven by reverse causality; however, inequitable access to and possibly poor quality of healthcare for primary and emergency services appears to play a role in maternal survival as well.
7	Ellard, D.R., et al., (2016)	Pre- & post-examination and a survey	17 health facilities in rural Tanzania 36 trainees including 19 assistant medical officers, 1 senior clinical officer and 16 nurse midwives/nurses	Descriptive and summary statistics were produced. Survey data presented as descriptive statistics and data grouped by facility type.	Two interventions: training of ACs and nurses in CEmOC and anesthesia. And post-training mentoring and supervision of participants at their work place.-Medical officers, senior clinical officer, nurse midwives/nurses -Hospital, health facility	Explore the impact of ETATMBA training on health outcomes including maternal and neonatal morbidity and mortality	Maternal deaths show a non-significant downward trend over the two years.	Enhancing knowledge, practical skills, and clinical leadership of ACs may have a positive impact on health outcomes. However, any impact may be confounded by the significant challenges in delivering a service in terms of resources. Thus, training may be beneficial, but it requires an infrastructure that supports it.

8	Nove, A., et al., (2020)	Modeling study	88 countries (30 with lowest HDI, 20 low-to-medium HDI, and 29 medium-to-high HDI)	Used the Lives Saved Tool to estimate the number of deaths that would be averted by 2035, if coverage of health interventions that can be delivered by professional midwives.	Four scenarios to assess the effects of increasing the coverage of midwife-delivered interventions by a modest amount (10% every 5 years), a substantial amount (25% every 5 years) and the amount needed to reach universal coverage of these interventions (i.e., to 95%) and the effects of coverage attrition (a 2% decrease every 5 years)-Midwives-N/A	Maternal deaths, neonatal deaths and stillbirths	A substantial increase n coverage of midwife-delivered interventions could avert 41% of maternal deaths, by 2035. Modest increase could avert 22% of maternal deaths. Universal coverage of midwife-delivered interventions would avert 67% of maternal deaths. Averted deaths would be concentrated in Group B countries, which currently account for a large proportion of the world's population.	Midwives can help to substantially reduce maternal and neonatal mortality and stillbirths in LMICs. However, to realize this potential, midwives need to have skills and competencies in line with recommendations from the ICM, to be part of a team of sufficient size and skill, and to work in an enabling environment. Study highlights the potential of midwives but there are many challenges to the achievement of this potential. If increased coverage of midwife-delivered interventions can be achieved, health systems will be better able to provide effective coverage of essential sexual, reproductive, maternal, newborn, and adolescent health interventions.

9	Lindtjorn, B., et al., (2017)	Implementation/observational study	3 districts (woreda) in Southwest Ethiopia 38,312 births	Data collected in the national birth registry system. Analysis was completed using proportions, incidence rates and odds ratios	Upgrading institutions to carry our Basic & Comp. Emergency Obstetric Care. Health institutions were upgraded by training non-clinical physicians and midwives by providing the institutions with essential and basic equipment, and by regularly monitoring and supervision by staff competent in emergency obstetric work-doctor, midwife, health institutions	Maternal Mortality ratio	MMR declined by 64% during intervention period	It is possible to achieve substantial reductions in MMRs over a short period of time if the effective coverage of well-known interventions is implemented
10	Hanson, C., et al., (2015)	Secondary analysis of cross-sectional georeferenced census data	5 rural districts in southern Tanzania 71,198 women who had given birth during 5 years prior	Cross sectional geo census data collected & interviews/verbal autopsy/sociodemographic info. Multi-level regression was used to analyze the effects of distance to health facilities providing delivery care and maternal mortality	Distance to health facility/SB attendance-n/a-Hospital, health centre, home	Maternal mortality by distance to health facility	Deaths related to direct causes of maternal mortality were strongly related to distance, with mortality increasing from 111 per 100,000 live births among women who lived within 5km to 422 deaths per 100,000 live births among those who lived more than 35km from a hospital	Large distances to hospital contribute to high levels of direct obstetric mortality. High pregnancy-related mortality in those living near to a hospital suggests deficiencies in quality of care.

11	Ronsman, C., et.al., (2003)	Ecological study	16 sites in 8 West African countries (Senegal, Guinea-Bissau, Gambia, Burkina Faso, Cote d'Ivoire, Mali, Mauritania, Niger) 58,595 women who had given birth	The Maternal Mortality and Obstetric Care in West Africa (MAMOCWA) study, The Gambia and the Morbidite Maternelle en Afrique de l"Ouest (MOMA) study data. Compared five indicators of access to obstetric services. Associations between process indicators and maternal mortality levels were assessed using correlation coefficient. Linear and non-linear regression lines were used.	Access to obstetric services-Doctor, midwife, nurse or TBA-Hospital, health centre, in any health facility	Maternal Mortality	In rural areas, maternal mortality, was 601 per 100,000 live births, compared with 241 per 100,000 for urban areas. In urban areas, vast majority of births took place in a health facility or with a skilled provider (69%), while 80% of the rural women gave birth a home without any skilled care. There was a relatively close link between levels of maternal mortality and the percentage of births with a skilled attendant, in hospital or with a cesarean section, with marked clustering in urban and rural areas.	Huge rural-urban differences in maternal mortality are due, at least in part, to differential access to high quality maternity care.

12	Zerfu, T.A., et al., (2018)	Cluster-randomized community trail	282 villages 2,147 women	Baseline and end line data collected by trained nurses	Provision of maternal, neonatal and child health services by CORN based at either health centers or health posts. Education of mothers about skilled institutional health services including: ANC, SBA, PNC, and FP services. - Skilled care provider (midwives, doctors or other trained professional)- Health facility or home	SBA utilization, place of delivery	Overall SBA utilization increased by 81.1% and 122.9% in the HP and HC based intervention arms. Health center-based deliveries increased and overall home deliveries decreased.	Deployment of trained reproductive health nurses to rural communities in Ethiopia significantly improved utilization of SBA services. In similar low income settings where coverage of SBA services is very low, deployment of trained community-based nurses to grassroots level could potentiate rapid service uptake.

APPENDIX 3: RECRUITMENT EMAIL FOR KEY INFORMANT INTERVIEW PARTICIPANTS

Dear [Name of Key Informant],

I would like to invite you to participate in a research study exploring the barriers and facilitators to increasing skilled birth attendance in Haiti. I am conducting this study to meet dissertation requirements as a doctoral candidate at the University of North Carolina at Chapel Hill, Gilling School of Global Public Health.

The specific aims are 1) to understand the history and current iteration of the MFH SBA training program and subsequent increase in skilled birth attendance at STH; 2) How does the growth of the MFH SBA training program relate to increased availability of SBAs and birth outcomes at STH? and 3) What are the barriers and facilitators of increasing skilled birth attendance in a rural hospital in Haiti?

Benefits of this research include:

- Understanding of the history of the MFH SBA training program and it impact on the availability of skilled birth attendance and birth outcomes at STH.
- An understanding of barriers and facilitators of increasing skilled birth attendants in a rural hospital and implementing an SBA training program.

If you agree to participate, I will schedule a 30-minute, in-person or telephone meeting with you. During this meeting, I will ask you some questions about your personal experience as a skilled birth attendant at STH and/or as a MFH staff member.

Participation in this study is voluntary and confidential. Your name will not be used and this site will be blinded and only described in general terms. Though direct quotes may be used in the final dissertation, your name and other identifying information will remain anonymous.

Please let me know if you are willing to participate in this study.

Sincerely,

Jennifer Burns

APPENDIX 4: KEY INFORMANT INTERVIEW GUIDE: KEY MEMBERS OF MFH

Date:_____

Job Title:_____

Key Informant ID#:_____

Introduction

The purpose of this interview is to understand the history and the current iteration of Midwives for Haiti Skilled Birth Attendant training program. Specifically, I am interested in learning more about the staffing and rates skilled birth attendance over time at STH, as well as the evolution of the implementation of the SBA training program

This interview should take about 30-45 minutes. Again, it will be completely confidential and any information that you provide will be released as a summary or combined into general themes. Your name will not be connected to your answers in any way. Furthermore, your job title will remain blinded and will not be listed by name but as a 'Job Title X'. With your permission, I would like to record our interview. Digital audio files and transcripts will be confidentially destroyed at the end of the research study.

- **Are there any questions that you have about the research study or the interview?**
- **May I record the interview?**

I would like to start by explaining some of the terms I used. When I refer to SBAs, I am referring to skilled birth attendants who are graduates of the MFH SBA training program. When I refer to MFH, I am referring to Midwives for Haiti.

- **Do you have any questions about the definitions before we move on?**

I am going to start with some introductory questions to better understand your background and current roll at MFH or STH.

- **How long have you worked for Midwives for Haiti?_____**
- **What is your current role?_____**
- **Have you had other roles/job titles at MFH?_____**
- **What is your nationality? _____**

Now, I would like to talk specifically about the history of the MFH SBA training program.

- How did you become involved with MFH?
- At the time that you began working with MFH, what did the training program look like?
- How has the training program evolved over the time you have been part of the organization?
    - Probing: If you can recall, please tell me each iteration you remember of the training program.
- What did the coverage of skilled birth attendance look like at St. Therese when you started working with MFH?
- How has the coverage skilled birth attendance evolved at St. Therese over the time you have been part of the organization?
- What is the current staffing model at STH for skilled birth attendants?
- How has the staffing at St. Therese impacted the rate of skilled birth attendance?

Closing

- Do you have any additional comments that you would like to make about the history and current iteration of the MFH SBA training program? Any additional comments about the subsequent increase in skilled birth attendance at STH

APPENDIX 5: KEY INFORMANT INTERVIEW GUIDE: MFH SBA GRADUATES WORKING AT STH

Date:_____

Job Title:_____

Key Informant ID#:_____

Introduction

The purpose of this interview is to explore the experiences of MFH SBA graduates working at STH. Specifically, I am interested in learning more about the barriers and facilitators of increasing skilled birth attendants.

This interview should take about 30 minutes. Again, it will be completely confidential and any information that you provide will be released as a summary or combined into general themes. Your name will not be connected to your answers in any way. Furthermore, your job title will remain blinded and will not be listed by name but as a 'Job Title X'. With your permission, I would like to record our interview. Digital audio files and transcripts will be confidentially destroyed at the end of the research study.

- **Are there any questions that you have about the research study or the interview?**
- **May I record the interview?**

I would like to start by explaining some of the terms I used. [Distribute the list of practices from literature review.] When I refer to SBAs, I am referring to skilled birth attendants who are graduates of the MFH SBA training program.

- **Do you have any questions about the definitions before we move on?**

I am going to start with some introductory questions to better understand your background and current roll at STH.

- **When did you graduate from the Midwives for Haiti training program?_____**
- **Where you hired as an SBA upon graduating? Y N**
- **If not, how long did it take you to find employment?_____**
- **When you were hired to work at St. Therese? Date/Number of years_____**
- **Have you worked elsewhere? If so, where and for how long?_____**
- **Are you employed by MSPP or MFH?_____**

Now, I would like to talk specifically about the barriers and facilitators of increasing skilled birth attendants at STH. Simply stated what has helped and what has made it hard to increase skilled birth attendants.

Barriers/Facilitators

- When reflecting on the implementation of the MFH SBA training program, are there specific facilitators that you can identify?
    - Probing: Is there anything you can identify that has supported the implementation of the SBA training program?
- Are there other organizations that have supported the implementation of the MFH skilled birth attendant training program?
- Are there any policies or organizations that have supported the implementation of the MFH skilled birth attendant training program?
- How has the relationship with MSPP and specifically the MSPP hospital, St. Therese, helped with the successful implementation?

- What obstacles or barriers have you encountered in implementing the MFH skilled birth attendant training program?
    - Probes: Tell me about any barriers you have encountered specifically related to politics. How about financial barriers? Systems barriers?
    - Are there organizational challenges? Policy barriers?
- Can you tell me about your personal experience of working for MFH as it pertains to implementing the SBA program?
- Can you tell me about your personal experience of increasing skilled birth attendants in Haiti within your role of working for MFH?
- Tell me a story about a specific time that made a positive impact in the successful implementation of the program.
- Tell me a story about a time that a challenge occurred that could have endangered the implementation of the program.
- In your opinion, what is the most important thing that Midwives for Haiti could do to increase skilled birth attendants at STH? And throughout Haiti?

Closing

- Do you have any additional comments that you would like to make about barriers and facilitators of increasing skilled birth attendants in Haiti?

APPENDIX 6: KEY INFORMANT INTERVIEW GUIDE: MFH STAFF MEMBERS

Date:_____

Job Title:_____

Key Informant ID#:_____

Introduction

The purpose of this interview is to explore the experiences of key MFH staff members. Specifically, I am interested in learning more about the barriers and facilitators of implementing the skilled birth attendant training program.

This interview should take about 30 minutes. Again, it will be completely confidential and any information that you provide will be released as a summary or combined into general themes. Your name will not be connected to your answers in any way. Furthermore, your job title will remain blinded and will not be listed by name but as a 'Job Title X'. With your permission, I would like to record our interview. Digital audio files and transcripts will be confidentially destroyed at the end of the research study.

- **Are there any questions that you have about the research study or the interview?**
- **May I record the interview?**

I would like to start by explaining some of the terms I used. [Distribute the list of practices from literature review.] When I refer to SBAs, I am referring to skilled birth attendants who are graduates of the MFH SBA training program.

- **Do you have any questions about the definitions before we move on?**

I am going to start with some introductory questions to better understand your background and current roll at Midwives for Haiti.

- **How long have you worked for Midwives for Haiti?_____**
- **What is your current role?_____**
- **Have you had other roles/job titles at MFH?_____**
- **What is your nationality? _____**

Now, I would like to talk specifically about the barriers and facilitators of implementing the MFH skilled birth attendant training program in Haiti. Simply stated what has helped and what has made it hard to implement the MFH SBA training program.

Barriers/Facilitators

- When reflecting on the implementation of the MFH SBA training program, are there specific facilitators that you can identify?
    - Probing: Is there anything you can identify that has supported the implementation of the SBA training program?
- Are there other organizations that have supported the implementation of the MFH skilled birth attendant training program?
- Are there any policies or organizations that have supported the implementation of the MFH skilled birth attendant training program?
- How has the relationship with MSPP and specifically the MSPP hospital, St. Therese, helped with the successful implementation?
- What obstacles or barriers have you encountered in implementing the MFH skilled birth attendant training program?
    - Probes: Tell me about any barriers you have encountered specifically related to politics. How about financial barriers? Systems barriers?
    - Are there organizational challenges? Policy barriers?

- Can you tell me about your personal experience of working for MFH as it pertains to implementing the SBA program?
- Can you tell me about your personal experience of increasing skilled birth attendants in Haiti within your role of working for MFH?
- Tell me a story about a specific time that made a positive impact in the successful implementation of the program.
- Tell me a story about a time that a challenge occurred that could have endangered the implementation of the program.
- In your opinion, what is the most important thing that Midwives for Haiti could do to increase skilled birth attendants at STH? And throughout Haiti?

Closing

- Do you have any additional comments that you would like to make about barriers and facilitators of increasing skilled birth attendants in Haiti?

APPENDIX 7: CFIR CODE BOOK

Deductive Coding List	Description: Developed Before Data Collection
Intervention Characteristics	Characteristics of the intervention being implemented in a specific setting, including the interventions core components and the adaptable elements, structures, and systems related to the intervention and the setting where it is being implemented.
Evidence Strength & Quality	Stakeholders' perceptions of the quality and validity of evidence supporting the belief that the intervention will have desired outcomes
Relative Advantage	Stakeholders' perception of the advantage of implementing the intervention versus an alternative solution
Adaptability	The degree to which an intervention can be adapted, tailored, refined, or reinvented to meet local needs
Design Quality and Packaging	Perceived excellence in how the intervention is bundled, presented, and assembled
Cost	Costs of the intervention and costs associated with implementing that intervention including investment, supply, and opportunity costs
Outer Setting	Includes the economic, political, and social context within which an organization resides
Cosmopolitanism	The degree to which an organization is networked with other external organizations
External Policy & Incentives	A broad construct that includes external strategies to spread interventions including policy and regulations (governmental), external mandates, recommendations and guidelines, collaboratives, and public benchmark reporting
Inner Setting	Features of structural, political, and cultural contexts through which the implementation process will proceed
Structural Characteristics	The social architecture, age, maturity, and size of an organization
Implementation Climate	The absorptive capacity for change, shared receptivity of involved individuals to an intervention and the extent to which use of that intervention will be rewarded, supported, and expected within their organization
Characteristics of Individuals	Individuals involved with the intervention and/or implementation process
Knowledge & Beliefs about the Intervention	Individuals' attitudes toward and value placed on the intervention as well as familiarity with facts, truth, and principles related to the intervention
Individual Identification with Organization	A broad construct related to how individuals perceive the organization and their relationship and degree of commitment with that organization
Process	The active change process aimed to achieve individual and organizational level use of the intervention as designed
Planning	The degree to which a scheme or method of behavior and tasks for implementing an intervention are developed in advance and the quality of those schemes or methods
Engaging	Attracting and involving appropriate individuals in the implementation and use of the intervention through a combined strategy of social marketing, education, role modeling, training, and other similar activities
Executing	Carrying out or accomplishing the implementation according to plan
Reflecting & Evaluating	Quantitative and qualitative feedback about the progress and quality of implementation
Inductive Coding List	**Description:** **-developed to flag ideas that relate to the interpretation of the data**
Infrastructure	The basic physical and organizational structures and facilities (buildings, roads, power supplies) needed for the operation of a society
Political Instability	The unstable structure of a government and its inclination to collapse in a short time due to unstable political structures
Safety Issues	Safety issues include risks of kidnapping, crime, and civil unrest

REFERENCES

1. United Nations Population Fund. *Trends in Maternal Mortality: 2000 to 2017*. World Health Organization; 2019. Accessed April 10, 2023. https://www.unfpa.org/featured-publication/trends-maternal-mortality-2000-2017

2. World Health Organization. *Optimizing Health Worker Roles to Improve Access to Key Maternal and Newborn Health Interventions through Task Shifting*. World Health Organization; 2012. Accessed April 10, 2023. https://apps.who.int/iris/handle/10665/77764

3. Girum T, Wasie A. Correlates of maternal mortality in developing countries: an ecological study in 82 countries. *Matern Health Neonatol Perinatol*. 2017;3:19. doi:10.1186/s40748-017-0059-8

4. AbouZahr C, Wardlaw T, Stanton C, Hill K. Maternal mortality. *World Health Stat Q*. 1996;49(2):77-87.

5. Kassebaum N, Steiner C, Murray C, Lopez A, Lozano R. Global, regional, and national levels of maternal mortality, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2016;388(10053):1775-1812. doi:10.1016/S0140-6736(16)31470-2

6. United Nations Population Fund. The state of the world's midwifery. Updated May 3, 2021. Accessed Apil 10, 2023. https://www.unfpa.org/sowmy

7. Maternal mortality – revised WHO estimates alarming. *Indian Med Trib*. 1996;4(11):1-4.

8. Roser M, Ritchie H. Maternal mortality. Our World in Data. November 12, 2013. Accessed April 10, 2023. https://ourworldindata.org/maternal-mortality

9. World Health Organization. *Strategies Towards Ending Preventable Maternal Mortality (EPMM)*. World Health Organization; 2015. Accessed April 10, 2023. https://apps.who.int/iris/handle/10665/153544

10. Department of Economic and Social Affairs. *Transforming our World: The 2030 Agenda for Sustainable Development*. United Nations; 2015. Accessed April 10, 2023. https://sdgs.un.org/2030agenda

11. World Health Organization. *International Statistical Classification of Diseases and Related Health Problems*. 11th ed. World Health Organization.

12. Say L, Chou D, Gemmill A, et al. Global causes of maternal death: a WHO systematic analysis. *Lancet Glob Health*. 2014;2(6):e323-33. doi:10.1016/S2214-109X(14)70227-X

13. Dahab R, Sakellariou D. Barriers to accessing maternal care in low income countries in africa: a systematic review. *Int J Environ Res Public Health*. 2020;17(12). doi:10.3390/ijerph17124292

14. UNICEF. The State of the World's Children 1998: a UNICEF report. Malnutrition: causes, consequences, and solutions. *Nutr Rev*. 1998;56(4 Pt 1):115-123. doi:10.1111/j.1753-4887.1998.tb01723.x

15. World Health Organization. Maternal mortality. Udated February 22, 2023. Accessed April 10, 2023. https://www.who.int/news-room/fact-sheets/detail/maternal-mortality

16. World Bank. Haiti overview. 2023. Updated March 31, 2023. Accessed April 10, 2023. https://www.worldbank.org/en/country/haiti/overview

17. Leleux B, van der Kaaij J. Sustainable Development Goals. In: *Winning Sustainability Strategies: Finding Purpose, Driving Innovation and Executing Change*. Springer International Publishing; 2019:81-102. doi:10.1007/978-3-319-97445-3_5

18. International Confederation of Midwives. ICM definitions. Accessed April 10, 2023. https://www.internationalmidwives.org/our-work/policy-and-practice/icm-definitions.html

19. World Health Organization. *Definition of Skilled Health Personnel Providing Care During Childbirth*. World Health Organization; 2019. Accessed April 10, 2023. https://www.who.int/publications/i/item/WHO-RHR-18.14

20. World Bank. World Bank Country and Lending Groups. World Bank; 2023. Accessed April 10, 2023. https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

21. Van Lerberghe W, Matthews Z, Achadi E, et al. Country experience with strengthening of health systems and deployment of midwives in countries with high maternal mortality. *Lancet*. 2014;384(9949):1215-1225. doi:10.1016/S0140-6736(14)60919-3

22. National Heart, Lung, and Blood Institute. Study quality assessment tools. National Institutes of Health. Updated July 2021. Accessed April 10, 2023. https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools

23. Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. *BMJ*. 2009;339:b2700. doi:10.1136/bmj.b2700

24. Jokhio AH, Winter HR, Cheng KK. An intervention involving traditional birth attendants and perinatal and maternal mortality in Pakistan. *N Engl J Med*. 2005;352(20):2091-2099. doi:10.1056/NEJMsa042830

25. Ellard DR, Chimwaza W, Davies D, et al. Up-skilling associate clinicians in Malawi in emergency obstetric, neonatal care and clinical leadership: the ETATMBA cluster randomised controlled trial. *BMJ Glob Health*. 2016;1(1):e000020. doi:10.1136/bmjgh-2015-000020

26. Ellard DR, Shemdoe A, Mazuguni F, et al. Can training non-physician clinicians/associate clinicians (NPCs/ACs) in emergency obstetric, neonatal care and clinical leadership make a difference to practice and help towards reductions in maternal and neonatal mortality in rural Tanzania? The ETATMBA project. *BMJ Open*. 2016;6(2):e008999. doi:10.1136/bmjopen-2015-008999

27. Lindtjørn B, Mitiku D, Zidda Z, Yaya Y. Reducing maternal deaths in ethiopia: results of an intervention programme in southwest ethiopia. *PLoS ONE*. 2017;12(1):e0169304. doi:10.1371/journal.pone.0169304

28. Nove A, Friberg IK, de Bernis L, et al. Potential impact of midwives in preventing and reducing maternal and neonatal mortality and stillbirths: a Lives Saved Tool modelling study. *Lancet Glob Health*. 2020;9(1):e24-e32. doi:10.1016/S2214-109X(20)30397-1

29. Huang J, Lu H, Li J, et al. Comparison of midwives' self-perceived essential competencies between low and high maternal mortality ratio provinces in China. *J Clin Nurs*. 2020;29(23-24):4733-4747. doi:10.1111/jocn.15514

30. Rajbhandari R, Rai S, Hathi S, Thapa R, Rai I, Shrestha A. The quality of skilled birth attendants in Nepal: High aspirations and ground realities. *PLoS ONE*. 2019;14(4):e0214577. doi:10.1371/journal.pone.0214577

31. Ronsmans C, Scott S, Qomariyah SN, et al. Professional assistance during birth and maternal mortality in two Indonesian districts. *Bull World Health Organ*. 2009;87(6):416-423. doi:10.2471/blt.08.051581

32. Ronsmans C, Etard JF, Walraven G, et al. Maternal mortality and access to obstetric services in West Africa. *Trop Med Int Health*. 2003;8(10):940-948. doi:10.1046/j.1365-3156.2003.01111.x

33. Zerfu TA, Taddese H, Nigatu T, et al. Is deployment of trained nurses to rural villages a remedy for the low skilled birth attendance in Ethiopia? A cluster randomized-controlled community trial. *PLoS ONE*. 2018;13(10):e0204986. doi:10.1371/journal.pone.0204986

34. Montgomery AL, Fadel S, Kumar R, Bondy S, Moineddin R, Jha P. The effect of health-facility admission and skilled birth attendant coverage on maternal survival in India: a case-control analysis. *PLoS ONE*. 2014;9(6):e95696. doi:10.1371/journal.pone.0095696

35. Hanson C, Cox J, Mbaruku G, et al. Maternal mortality and distance to facility-based obstetric care in rural southern Tanzania: a secondary analysis of cross-sectional census

data in 226 000 households. *Lancet Glob Health*. 2015;3(7):e387-95. doi:10.1016/S2214-109X(15)00048-0

36. Souza JP, Gülmezoglu AM, Vogel J, et al. Moving beyond essential interventions for reduction of maternal mortality (the WHO Multicountry Survey on Maternal and Newborn Health): a cross-sectional study. *Lancet*. 2013;381(9879):1747-1755. doi:10.1016/S0140-6736(13)60686-8

37. World Health Organization. Millennium development goals (MDGs). February 19, 2018. Accessed April 10, 2023. https://www.who.int/news-room/fact-sheets/detail/millennium-development-goals-(mdgs)

38. World Health Organization. *Making Pregnancy Safer: The Critical Role of the Skilled Attendant*. World Health Organization; 2004. Accessed April 10, 2023. https://www.who.int/publications/i/item/9241591692

39. McLaughlin CG, Wyszewianski L. Access to care: remembering old lessons. *Health Serv Res*. 2002;37(6):1441-1443. doi:10.1111/1475-6773.12171

40. Munabi-Babigumira S, Glenton C, Lewin S, Fretheim A, Nabudere H. Factors that influence the provision of intrapartum and postnatal care by skilled birth attendants in low- and middle-income countries: a qualitative evidence synthesis. *Cochrane Database Syst Rev*. 2017;11(11):CD011558. doi:10.1002/14651858.CD011558.pub2

41. International Confederation of Midwives. *Global Standards for Midwifery Regulation*. International Confederation of Midwives; 2011. Accessed April 10, 2023. https://www.internationalmidwives.org/assets/files/general-files/2018/04/global-standards-for-midwifery-regulation-eng.pdf

42. International Confederation of Midwives. *Global Standards for Midwifery Education*. International Confederation of Midwives; 2013. Accessed April 10, 2023. https://www.internationalmidwives.org/assets/files/general-files/2018/04/icm-standards-guidelines_ammended2013.pdf

43. International Confederation of Midwives. *Essential Competencies for Midwifery Practice*. International Confederation of Midwives; 2019. Accessed April 10, 2023. https://www.internationalmidwives.org/our-work/policy-and-practice/essential-competencies-for-midwifery-practice.html

44. Sandall J, Soltani H, Gates S, Shennan A, Devane D. Midwife-led continuity models versus other models of care for childbearing women. *Cochrane Database Syst Rev*. 2013;(8):CD004667. doi:10.1002/14651858.CD004667.pub3

45. International Confederation of Midwives. *Bill of Rights for Women and Midwives*. International Confederation of Midwives; 2017. Accessed April 10, 2023.

https://www.internationalmidwives.org/our-work/policy-and-practice/bill-of-rights-for-women-and-midwives.html

46. International Confederation of Midwives. *International Code of Ethics for Midwives*. International Confederation of Midwives; 2018. Accessed April 10, 2023. https://www.internationalmidwives.org/our-work/policy-and-practice/international-code-of-ethics-for-midwives.html

47. International Confederation of Midwives. ICM anti-racism statement. Accessed April 10, 2023. https://www.internationalmidwives.org/our-work/policy-and-practice/icm-anti-racism-statement.html

48. Position/policy statements adopted by ICM council at meeting in Vancouver--May 1993. *Midwifery*. 1993;9(3):169-172. doi:10.1016/0266-6138(93)90024-m

49. World Health Organization. *WHO Recommendations on Antenatal Care for a Positive Pregnancy Experience*. World Health Organization; 2016. Accessed April 10, 2023. https://www.who.int/publications/i/item/9789241549912

50. World Health Organization. *WHO Recommendations: Intrapartum Care for a Positive Childbirth Experience*. World Health Organization; 2018. Accessed April 10, 2023. https://www.who.int/publications/i/item/9789241550215

51. World Health Organization. *WHO Recommendations on Postnatal Care of the Mother and Newborn*. World Health Organization; 2014. Accessed April 10, 2023. https://apps.who.int/iris/handle/10665/97603

52. Guillebaud J. Medical-eligibility criteria for contraceptive use. *Lancet*. 2001;357(9266):1378-1379. doi:10.1016/S0140-6736(00)04615-8

53. World Health Organization. *Selected Practice Recommendations for Contraceptive Use*. World Health Organization; 2016. Accessed April 10, 2023. https://www.who.int/publications/i/item/9789241565400

54. World Health Organization. *Quality of Care in Contraceptive Information and Services, Based on Human Rights Standards: A Checklist for Health Care Providers*. World Health Organization; 2017. Accessed April 10, 2023. https://apps.who.int/iris/bitstream/handle/10665/254826/9789241512091-eng.pdf

55. Ciapponi A, Lewin S, Herrera CA, et al. Delivery arrangements for health systems in low-income countries: an overview of systematic reviews. *Cochrane Database Syst Rev*. 2017;9(9):CD011083. doi:10.1002/14651858.CD011083.pub2

56. Sterne JAC, Savović J, Page MJ, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. *BMJ*. 2019;366:l4898. doi:10.1136/bmj.l4898

57. Sterne JAC, Hernán MA, Reeves BC, et al. ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. *BMJ*. 2016;355:i4919. doi:10.1136/bmj.i4919

58. De Silva MJ, Breuer E, Lee L, et al. Theory of Change: a theory-driven approach to enhance the Medical Research Council's framework for complex interventions. *Trials*. 2014;15:267. doi:10.1186/1745-6215-15-267

59. Kirk MA, Kelley C, Yankey N, Birken SA, Abadie B, Damschroder L. A systematic review of the use of the Consolidated Framework for Implementation Research. *Implement Sci*. 2016;11:72. doi:10.1186/s13012-016-0437-z

60. Social TrendSpotter. Where is your organization in the nonprofit lifecycle? Why all nonprofits need this crucial piece of the puzzle. November 14, 2019. Accessed April 10, 2023. https://socialtrendspot.medium.com/where-is-your-organization-in-the-nonprofit-lifecycle-5ecdbac831ce

61. Harvard Business Review. Why history matters to managers. *Harvard Business Review*. January 1986. Accessed April 10, 2023. https://hbr.org/1986/01/why-history-matters-to-managers

62. Kimberlin SE, Schwartz SL, Austin MJ. Growth and resilience of pioneering nonprofit human service organizations: a cross-case analysis of organizational histories. *J Evid Based Soc Work*. 2011;8(1-2):4-28. doi:10.1080/15433710903272820

63. CFIR Research Team. 2009 CFIR constructs. Consolidated Framework for Implementation Research. Accessed April 10, 2023. https://cfirguide.org/constructs-old/

64. Proctor E, Silmere H, Raghavan R, et al. Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. *Adm Policy Ment Health*. 2011;38(2):65-76. doi:10.1007/s10488-010-0319-7

65. Creswell JW, Creswell JD. *Reserach Design: Qualitative, Quatitative, and Mixed Methods Approaches*. 5th ed. Sage; 2018.

66. Yin RK. *Case Study Research and Applications: Design and Methods*. 6th ed. Sage; 2018.

67. Priest MC, Speckman KSW, McCarthy S, Romocki LS, Walmer DK. Traditional birth attendant education in rural Haiti. *JEHP*. 2018;18(1):66-85.

68. World Health Organization. Maternal mortality ratio (per 100 000 live births). Accessed April 10, 2023. https://www.who.int/data/gho/indicator-metadata-registry/imr-details/26

69. Centers for Disease Control and Prevention. Infant mortality. Updated June 22, 2022. Accessed April 10, 2023. https://www.cdc.gov/reproductivehealth/maternalinfanthealth/infantmortality.htm

70. IGI Global. What is political instability. Accessed April 10, 2023. https://www.igi-global.com/dictionary/exporting-without-direct-access-to-international-markets/92620

71. Merriam-Webster. Infrastructure. Accessed April 10, 2023. https://www.merriam-webster.com/dictionary/infrastructure

72. World Bank. Access to electricity (% of population) - Haiti 2021. Accessed April 10, 2023. https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=HT

73. U.S. Department of State. Haiti travel advisory. December 1, 2022. Accessed April 10, 2022. https://travel.state.gov/content/travel/en/traveladvisories/traveladvisories/haiti-travel-advisory.html

74. Smith S. Where is your organization in the nonprofit lifecycle? Social Impact Architects. June 22, 2022. Accessed April 10, 2023. https://socialimpactarchitects.com/nonprofit-lifecycle/

75. United Nations. Millennium development goals indicators. Updated March 22, 2023. Accessed April 10, 2023. https://unstats.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm

76. World Health Organization. Newborns: Improving survival and well-being. September 19, 2020. Accessed April 10, 2023. https://www.who.int/news-room/fact-sheets/detail/newborns-reducing-mortality

77. UNICEF. *Integrating Humanitarian Response and Development: Programme Framework for Fragile Contexts*. UNICEF; 2018. https://www.unicef.org/documents/unicef-programme-framework-fragile-contexts

78. Trading Economics. Haiti inflation rate. Accessed April 10, 2023. https://tradingeconomics.com/haiti/inflation-cpi

79. Haiti: 200,000 more children pushed into hunger since March, as nearly half the population goes hungry - Haiti | ReliefWeb. Accessed March 25, 2023. https://reliefweb.int/report/haiti/haiti-200000-more-children-pushed-hunger-march-nearly-half-population-goes-hungry

80. Midwives for Haiti. One family, many Voices: By the numbers. December 21, 2020. Accessed April 10, 2023. https://midwivesforhaiti.org/one-family-many-voices-by-the-numbers/

81. World Bank Group. *Better Spending, Better Care: A Look at Haiti's Health Financing*. World Bank Group; 2015. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/393291498246075986/summary-report

82. Hinche arrondissement. Wikipedia. Updated April 12, 2020. Accessed April 10, 2023. https://en.wikipedia.org/wiki/Hinche_Arrondissement

83. We All Count. Data equity framework. Accessed April 10, 2023. https://weallcount.com/the-data-process/

84. Centers for Disease Control and Prevention. Framework for program evaluation. Updated March 10, 2023. Accessed April 10, 2023. https://www.cdc.gov/eval/framework/index.htm

85. Engelgau MM, Rosenthal JP, Newsome BJ, Price L, Belis D, Mensah GA. Noncommunicable diseases in low- and middle-income countries: a strategic approach to develop a global implementation research workforce. *Glob Heart*. 2018;13(2):131-137. doi:10.1016/j.gheart.2018.05.001

86. Bruns EJ, Parker EM, Hensley S, et al. The role of the outer setting in implementation: associations between state demographic, fiscal, and policy factors and use of evidence-based treatments in mental healthcare. *Implement Sci*. 2019;14(1):96. doi:10.1186/s13012-019-0944-9

87. Ojo T, Kabasele L, Boyd B, et al. The role of implementation science in advancing resource generation for health interventions in low- and middle-income countries. *Health Serv Insights*. 2021;14:1178632921999652. doi:10.1177/1178632921999652

88. United States Institute of Peace. Haiti: a republic of NGOs? September 10, 2009. Accessed April 10, 2023. https://www.usip.org/events/haiti-republic-ngos

89. Edmonds K. NGOs and the business of poverty in Haiti. North American Congress on Latin America. April 5, 2010. Accessed April 10, 2023. https://nacla.org/news/ngos-and-business-poverty-haiti

90. McMahon J. Lessons from ineffective NGOs in Haiti. Borgen Magazine. December 12, 2020. Accessed April 10, 2023. https://www.borgenmagazine.com/ngos-in-haiti/

91. Zanotti L. Cacophonies of aid, failed state building and NGOs in Haiti: setting the stage for disaster, envisioning the future. *Third World Q*. 2010;31(5):755-771. doi:10.1080/01436597.2010.503567

92. Deserranno E, Nansamba A, Qian N, et al. Why well-meaning NGOs sometimes do more harm than good. Kellogg School of Management, Northwestern University. August 7, 2020. Accessed April 10, 2023. https://insight.kellogg.northwestern.edu/article/international-aid-development-ngos-crowding-out-government

93. Heap CJ, Jennings HM, Mathias K, et al. Participatory mental health interventions in low-income and middle-income countries: a realist review protocol. *BMJ Open*. 2022;12(4):e057530. doi:10.1136/bmjopen-2021-057530

94. Makuwira J. Non-governmental organizations (NGOs) and participatory development in basic education in Malawi. *Current Issues in Comparative Education*. 2004;6(2):113-124.

95. Ishaku SM, van der Harst M, Warren CE, et al. Research within international non-governmental organisation programmes in low and middle-income countries: challenges amid opportunities. *BMJ Glob Health*. 2021;6(8). doi:10.1136/bmjgh-2021-006210

96. Walker LJ, Frimer JA, Dunlop WL. Varieties of moral personality: beyond the banality of heroism. *J Pers*. 2010;78(3):907-942. doi:10.1111/j.1467-6494.2010.00637.x

97. Franco ZE, Blau K, Zimbardo PG. Heroism: A conceptual analysis and differentiation between heroic action and altruism. *Review of General Psychology*. 2011;15(2):99-113. doi:10.1037/a0022672

98. USAID. *HFG Haiti Final Report*. USAID; 2018. https://pdf.usaid.gov/pdf_docs/PA00T9J9.pdf

99. Brandt AJ, Pedroza J, Cassiani SH de B, Brown S, da Silva FAM. Maternal health training priorities for nursing and allied professions in Haiti. *Rev Panam Salud Publica*. 2020;44:e67. doi:10.26633/RPSP.2020.67

100. Nove A, Hoope-Bender PT, Moyo NT, Bokosi M. The midwifery services framework: what is it, and why is it needed? *Midwifery*. 2018;57:54-58. doi:10.1016/j.midw.2017.11.003

101. World Health Organization. *Conducting a Sexual, Reproductive, Maternal, Newborn and Adolescent Health Workforce Assessment*. World Health Organization; 2015. Accessed April 10, 2023. https://www.who.int/publications/m/item/SRMNCAH_workforce_handbook

102. World Health Organization. *Strengthening Midwifery Toolkit*. World Health Organization; 2011. Accessed April 10, 2023. https://www.who.int/publications/i/item/9789241501965

103. PCORI. Dissemination and implementation framework and toolkit. August 8, 2016. Accessed April 10, 2023. https://www.pcori.org/research-results/putting-evidence-work/dissemination-and-implementation-framework-and-toolkit