

**The Impact and Experience of Introducing Professional
Midwives into Rural Government Hospitals in
Bangladesh, a Mixed-Methods Study**

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This thesis is submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy. The candidate has already achieved 180 credits for assessment of taught modules within the blended learning PhD programme.

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I declare that this thesis is my own work and has not been submitted for the award of a higher degree elsewhere.

Abstract

The aims of this research were 1) to determine if introducing international standard midwives in rural sub-district hospitals in Bangladesh, both with and without mentoring, improved the availability and quality of maternal and newborn health care; and 2) to explore the experiences of the midwives, and the maternity staff and managers that they joined, following their introduction. Key objectives were to examine the enabling environment and document barriers and facilitators to midwifery-led care. This was a mixed-methods study that examined differences between hospitals grouped into three categories—without midwives, with midwives, and with midwives and mentorship.

The quantitative component consisted of observations of facility readiness and clinical care to assess whether newly introduced evidence-based maternity care practices recommended by the World Health Organization were being implemented. In addition, maternity staff and midwives completed a written survey on their knowledge, perceptions and utilization of the new care practices. Qualitative focus groups and interviews were used to gain an understanding of the perceptions, attitudes and experiences among maternity staff and managers toward the midwives and the improved care practices.

There were 641 clinical observations, 237 completed surveys, 18 interviews and five focus groups. A continuum was identified reflecting that the facilities without midwives were

the least comfortable with and likely to implement the quality maternity care practices, and those with midwives and mentoring were the most likely to. In addition, perceptions toward midwives' capabilities, both among midwives themselves and among the other maternity staff they worked with, improved with mentoring.

The introduction of professional midwives was found to improve the quality of maternal health care in settings already staffed with doctors and nurses. The addition of mentors to support midwives potentiated the effect. Mentors strengthened capacity regarding new clinical practices, created enabling environments, and facilitated supportive transitions between the existing and new maternity staff.

Keywords: midwives, mentorship, quality of care, respectful maternity care, evidence-based maternity care, Bangladesh

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1. Background and context

Despite decades of global prioritization, pregnancy-related morbidity and mortality remain a significant public health and human rights concern for the world's poorest (Adam & de Savigny, 2012; Miller et al., 2016). Social determinants of health, including complacency with gender related rights violations underlie this scenario (Freedman, 2001; Human Rights Council, 2010). Inequity between men and women, and rich and poor, are ultimately root causes, as death from pregnancy-related complications is too often a preventable human rights concern (Ronsmans & Graham, 2006).

Investing in health care for the poorest inevitably involves addressing issues related to poverty, gender and power. Accessible, affordable care is shown to reduce the debilitating financial burden of health care for the poor (Rahman et al., 2013). In addition, quality maternity care contributes toward fulfilling women's basic right to health and wellbeing (Maternal Health Task Force, 2014). Furthermore, prioritizing lifesaving care for women is an affirmation of their worth. The negative impacts of poor healthcare systems on maternal mortality and morbidity extend beyond public health, as countries' socioeconomic development is hindered when women's fundamental human rights are not upheld (Fauveau et al., 2008; Human Rights Council, 2012; Khan et al., 2006).

Insidious gender related rights violations in healthcare systems do not only affect pregnant women, but they also affect the female healthcare providers who care for them. Frequently, in low- and middle-income countries (LMICs), midwives and nurses are

women from lower socio-economic classes. In such settings, these professions are sometimes known to be stigmatized, as midwives and nurses care for socially disadvantaged women during times of “female” (too often considered ‘dirty’¹) health needs (Fauveau et al., 2008; Filby et al., 2016; Hadley et al., 2007a, 2007b).

Improvements in societal valuing of women, economic status, and other social determinants of health are ultimately needed for sustained improvements in maternal health outcomes (Sado et al., 2014; Yamin, 2013). However, improving healthcare systems has the potential for positive impact on maternal health *as well as* on health-related economic security and women’s value in society (Yamin et al., 2013). We know that between countries with similar social determinants of health, some have better health outcomes and a lesser economic burden associated with the cost of health care (Tandon et al., 2000). Therefore, it can be argued that within similarly resource constrained settings, availability of accessible, quality health interventions can not only improve health outcomes, but also ensure rights, affirm women’s worth and enhance economic security for the poor.

¹ The literature points out that childbirth is considered unclean in many cultural contexts globally; in South Asia it is considered dirty due to providers’ contact with bodily fluids and stigma associating females providing night duty care with sex work.

1.1 Quality of care for maternal and newborn health

It is well established in the literature that ensuring quality of care improves health outcomes and fulfils women's right to health (Koblinsky et al., 2016; D.T. Lavender, 2016). The World Health Organization (WHO) uses the definition for quality as effective, efficient, acceptable, equitable, and safe healthcare provision. The concept of quality in healthcare provision is subdivided into the three domains of structure, process, and outcome. Structures include the components of the health system related to infrastructure, commodities, and human resources (World Health Organization, 2016a).

Quality within maternal and newborn health care includes the structural component of adequate and capacitated human resources (e.g., midwives, lifesaving commodities, and enabling environments etc.) and the process of care provision, which is reflected in international guidelines (World Health Organization, 2016a). The introduction of midwives has been equated with improved quality in maternal and newborn healthcare, particularly in high-resource settings (UNFPA et al., 2014).

In a pivotal article published in the *Lancet*, Renfrew et al. (2014) introduced a framework for quality maternal and newborn care (QMNC) to guide health systems in delivering quality care. The QMNC framework was informed by a mixed-methods literature review identifying the type of care provision that constitutes an ideal maternity care model, as well as what women want during the childbearing year (Renfrew et al., 2014). It delineates the ideal maternity model of care into five practice components: education and health promotion, screening and assessment, promotion of normal processes, first line

management of complications, and medical/obstetric/neonatal interventions. Other essential components include organization of care, values, philosophy, and care provider characteristics using evidence-based midwifery practices within maternity care. The model's ideal organization of care comprises availability, accessibility, acceptability, and quality. Guiding values were defined as being respectful, women centred and directed, and the guiding philosophy as optimizing the psychological, physiological, and social process while using only medical interventions needed to improve health outcomes. While the framework is a model of care for all women and babies, of which midwifery is an important component, Renfrew and associates (2014) demonstrate that midwives, as defined by the ICM, are the best placed to provide maternity care.

The QMNC framework has thus become a global standard for guiding and evaluating quality midwifery care. It is well known among the global midwifery community and was used to inform the newly established midwifery profession in Bangladesh. Although the QMNC framework presents midwives as ideal maternity care providers, WHO guidelines for quality maternity care were ultimately chosen for this research. This decision was based on two factors. First, although both frameworks address very similar issues, the WHO guidelines give specific direction to health authorities in terms of what quality maternity care should look like in LMIC settings. Second, WHO guidelines are well known by government and development partners in Bangladesh. It was thus believed that research demonstrating closer alignment with WHO guidelines was more likely to be recognized and utilized by national stakeholders.

Specifically, this research utilized the *WHO Standards for Improving Quality of Maternal and Newborn Care in Health Facilities* as a framework for the analysis. The definition of evidence-based care used in this research is guided by this document, as well as by the *WHO Recommendations on Maternal Health*, which were updated in May of 2017. In accordance with these guidelines, evidence-based routine maternity care includes 1) respectful and women centred care; 2) no routine use of oxytocin, episiotomy, lithotomy position, or caesarean section; and 3) routine use of companionship, partograph, oral hydration and nutrition in labour, upright position for labour and delivery, delayed umbilical cord clamping, skin-to-skin contact between mother and baby, and active management of third stage of labour. The quantitative component utilized observations of implementation of these interventions within three distinct categories of rural hospitals: those with no midwives, those with midwives but without mentoring, and those with both midwives and mentoring. In the qualitative component, maternity staff, managers, and midwives shared their experiences related to the deployment of midwives and the new quality of care interventions.

1.2 Skilled birth attendants

A skilled health workforce is a key ingredient to improved quality of care, and thus health system strengthening (Mumtaz et al., 2015; Nove et al., 2018). The WHO definition of a skilled birth attendant (SBA) states that, “a skilled attendant is an accredited health professional — such as a midwife, doctor or nurse — who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies,

childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns” (World Health Organization, 2004). Country data on births attended by skilled health personnel are used to track progress toward reducing maternal mortality as part of the Sustainable Development Goal agenda. Increasing the rate of skilled birth attendance is thus a core goal in many low-resource settings. The efforts toward this goal often involve training and placing additional numbers of skilled birth attendants within health systems, as well as increasing access to health care for women who are poor and/or do not live in close proximity to a health facility.

As countries have increased their investments in reducing maternal mortality, a variety of non-standardized cadres of birth attendants have been developed by governments to address maternal health needs (Miller et al., 2016). These providers include traditional birth attendants, community health workers, nurses, nurse-midwives, midwives, and doctors. Globally, skilled birth attendance rose from 55% to 65% between 1990 and 2009 with a concomitant fall in the maternal mortality ratio (MMR) (MMR is a measure of the number of maternal deaths in a given time period per 100,000 live births in the same period) (Vieira et al., 2012). However, evaluations of these non-standardized cadres have shown mixed results (Islam et al., 2014; Renfrew et al., 2014).

1.3 The midwifery model of care

Current global literature highlights that the introduction of a skilled birth attendant and increasing facility births are not always enough to improve health outcomes; attention

must also be given to assuring quality (Dame Tina Lavender, 2016; Morgan et al., 2014; ten Hoop-Bender et al., 2014; ten Hoop Bender et al., 2006; World Health Organization, 2004).

With the aim of ensuring quality there is a global initiative to standardize and scale up a basic cadre of maternal healthcare provider. This provider ideally has adequate competency, an orientation toward human rights, and a tenacious drive to serve the most marginalized women and girls (UNFPA et al., 2014). This provider is a midwife.

Models of service provision in high-resource settings where midwives are the decision makers for healthy women, and coordinate with interdisciplinary teams when complications arise, have demonstrated similar (even potentially better) outcomes compared to medical models; with fewer medical interventions and thus less cost (Sandall et al., 2016). In low-resource settings, research shows an association between the introduction of midwives and a decrease in maternal and neonatal mortality rates and project that midwives would make significant impact. However, few high quality studies of the impact of deployed professional midwives in LMICs exist (Van Lerberghe et al., 2014; World Bank, 2013). In addition, there is confusion about the definition of the term professional midwife. Many of the birth attendants mentioned in 2.2, in particular nurses, have used the title “midwife” and are included in the literature on midwifery (UNFPA, 2014).

The International Confederation of Midwives (ICM) has developed a global definition for a professional midwife. The definition is based on standard pre-service education and a

scope of practice that includes a focus on women's right to quality maternal health care (Sandall et al., 2016). The impact of ICM-standard midwives in low- and middle-income countries (LMICs) is not yet documented (Van Lerberghe et al., 2014). In addition, the literature highlights barriers to midwifery practice in LMICs, including issues related to gender and power dynamics within health systems (Filby et al., 2016).

The potential change that the introduction of a professional midwife can bring is in some ways paradoxical. In a very low-resource context, introducing professional midwives may mean assuring a basic standard of care, including emergency interventions to a woman who previously had no or minimal access. In more technologically advanced settings however, introducing midwives may mean shifting standard delivery care to an approach with fewer routine technological interventions that carry risk, and more evidence-based practices that support and enable the carrying through of the natural labour process (Miller et al., 2016). In most LMICs, there is both a critical need for expanded availability of emergency interventions *and* increased use of evidence-based routine care (Miller et al., 2016; Renfrew et al., 2014).

1.4 A standard definition for professional midwives

A professional midwife, as defined by the ICM, is a maternal health practitioner who employs the promotion of normal physiology supported by modern science and technology (International Confederation of Midwives, 2005a; Sandall et al., 2016). The advent of professional midwifery carries with it a beacon of the empowerment of women (Hermansson & Mårtensson, 2011). Midwives, in their broader definition, have cared for

women throughout history. Historically, as women's status in society improves, the professional status of those who care for them is prioritized (Ehrenreich & English, 1975; Pratley, 2016). Therefore, in societies that uphold the practice of professional midwifery, more gender equity is also observed.

The ICM has a defined pre-service curriculum, scope of practice, and regulations for the pre-service education and practice of a midwife. Included in the competencies for midwives are understanding of social context, advocating for women's rights, and giving voice to the voiceless (International Confederation of Midwives, 2005b; Nove et al., 2018). Table 1 provides a summary of key concepts for the profession of midwifery as defined by the ICM.

Table 1 ICM Key Concepts of the Profession of Midwifery

Number	Concept
1.	Respect for human dignity and for women as persons with full human rights
2.	Advocacy for women so that their voices are heard, and their healthcare choices are respected
3.	Cultural sensitivity, including working with women and healthcare providers to overcome those cultural practices that harm women and babies

4. A focus on health promotion and disease prevention that views pregnancy as a normal life event
-

5. Advocacy for normal physiologic labour and birth to enhance best outcomes for mothers and infants
-

6. Autonomous when caring for healthy women, able to be the first responder in obstetric and newborn emergencies, works in interdisciplinary teams when complications arise.

1.5 Professional midwives and “specialist” care

In LMICs, scant resources must be divided between competing priorities. Midwives stand out against nurses in that they are specialists; whereas nurses in low-resource rural settings are typically generalists (Fauveau et al., 2008). Specialization, as defined both by education and by professional focus, is the common practice for nursing and medicine in high-resource settings (Bousfield, 1997). However, in low-resource settings it is often thought to be more cost-effective to use a more general practitioner. The introduction of professional midwives places priority on specialization as a potential change agent (Sandall et al., 2016; Van Lerberghe et al., 2014). Because maternal and newborn morbidity and mortality is a recalcitrant problem and midwives have proven outcomes in high-resource settings, there is a global movement to establish the “specialist” as the first line to address reproductive health needs (Bogren et al., 2017; Sakala & Newburn, 2014; ten Hoope-Bender et al., 2014).

1.6 Health facility mentoring/supportive supervision

“Mentoring” and “supportive supervision” are terms that have overlapping definitions. Both mentoring and supervision have been found to strengthen health systems to provide enabling environments and improve health worker performance, thus effecting desired changes in clinical practice. A key point in the literature is that old and new components of health systems must synergize in order to improve quality. Further, synergy needs to be prioritized when new interventions are introduced (ten Hoop-Bender et al., 2014). The WHO defines supportive supervision and mentoring as having synergistic components as delineated in the below diagram from (World Health Organization, 2005).

Table 2 WHO diagram on supervision and mentoring

Supportive Supervision	Clinical Mentoring / Supportive Supervision	Clinical Mentoring
<ul style="list-style-type: none"> • Space, equipment, and forms • Supply chain management 	<ul style="list-style-type: none"> • Patient flow and triage • Clinic organization • Patient monitoring and record-keeping 	<ul style="list-style-type: none"> • Clinical case review • Bedside teaching • Journal club

<ul style="list-style-type: none"> • Training, staffing, human resource issues 	<ul style="list-style-type: none"> • Case management observation 	<ul style="list-style-type: none"> • Morbidity and mortality rounds
<ul style="list-style-type: none"> • Entry points 	<ul style="list-style-type: none"> • Team meetings 	<ul style="list-style-type: none"> • Assist with care and referral of complicated cases
<ul style="list-style-type: none"> • Patient satisfaction 	<ul style="list-style-type: none"> • Review of referral decisions 	<ul style="list-style-type: none"> • Available via distance
<ul style="list-style-type: none"> • May be top down 		<ul style="list-style-type: none"> • Relationship based
<ul style="list-style-type: none"> • May be compliance centred 		

Health facility mentoring is defined in this research as providing mentoring for both individual providers and the facility systems that support interventions (Anatole et al., 2013; Shrivastava et al., 2014; Wallen et al., 2010). Although this type of mentoring has support in the literature and is endorsed by the WHO, its use in low-resource settings has gaps. Mentoring is used more widely in high resource countries (Althabe et al., 2008; Fischer et al., 2015; Namazzi et al., 2015). Facility mentoring has constraints in LMIC that include intensive human resource demands, limited availability of expert mentors, the need for the interventions to continue over time (as opposed to being single training sessions), and concerns around mentors' direct involvement in clinical care if the mentor is not employed by the same health facility or institution (Catton, 2017; Moore et al., 2012; Phillips, 2013; Saxton et al., 2015; Singhal et al., 2012).

1.7 Bangladesh maternity care profile

Bangladesh is a densely populated South Asian country of 170 million people. The population of Bangladesh is 89% Muslim and 63% rural (Department of Economic and Social Affairs Population Dynamics, 2018). Geographically it sits in a river delta and is prone to many natural disasters including flooding, cyclones, landslides, and earthquakes. In addition, Bangladesh hosts a large refugee population from neighbouring Myanmar. Bangladesh has made improvements in many social indicators in the last 20 years but continues to lag in critical areas, including maternal health and gender equity. The country is rated 129th of 189 in the United Nations Development Programme's Gender Inequality Index (United Nations Development Programme, 2018), the lowest in South Asia after Afghanistan. Although women do hold positions of leadership, and both education and literacy for women are improving, many indicators for gender equity have not been met (World Economic Forum, 2020). Within families, men tend to retain power over resources, land, and decision making—including when and whom girls and women marry, pregnancy, and decisions related to obtaining health care. Gender-based violence rates are high with as many as 80% of ever married women reporting at least one episode in their lifetime (Bangladesh Bureau of Statistics, 2015).

Within Bangladesh, significant inequity exists between rich and poor (Miller et al., 2016). The data indicate that the poorest women in Bangladesh are 10 times more likely to die from pregnancy-related complications than are the richest women (National Institute of Population Research and Training, Mitra and Associates, et al., 2016). In 2018, while 78%

of the richest women gave birth in a facility and 83% used a trained healthcare provider, among the poorest, use rates for these services were only 26% and 28% respectively. Much of the decline in maternal morbidity and mortality in Bangladesh is attributable to substantial increases in facility births, which have been concentrated within private fee-based health services. Gaps in availability and quality of care in public facilities that serve the poorest are ubiquitous (Collin et al., 2007; Kamal, 2009).

1.7.1 Maternal and newborn health

Bangladesh has impressively reduced the fertility rate to 2.3, but this rate has stagnated in recent years (National Institute of Population Research and Training, Mitra and Associates, et al., 2018). Bangladesh has also reduced maternal and newborn mortality significantly with maternal mortality rates falling from over 500/100,000 in 1980, to the current rate of just under 200/100,000. Newborn mortality rates have fallen from over 80/1,000 to currently 20/1,000. However, since 2010 there has been no decline, and the Millennium Development Goals (MDG) for maternal and newborn mortality were not met (National Institute of Population Research and Training, Mitra and Associates, et al., 2018). Currently, half of births take place at home. Bangladesh has a well-developed publicly funded health service delivery system comprising medical college hospitals, district and sub-district hospitals, union-level health centres (sub-sub-district), and community health clinics. Many of the more rural facilities are underutilized due to gaps in service availability and high out-of-pocket unofficial fees (Huq et al., 2015; Sarker et al., 2016). Cost of service is identified as the major deterrent for poor people wishing to seek

care at health facilities—24% of those seeking care are said to need to borrow money or sell possessions. This too frequently pushes people into poverty (Chandrasiri J. et al., 2012).

Only 29% of all facility births in Bangladesh take place in government health facilities. The remainder occur primarily in private clinics and hospitals (National Institute of Population Research and Training, Mitra and Associates, et al., 2018). Stratifying wealth quintiles reveals that the poor are more likely to deliver in government facilities, while more affluent women increasingly choose the private sector. Despite increases in facility births in recent years, maternal mortality has not fallen, pointing to limitations in care quality.

Among births in the private sector, 84% of newborns are delivered via caesarean section. In public sector facilities, the caesarean rate is 36%, but this rate includes facilities that do not perform any caesareans (the majority) so those performing them have much higher rates (National Institute of Population Research and Training, Mitra and Associates, et al., 2018). A recent Lancet journal dedicated to caesarean section found that, among countries with less than 60% of all births taking place in hospitals, Bangladesh had the highest caesarean rate at 65.2% (Boerma et al., 2018). Like facility delivery, although increasing caesareans may have contributed to lowering MMR to a certain point, since a rate of 200/100,000 has been achieved, the continued rise has not improved maternal or neonatal mortality.

1.7.2 Human resources and governance for maternity care provision

In Bangladesh, health system decision-making is centralized. All government hospitals have a standard design with different levels (e.g., district, sub-district etc.) having a

standard floor plan, staffing plan, and medicine supply. Hiring, also known as deployment, is performed centrally. Within health facilities, prior to the introduction of midwives, maternity care was provided by doctors, nurses, and emergency room staff (Ahmed et al., 2015). Before the introduction of midwives, delivery of maternity care was provided by nurses who had limited midwifery skills and was in part motivated by long-standing dynamics between staff and managers. Some of these have been problematic and have contributed to ongoing poor care, as well as informal financial incentives for labour and delivery care. Some examples are described in the following paragraph (Naher et al., 2018; Naher et al., 2020).

There have been reports that hospital managers at times seem to prioritize low mortality rates over accessible quality clinical care (Afrin et al., 2015; Thenenthiran et al., 2014). As a result, many hospital maternities tend to prioritize accepting only healthy women into their facility. Women in critical condition from obstetric emergencies have often been referred without treatment to higher-level facilities. Obstetricians in rural facilities are, at best, present for a limited time daily (Naher et al., 2020). In addition, obstetricians tend to focus on performing (often unindicated) caesarean sections and have a tendency to resist managing critical cases within peripheral facilities (Afrin et al., 2015; Haider et al., 2018; Thenenthiran et al., 2014).

Before the introduction of professional midwives, rural public health facilities were staffed with five distinct cadres of maternal healthcare provider; none met the ICM standard of a midwife (Bogren et al., 2017). Health policies and guidelines that reflect

global recommendations for comprehensive sexual and reproductive health care are in place, but implementation has significant gaps (Islam et al., 2006). Evidence of gaps in healthcare provision include the fact that only 50% of district hospitals and 20% of sub-district hospitals treat women who present with the leading causes of maternal death (post-partum haemorrhage and eclampsia), and only 26% of newborns receive skin-to-skin contact (Directorate General of Health Services, 2018; National Institute of Population Research and Training, Mitra and Associates, et al., 2016; Singh et al., 2017). This is described in more detail in the following paragraphs.

In addition, research on nurses working in government facilities has found that only 6% of nurses' time at work involved providing patient care. When this was explored, nurses stated that they felt stigma around being thought of as sex workers because they work at night, and their work requires touching patients. As a result, instead of nurses providing direct care, care tended to be relegated to cleaners and family members (Hadley & Roques, 2007).

1.7.3 Service provision

1.7.3.1 Antenatal care (ANC)

Although ANC is not new in Bangladesh, having a dedicated room and provider, globally accepted documentation (i.e., an ANC card), and following WHO standards for ANC, is still not standard practice. Recently, in response to surveys that found stagnating maternal mortality rates, the government ordered that all sub-district hospitals must have separate ANC corners. The most common arrangement before this order, particularly in hospitals

without midwives (or a mentoring programme for them) was to have no distinct ANC area, but rather a combined female consultation area staffed by generalist doctors. ANC visits typically do not include even basic globally recommended service components, such as the physical exam, an ANC record, or patient education about pregnancy risks (National Institute of Population Research and Training, Mitra and Associates, et al., 2018). According to global standards, ANC cards are carried by the mother and allow for continuity from one visit to the next. While they are in the guidelines for government facilities in Bangladesh, they are often unavailable. Even when available though, there are gaps in their usage. The more typical routine is to record the visit in a register book that captures information needed for reporting into the health information system. However, the register book does not guide ANC care, nor does it allow for follow-up with successive visits. In 2018, in response to known gaps in standard ANC care and the stagnating MMR, all sub-district hospitals were given a government order to establish ANC rooms with a separate ANC provider and proper documentation.

Resistance, however, remains. There are secondary gains for doctors from performing their own ANC, including access to women for planning (frequently unindicated) caesarean sections (Haider et al., 2018). As already mentioned, Bangladesh was recently identified as having the highest caesarean section rates (65.2%) among countries with low levels of institutional births (Boerma et al., 2018), and ANC chambers are often the place of planning for caesarean sections.

1.7.3.2 Respectful, evidence-based routine maternity care

There are ongoing efforts to improve the quality of maternity care in Bangladesh. However, notable gaps exist between what is written in guidelines and what is observed in terms of care provided (National Institute of Population Research and Training, Mitra and Associates, et al., 2018). In addition, many healthcare providers know the names of certain procedures but do not perform them. Examples are skin-to-skin contact, which is known but rarely performed to the global standard, and Helping Babies Breathe, which is the phrase used to describe the newborn resuscitation intervention using an Ambu bag that again people know about but frequently do not perform (McPherson, 2016). Many harmful clinical care routines persist such as overuse of antibiotics, medical uterine stimulates during labour (which can lead to asphyxia), painful and potentially dangerous routine exploration of the post-partum uterus, excess use of caesarean section, and unnecessary incisions of the vagina during delivery (Bohren et al., 2015).

1.7.3.3 Emergency care

Timely treatment of obstetric emergencies in health facilities has significant gaps in Bangladesh (National Institute of Population Research and Training, Associates for Community and Population Research, et al., 2018). Because in Bangladesh 50% of births take place in the community, and more in the lowest socio-economic groups (National Institute of Population Research and Training, Mitra and Associates, et al., 2018), and because postpartum haemorrhage (PPH) and eclampsia are the leading causes of maternal death and account for 50% of maternal mortality, it is essential that rural public

health facilities, which serve the poorest, respond efficiently to women coming from the community with these problems.

Currently, many patients with life-threatening conditions are referred to higher-level facilities without initial stabilization. The ramifications of not treating PPH at the first point of contact can explain the refractory MMR in Bangladesh. Estimates are that it takes women an average of 2 hours to die from PPH (Filippi et al., 2016; Maine, 1987). If PPH occurs in a home birth, the family must recognize the problem, and then organize transport. By the time they reach the closest health facility, the woman is often in shock (Likis et al., 2016). If the patient is then referred onward, frequently an hour or more will have passed, increasing the likelihood of death. Eclampsia deaths take slightly more time, but with eclampsia, often the woman is still pregnant so, even if the mother lives, the risk to the foetus is significant. Initial stabilization for both these conditions is relatively simple. Eclampsia requires an injection, something that all healthcare providers in Bangladesh are skilled at. For PPH, there are a handful of interventions including an injection, an IV, massage of the uterus, emptying of the bladder, and at times manual evacuation of the uterus. All these could be performed by midwives and most doctors and nurses (World Health Organization, 2015).

1.7.4 New cadre of midwives

In response to these identified gaps, Bangladesh has developed a new cadre of ICM-standard diploma midwives. These midwives are pioneers in a new profession and face related challenges. Pre-service education was scaled up quickly, which has led to gaps in

education quality as a result of low national expertise in the field (Yigzaw et al., 2015). As of the end of 2018, 330 of the country's 417 sub-district hospitals have at least one new professional midwife on staff. A midwifery strategy, job description, scope of practice, and models of care were endorsed through the Ministry of Health and Family Welfare, and orientations for health facility managers are ongoing. The introduction of midwives into the government health system is intended to improve the availability, quality, acceptability, and accessibility of facility birth; as well as to respond to obstetric emergencies and thus improve health outcomes. Midwives, educated to ICM standards, were educated to be experts on quality maternity care, including response to obstetric emergencies, and use of interventions known to promote normal physiology.

As the profession of midwifery—distinct from nursing—is new in Bangladesh, and the newly graduated midwives face the challenges of being inexperienced in a new field without leaders, the government, with support of a non-governmental organization (NGO), is implementing a mentorship programme in selected facilities to help facility managers, midwives, and maternity staff transition into their new roles. The aim of the programme is to support the new midwives and the facility systems to expand service availability and improve evidence-based practices—for both emergency and routine maternal and newborn health care (Catton, 2017; Erlandsson et al., 2018; Yigzaw et al., 2015). Facility mentorship is currently underway in 62 of the 350 deployment sites (Line Director MNCAH MOH&FW, personal communication, 2018). The mentorship is notable in that it deploys young female doctors, as opposed to midwives, in the role of mentors.

This choice of doctors was made based on the lack of senior midwives, and the need for the mentors to have authority within the hierarchical hospital system. Their role was not only to capacitate the midwives, but was as much to advocate with the managers to create enabling environments for the midwives to shift routines to improved care quality. Although Bangladesh has a long history of training health workers in quality maternal and newborn health care, mentoring has not been widely implemented (Islam et al., 2006).

1.8 Experiences of the introduction of midwives

Midwives were introduced into hospital maternity wards in August of 2018, nine months prior to the data gathering for this research. Prior to their introduction, nurses, in collaboration with doctors, had been providing care in the maternity wards for over 20 years. Nurses received education on midwifery as part of their pre-service education but did not meet the accepted global standard as guided by the ICM. Until the deployment of midwives, nurses had been considered “midwives” in addition to their nursing role (Bogren et al., 2017). When the new midwives were deployed in 2018, hospitals were given a scope of practice for the midwives and a government order stating that midwives should work only in the maternity units. Although there were orientations for the midwives, there was no directive for the nurses and doctors working in the units the midwives were deployed to (Begum, F. DGNM, personal communication, January 2019).

Barriers to establishing enabling environments for the midwives included: 1) nurses’ perceptions that they were the experts in midwifery, 2) monetary, as well as social standing, incentives for nurses to continue in their role as “midwives”, 3) midwives being

junior in a hierarchical society, and 4) midwives' expanded knowledge leading them to desire to change existing routines and thus challenge the nurses' status quo (Bogren et al., 2018).

Figures 1 and 2 summarize the experience of the introduction of midwives and mentors.

Figure 1: Introduction of midwives

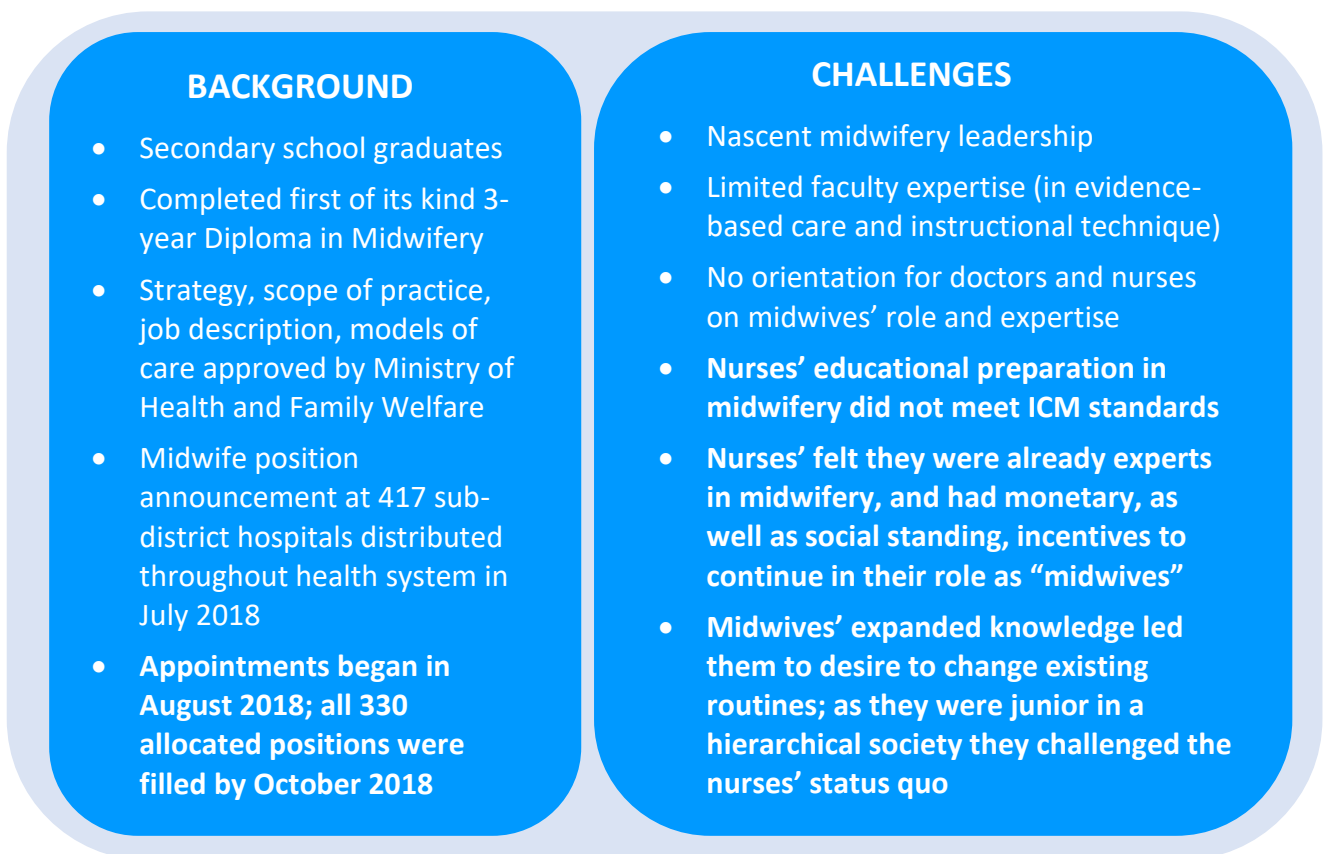
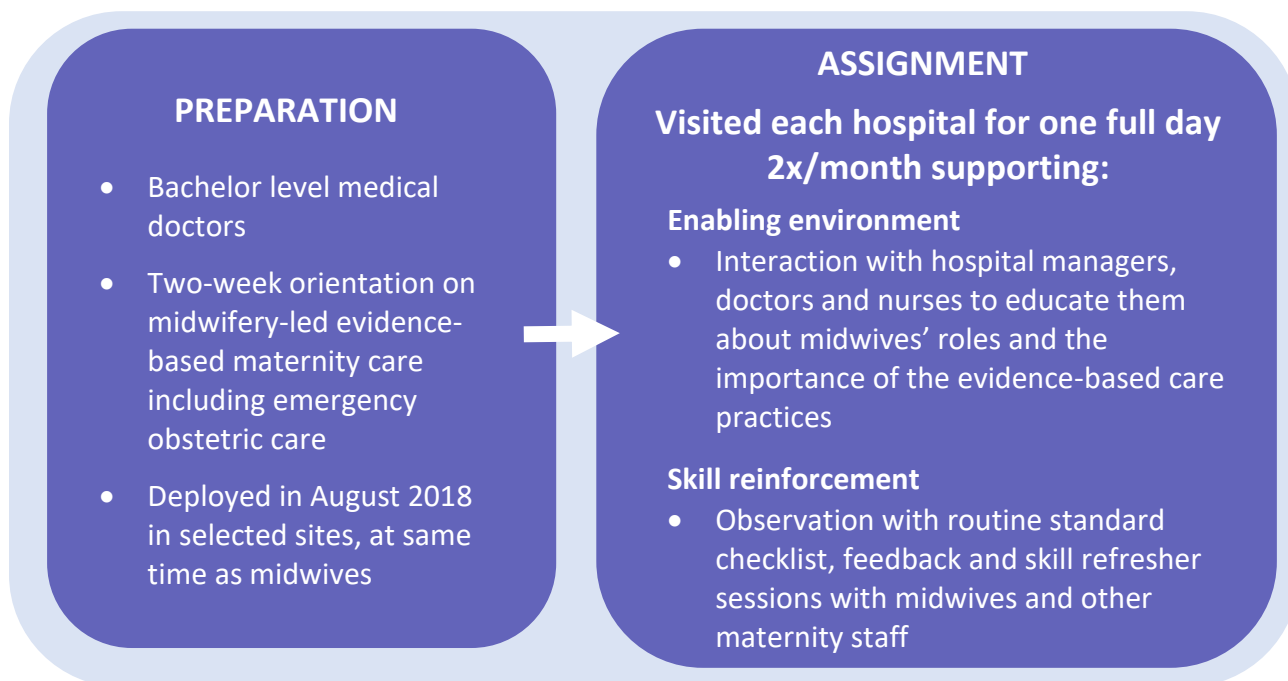


Figure 2: Preparation and deployment of mentors

1.9 Caring for the poor

Women from the poorest wealth quintile in Bangladesh are the least likely to access facilities for maternity care. Those who do seek facility-based care use rural public health facilities where midwives are deployed. As noted earlier, those in middle and upper socio-economic brackets typically seek services at private facilities. Yet even at public facilities, the poor face unofficial charges which are well-documented and recalcitrant to change. Thus, cost of care is a common reason cited for not seeking facility services (National Institute of Population Research and Training, International Centre for Diarrhoeal Disease Research, et al., 2016; National Institute of Population Research and Training, Mitra and Associates, et al., 2018). Midwives have been taught as part of their pre-service education to be ethical and care for all in need. The hope is that their commitment to maternal and

newborn health will outweigh the strong culture of tipping². The purpose of introducing midwives was to ensure quality, respectful maternity care for the poorest with the ultimate goal of improving maternal and newborn health outcomes, thus reducing the burden of women's rights violations in the maternal and newborn health care system. In summary, Bangladesh is an LMIC that has made notable progress but is challenged with significant gaps in the systems that support maternal and newborn health services. High maternal and newborn mortality is a recalcitrant public health and human rights problem that disproportionately affects the poorest. The lack of an effective response to this crisis reflects an apparent complacency toward tackling the difficulties of the complex systems that require change.

1.10 Summary

Ensuring quality maternal and newborn health care for the poorest can send a message to women and communities that women have worth. It can also relieve some of the debilitating financial burden frequently incurred from seeking healthcare services. Bangladesh recently introduced a globally standard midwife cadre into its health system. Midwives were deployed to selected rural hospitals supported by a mentoring programme designed to facilitate the establishment of an enabling environment at the facility level for midwives to practice. This research looks at the effects of these interventions.

² Tipping refers to informal or under-the-table payments (also sometimes called bribes) to health facility staff to reduce waiting time and obtain treatment (Naher et al., 2020).

1.11 Aims and objectives

This work is grounded in the knowledge that availability of quality maternity care saves lives and empowers women; and that both quality and availability are largely dependent on access to respectful evidence-based services (Sharma et al., 2015; Vogel et al., 2015). Such services include health promotion, prevention, early recognition of complications, and timely emergency interventions (Renfrew et al., 2014). Addressing health systems strengthening, particularly in low-resource settings, is not as simple as ensuring the presence of different care components; to make sustainable change, systems must also be addressed.

The aims of this mixed-methods research were twofold:

- 1) To determine if a national deployment of midwives in hospitals in a low-resource setting—with and without facility mentorship—improved the implementation rates of evidence-based maternal and newborn care practices, thus improving quality and reducing mortality and morbidity as well as potentially contributing to the empowerment of women and greater equity in society.
- 2) To explore the experiences of midwives providing care, as well as non-midwife maternity staff and managers to understand the underlying motivators that facilitated, and also challenged, the introduction of midwives, and the transition to improved care quality in hospitals in a low-resource setting.

The first objective of this research was to examine the introduction of an international standard midwifery cadre into rural hospitals in Bangladesh. The importance of enabling environments that empower healthcare providers, as well as the women they care for is highlighted (Morgan et al., 2014). Through quantitative methods, this research reports on changes in evidence-based care practices as guided by WHO quality maternity care standards, after the introduction of midwives, and also after the introduction of midwives with mentorship.

The second objective of this research was to provide insight into barriers and facilitators related to midwives transitioning into their new roles and shifting to improved maternity care quality in rural hospitals in Bangladesh. Through both quantitative and qualitative methods, the experiences of midwives, other maternity staff, and managers regarding the introduction of midwives, and the adoption of the new quality of care practices are reported on.

2. Literature review

2.1 Introduction

This review chapter describes research on health system strengthening through the introduction of midwives, as well as mentoring, in LMICs. Health systems strengthening as defined by WHO involves improving the functioning of the health system across six component areas, or building blocks. The six health system building blocks are: service delivery, workforce, information systems, access to essential medicines, financing, and leadership and governance (World Health Organization, 2007). The aspects of system strengthening examined in this review are improved evidence-based care and health outcomes, which span multiple building blocks. The literature review looked both upstream at health systems and downstream at implementation.

The review aims to give insight into the use of midwives and also mentors to improve implementation of evidence-based care and health outcomes, and highlights the experiences of those involved. It is hoped that by further refining our knowledge on this topic, governments and development partners will be able to design more effective programming to improve the quality of maternal and newborn health care in low-resource settings.

Previous systematic reviews have addressed many topics in maternal health. Those most relevant include: barriers and facilitators to maternal health interventions in low-income countries, skilled birth attendants' perceptions of factors that influence the provision of

maternity care in LMICs, the impact of midwifery-led care models on health outcomes in high resource countries, and the effects of human resource (HR) interventions on maternal healthcare quality (Lassi et al., 2016; Munabi-Babigumira et al., 2017; Sandall et al., 2016; Stokes et al., 2016). The review of HR interventions found no research on the maternal healthcare outcomes of recruitment or employment (Lassi et al., 2016a). One systematic review focused on mentorship for healthcare providers in LMICs. It found a paucity of literature, with only five articles on the topic, one of which focused on maternity care and midwives (Bishanga et al., 2018; Schwerdtle et al., 2017). The review question was developed and refined over time and informed by literature scoping.

The review question was:

What is the impact and experience of deploying midwives, and also of mentoring maternity staff, in LMICs, on all aspects of administrating and providing maternity care?

2.2 Methods

An integrative systematic literature review was performed with a narrative synthesis (Grant & Booth, 2009; Torraco, 2005). Integrative reviews allow for a wide range of methods. An initial scoping found abundant literature on midwives in high-resource countries, and limited literature focused on midwives in LMICs. Within the limited wider research on all aspects of midwifery in LMICs, there were very few articles with a specific focus on either the introduction of ICM-standard midwives, or on mentoring to support newly deployed midwives. In addition, there were no randomized controlled studies, and

much of the literature consisted of qualitative research or case studies. For that reason, an integrative systematic review was chosen as it encouraged inclusion of diverse articles, and thus allowed for a more robust comprehensive review (Grant & Booth, 2009; Whitemore & Knaf, 2005).

Narrative synthesis works well within an integrative review because it facilitates a heterogeneous description (Booth et al., 2012). To support an integrative review, a narrative synthesis focuses on how studies addressing different aspects of the same topic can be summarized to provide a bigger picture, or a more in-depth understanding. It can be used for mixed-methods research to tell the story of what works. Data types can be synthesised separately, or in the case of this literature review, together. It was decided to analyse the different types of data together as, 1) in contexts where randomized controlled studies are not feasible, there is significant variation even within the same topic on quantitative and qualitative designs, and 2) the actual reporting of these studies may be more similar than different, and thus easily analysed together. This is particularly noted in the context of descriptive data in quantitative research (Sandelowski et al., 2006). Consideration of these factors led to the decision to use a narrative synthesis of both quantitative and qualitative studies.

2.3 Inclusion and exclusion criteria

The review was guided by the Population, Intervention, Comparison, Outcome (PICO) framework (Eldawlatly et al., 2018; Santos et al., 2007). Following the PICO framework, the following inclusion criteria were applied:

- *Population:* Midwives, maternity staff, managers, health systems, health facilities, managers, patients receiving care, in LMICs
- *Intervention:* The introduction of midwives and/or mentoring
- *Comparator:* Effective vs. ineffective for health system strengthening and quality and availability of services
- *Outcome:* Operationalization of evidence-based maternal health care within health systems, improved health outcomes including health and wellbeing of women and newborns, experiences of midwives, facility staff and managers regarding deploying midwives, and improvements in care quality.
- *Study design:* Any
- *Study type:* Qualitative or quantitative
- *Context:* LMICs per World Bank definition
- *Publication year after 2008*

Exclusion criteria were as follows:

- Studies conducted in high-income countries
- Studies not published in English
- Studies that delineate plans that have not yet been implemented
- Studies not focused on the introduction of midwives, mentoring, maternal health systems strengthening

- Studies that show planning and not impact

The review included literature from the last ten years that addressed systems strengthening in LMICs through the introduction of midwives, enabling environments for midwives, mentoring, and achieving quality of care. Ten years was chosen as paradigms and implementation strategies for global maternal health have changed dramatically in the past 20 years—from a model of community training to one of facility-based care using a basic level of professional provider. Reviews from the past ten years are thought to capture current contexts and issues (Aromataris et al., 2015). Only articles published in English were included as the author is only fluent in English and practical translation options we not found.

2.4 Information sources

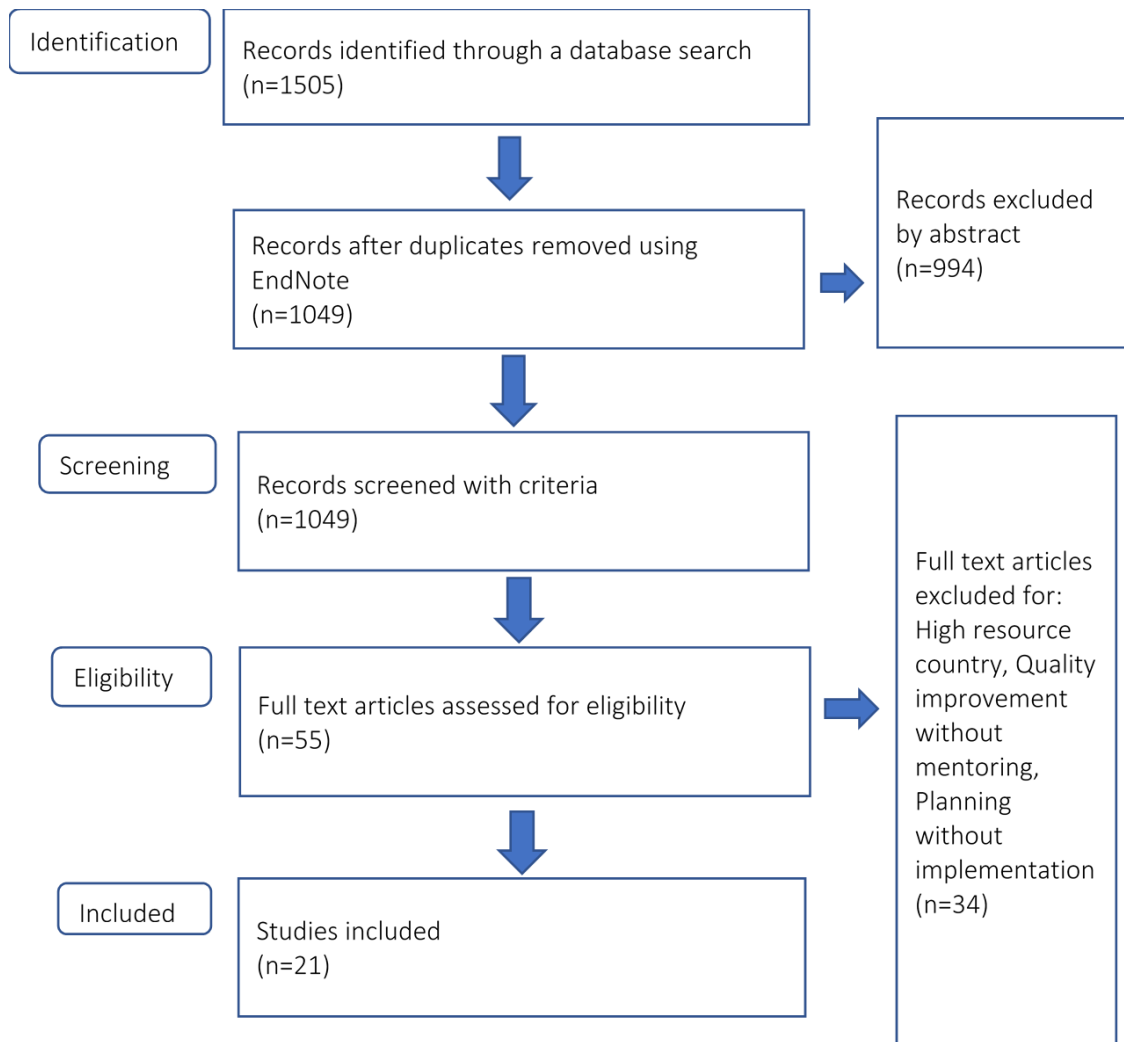
The final review was carried out in the early months of 2019 and was not updated before submission of the thesis. An attempt was made to incorporate relevant newer literature into the discussion. The literature on midwifery and mentoring was searched on Medline, EMBASE, and CINAHL, using broad search terms related to the topic (Althabe et al., 2008; Lassi et al., 2016; Miranda & Zaman, 2010). In addition to the database search, internet searches of published reports and grey literature was done, and hand searching of relevant reference lists was completed using a snowball approach. References (Chapter 8) were managed using EndNote citation manager (Pearson et al., 2015; Petticrew & Roberts, 2006).

2.5 Search strategy

The review was carried out using *a priori* planned searches and was inclusive of all literature that addressed the introduction of midwives and/or the use of mentoring to improve the quality of health care provided by maternity care systems that utilize midwives in LMICs, including the experiences of the involved managers and maternity staff. Predetermined key concepts (i.e., midwives/midwifery, supervision/mentoring, and care quality/care improvements) were searched with specific subject headings and the related Medical Subject Headings (MeSH) or thesaurus terms (Appendix 7.1). The Boolean value “AND” was used to narrow the results.

2.6 Study selection

Figure 3 shows the process of screening and reviewing abstracts and full-text articles based on the eligibility criteria (Moher et al., 2007). EndNote was used to assist in the screening process. After the initial screening of titles, the author screened all abstracts against the inclusion and exclusion criteria. A second round of review was then done of the articles’ full texts against the same criteria. This was done to address identified uncertainties such as which professionals were included and whether study designs were conceptual as opposed to focused on implementation. The second screening led to the inclusion of some articles with nurses who were clearly in midwives’ roles, and also articles describing skilled birth attendants. In addition, all but one of the articles published as part of the 2014 Lancet Series on Midwifery, including the article on the QMNC framework, were excluded as they were largely conceptual as opposed to describing implementation outcomes.

Figure 3 Prisma flow chart

2.7 Quality and relevance

To assess quality, a combined, modified mixed-methods synthesis tool developed at Leeds University, together with the Gough (2007) weight-of-evidence framework were used. The Gough tool guides quality evaluation using four themes, coherence and integrity, appropriateness for answering the question, relevance and focus, and overall assessment.

Further definition of each criterion is found in Appendix 7.1. Each theme is given a quality rating of high, medium, or low. These ratings then combine to form an overall rank for the research article. This quality assessment tool allowed for a range of research methods and methodology types as questions are answered considering the research context.

2.8 Data extraction

Data were extracted from 22 studies. The rank, as well as key content from the articles are found in Appendix 7.2 (Gough, 2007). The results included numerical data from quantitative studies and textual material from qualitative studies. Four articles were ranked as high quality, 15 as medium, and three as low, meaning that most articles were likely to be useful for this review. While the rank of the article was considered when summarizing the data, as integrative reviews consider all perspectives, all articles were included with consideration given to their potential strengths and weaknesses.

2.9 Data analysis and presentation

The health systems building block framework was used to guide data extraction and analysis (World Health Organization, 2007). Data from the articles were iteratively compared to identify common sub-themes relevant to the research question. The sub-themes were coded and aggregated to identify emerging themes according to the health systems building blocks. Table 3 was created to assist with summarizing the literature review findings according to each theme. This also facilitated the comparison of contrasting information within the identified themes. This process allowed for systematic

organization, analysis and reporting. Following the analysis, findings were reported narratively.

Table 3 Themes identified from the review

Themes	Sub-themes
National policies and administration	Gaps between policies and ground realities; allegations of corruption; impact on government spending, professional standardization (or lack of)
Care quality	With mentoring, certain improvements in care provision by maternity staff, quality monitoring systems, and availability of lifesaving medicines and equipment
Health seeking behaviours	Increased ANC, increased SBA, increased facility birth, increased immunizations
Experiences and underlying motivators of midwives and maternity staff	Discomfort related to deployment status and its impact on performance; and providers', mentors' and administrators' appreciation of mentoring
Health outcomes	Maternal mortality, newborn mortality, improved under 5 deaths

2.10 Results

2.10.1 Exploring the relationships between the studies

As delineated in the review question and more broadly in the aims and objectives for this research, the review was divided into two themes: 1) the impact and experience of the introduction of midwives into health systems, and 2) the impact and experience of mentoring to improve maternal health care.

Nine studies were found that evaluated the impact of the introduction of midwives into health systems; four were systematic reviews, the other five examined programmes in Sri Lanka, Bangladesh, Indonesia, Pakistan, and Afghanistan. Two of these studies had overall high quality rankings and three had overall low rankings. As much of the research on midwives is national rather than project based, there were fewer articles with strong research designs. For this review, articles that used the term midwife were included. Although the ICM has a standard definition of a midwife, that definition is often not abided by in the literature (Van Lerberghe et al., 2014). Some of the articles used the broader term “skilled birth attendant”—or SBA—and mentioned the WHO definition which includes midwives but is not aligned with the ICM standards for pre-service education. In this literature review, only one of the articles stated use of ICM-standard midwives and five clearly described pre-service education that did not follow an ICM standard. Two did not describe the pre-service preparation or an affiliation with ICM standards.

Thirteen articles were found on mentoring midwives or maternity nurses acting as midwives in maternal health systems in LMICs; two were ranked as high and none were ranked as low. The research was from India, Rwanda, Uganda, Ethiopia, South Africa, Nepal, and Laos. There was one systematic review, but only one article reviewed was related to midwives. There is no universal definition for mentoring, and many of the research projects reviewed were evaluating intervention packages that had non-mentoring components such as training, provision of supplies, and the possibility of accreditation (Tiruneh et al., 2018).

Of the thirteen articles that reported details of the mentorship, all mentors were nurses, midwives, or doctors from the county where the research was taking place, and all received 1-4 weeks of training on mentoring. There was a significant range in terms of frequency of mentor visits. In one project, mentors performed only two mentoring visits a year. The majority had mentor visits every 1-2 month, and in one, mentors were deployed full time to the facilities (Catton, 2017; Fischer et al., 2015; Tiruneh et al., 2018). None of the articles described using international mentors. All the mentorships were onsite, as opposed to virtual.

Four of the articles on mentoring appear to be from the same project in Karnataka, India, a large government project that involved eight districts and 385 hospitals (Bradley et al., 2017). The research from Karnataka has both some overlapping and some distinct outcomes. Another article from India is from Maharashtra, a different state. In addition, two articles describe different aspects of the same nurse mentoring project in Rwanda,

and a systematic review is inclusive of one of the two articles from Rwanda (Anatole et al., 2013; Manzi et al., 2018).

As described in the previous section, the impacts of midwives and mentoring fell into five broad themes—national policies and administration, care quality, health seeking behaviours, experiences and underlying motivators of midwives and maternity staff, and health outcomes. These are delineated in Table 4 according to the health system building blocks. Although these themes are distinct, they could be also described as steps in a process, tied to and dependent on each other. Tables 4-7 detail the articles found and their quality rankings according to theme, provider type, whether they address exclusively midwives or midwives along with mentorship, and region and country of focus. Author, country/ies and year can be linked to article titles in the table in Appendix 7.2.

Table 4 Health systems building blocks and themes

Health system building block	Theme	Methods	Total	Year Range	Quality rating	Article List
Governance & Finance	National policy and admin	Literature review, qualitative interviews, focus groups, mixed methods, quasi experimental impact assessment, cluster randomized trial.	7	2012-2016	HHH (H)	K. Jayanna, India, 2016
					HMM (H)	Z. Mumtaz, Pakistan, 2014
					MMM (M)	W. Van Lerberghe, Burkina Faso, Cambodia, Morocco, Indonesia, 2014
					HMM (M)	Viera, Bangladesh, Indonesia, Peru 2012
					LHL (M)	E. Speakman, Afghanistan 2014
					LHL (L)	S. Webster, Indonesia 2013
					MLL (L)	R. Haththotuw, Sri Lanka 2012
Service delivery	Care quality	Scoping review, systematic review, literature review, qualitative interviews, mixed methods, quantitative observations, cluster randomized trial, cross-sectional survey, randomized controlled trial, case study, impact evaluation.	18	2011-2019	HHH (H)	S. Tasnim, Bangladesh 2011
					HHH (H)	K. Jayanna, India 2016
					HMH (H)	A. Manzi, Rwanda 2018
					HMM (M)	Viera, Bangladesh, Indonesia, Peru 2012
					HMM (M)	J. Bradley, Karnataka, India 2017
					HMM (M)	P. Schwerdtle Low- and middle-income countries 2017
					HML (M)	G. Tiruneh, Ethiopia 2018
					HML (M)	R. S. Potty, India 2019
					MHM (M)	P. Bhamare, India 2018

				MMM (M)	W. Van Lerberghe, Burkina Faso, Cambodia, Morocco, Indonesia, 2014
				MMM (M)	S. Rajbhandari, Nepal 2018
				MLH (M)	H. Catton, Laos 2017
				MML (M)	C. Horwood, South Africa 2019
				MLM (M)	A. Fischer, India 2015
				LHL (M)	E. Speakman, Afghanistan 2014
				LMM (M)	A. Manzi, Rwanda 2013
				LLM (M)	G. Namazzi, Uganda 2015
				MLL (L)	World Bank, Multiple LMICs 2013
Health seeking behaviors	Systematic review, literature review, qualitative interviews, mixed methods, descriptive case study, quantitative before and after.	10	2012-2019	HHH (H)	S. Tasnim, Bangladesh 2011
				HHM (H)	Z. Mumtaz, Pakistan 2014
				HMM (M)	Viera, Bangladesh, Indonesia, Peru 2012
				HML (M)	R. S. Potty, India 2019
				HML (M)	G. Tiruneh, Ethiopia 2018
				MMM (M)	W. Van Lerberghe, Burkina Faso, Cambodia, Morocco, Indonesia 2014
				LHL (M)	E. Speakman, Afghanistan 2014
				LLM (M)	G. Namazzi, Uganda 2015
				LHL (L)	S. Webster, Indonesia 2013
				MLL (L)	World Bank, Multiple LMICs 2013

	Health outcomes	Systematic review, literature review, qualitative interviews, mixed methods, meta analysis, descriptive case study, impact evaluation.	8	2012-2015	HHM (H) MHM (M) MMM (M) HMM (M) LHL (M) LHL (L) MLL (L) MLL (L)	Z. Mumtaz, Pakistan 2014 Singh, Africa, Asia and Latin America/ Caribbean 2013 W. Van Lerberghe, Burkina Faso, Cambodia, Morocco, Indonesia 2014 Viera, Bangladesh, Indonesia, Peru 2012 E. Speakman, Afghanistan 2014 S. Webster, Indonesia 2013 R. Haththotuw, Sri Lanka 2012 World Bank, Multiple LMICs 2013
	Workforce	Experiences and underlying motivators				
		Qualitative interviews and focal groups.	5	2013-2017	HHM (H) MLM (M) LLM (M) LHL (M) LHL (L)	Z. Mumtaz, Pakistan 2014 A. Fischer, India 2015 G. Namazzi, Uganda 2015 E. Speakman, Afghanistan 2014 S. Webster, Indonesia 2013
	Access to essential medicines	-	-	-	-	-
	Information systems	-	-	-	-	-

Table 5 Provider type

Provider type	Total	Date range	Quality rating	Article list
ICM standard midwife	3	2011- 2018	HHH (H) HML (M) LHL (M)	S. Tasnim, Bangladesh 2011 G. Tiruneh, Ethiopia 2018 S. Webster, Indonesia 2013
Unspecified midwives and or non ICM midwives	6	2012-2017	HHM (H) HMM (M) LHL (M) LLM (M) MLH (M) MLL (L)	Z. Mumtaz, Pakistan 2014 Viera, Bangladesh, Indonesia, Peru 2012 E. Speakman, Afghanistan 2014 G. Namazzi, Uganda 2015 H. Catton, Laos 2017 R. Haththotuw, Sri Lanka 2012
Unspecified SBA and mixed nurses and midwives	3	2013	MHM (M) MMM(M) MLL (L)	Singh, Africa, Asia and Latin America / Caribbean 2013 W. Van Lerberghe, Burkina Faso, Cambodia, Morocco, Indonesia 2014 World Bank, Multiple LMICs 2013
Nurses	3	2013-2018	HMH (H) HMM (M) LMM (M)	A. Manzi, Rwanda 2018 J. Bradley, India 2017 A. Manzi, Rwanda 2013

Unspecified maternity staff	7	2015-2019	<p>HHH (H) K. Jayanna, India 2016</p> <p>HMM (M) P. Schwerdtle, Low- and middle-income countries 2017</p> <p>HML (M) R. S. Potty, India 2019</p> <p>MHM (M) P. Bhamare, India 2018</p> <p>MMM (M) S. Rajbhandari, Nepal 2018</p> <p>MML (M) C. Horwood, South Africa 2019</p> <p>MLM (M) A. Fischer, India 2015</p>
Introduction of midwives	10	2011-2014	<p>HHH (H) S. Tasnim, Bangladesh 2011</p> <p>HHM (H) Z. Mumtaz, Pakistan 2014</p> <p>HMM (M) Viera, Bangladesh, Indonesia, Peru 2012</p> <p>HML (M) G. Tiruneh, Ethiopia 2018</p> <p>MMM (M) W. Van Lerberghe, Burkina Faso, Cambodia, Morocco, Indonesia 2014</p> <p>MHM (M) Singh, Africa, Asia and Latin America/Caribbean 2013</p> <p>LHL (M) E. Speakman, Afghanistan 2014</p> <p>LHL (L) S. Webster, Indonesia 2013</p> <p>MLL (L) World Bank, Multiple LMICs 2013</p> <p>MLL (L) R. Haththotuw, Sri Lanka 2012</p>
Inclusive of mentoring	13	2013-2019	<p>HHH (H) K. Jayanna, India 2016</p> <p>HMH (H) Manzi, Rwanda 2018</p>

- HMM (M) J. Bradley Karnataka, India 2017
- HMM (M) P. Schwerdtle, Low- and middle-income countries 2017
- HML (M) G. Tiruneh, Ethiopia 2018
- HML (M) R. S. Potty, India 2019
- MLH (M) H. Catton, Laos 2017
- MHM (M) P. Bhamare, India 2018
- MMM (M) S. Rajbhandari, Nepal 2018
- MML (M) C. Horwood, South Africa 2019
- MLM (M) A. Fischer, India 2015
- LMM (M) A. Manzi, Rwanda 2013
- LLM (M) G. Namazzi, Uganda 2015
-

Table 6 Midwives only or inclusive of mentorship

<u>Category</u>	<u>Number of articles</u>	<u>Date range</u>	<u>Quality ranking</u>	<u>Article list</u>
Introduction of midwives	10	2011-2014	HHH (H)	S. Tasnim, Bangladesh 2011
			HHM (H)	Z. Mumtaz, Pakistan 2014
			HMM (M)	Viera, Bangladesh, Indonesia, Peru 2012
			HML (M)	G. Tiruneh, Ethiopia 2018
			MMM (M)	W. Van Lerberghe, Burkina Faso, Cambodia, Morocco, Indonesia 2014
			MHM (M)	Singh, Africa, Asia and Latin America/Caribbean 2013
			LHL (M)	E. Speakman, Afghanistan 2014
			LHL (L)	S. Webster, Indonesia 2013
			MLL (L)	World Bank, Multiple LMICs 2013
			MLL (L)	R. Haththotuw, Sri Lanka 2012
Inclusive of mentoring	13	2013-2019	HHH (H)	K. Jayanna, India 2016
			HMH (H)	Manzi, Rwanda 2018
			HMM (M)	J. Bradley Karnataka, India 2017
			HMM (M)	P. Schwerdtle, Low- and middle-income countries 2017
			HML (M)	G. Tiruneh, Ethiopia 2018
			HML (M)	R. S. Potty, India 2019

- MLH (M) H. Catton, Laos 2017
 - MHM (M) P. Bhamare, India 2018
 - MMM (M) S. Rajbhandari, Nepal 2018
 - MML (M) C. Horwood, South Africa 2019
 - MLM (M) A. Fischer, India 2015
 - LMM (M) A. Manzi, Rwanda 2013
 - LLM (M) G. Namazzi, Uganda 2015
-

Table 7 By region and country

Region	Countries	Date range	Quality rating	Article list
Africa	Mixed	2013	MLL (L)	World Bank, Multiple LMICs 2013
	South Africa	2019	MML (M)	C. Horwood, South Africa 2019
	Ethiopia	2018	HML (M)	G. Tiruneh, Ethiopia 2018
	Rwanda	2013-2017	HMH (H)	A. Manzi, Rwanda 2018
			HMM (M)	P. Schwerdtle, Low- and middle-income countries 2017
			LMM (M)	A. Manzi, Rwanda 2013
	Uganda	2015	LLM (M)	G. Namazzi, Uganda 2015
	Botswana	2017	HMM (M)	P. Schwerdtle, Low- and middle-income countries 2017
Burkina Faso	2014	MMM (M)	W. Van Lerberghe, Burkina Faso, Cambodia, Morocco, Indonesia 2014	
Morocco	2014	MMM (M)	W. Van Lerberghe, Burkina Faso, Cambodia, Morocco, Indonesia 2014	
South and East Asia	Mixed	2013	MHM (M)	Singh, Africa, Asia and Latin America/ Caribbean 2013

Bangladesh	2011-2012	HHH (H) S. Tasnim Bangladesh 2011 HMM (M) Viera, Bangladesh, Indonesia, Peru 2012
Sri Lanka	2012	MLL (L) R. Haththotuw, Sri Lanka 2012
India	2015-2019	HHH (H) K. Jayanna, 2016 HMM (M) J. Bradley, India 2017 HML (M) R. S. Potty, India 2019 MHM (M) P. Bhamare, India 2018 MLM (M) A. Fischer, India 2015
Pakistan	2014	HHM (H) Z. Mumtaz, Pakistan 2014
Nepal	2018	MMM (M) S. Rajbhandari, Nepal 2018
Cambodia	2014	MMM (M) W. Van Lerberghe, Burkina Faso, Cambodia, Morocco, Indonesia 2014
Indonesia	2012-2014	MMM (M) W. Van Lerberghe, Burkina Faso, Cambodia, Morocco, Indonesia 2014 HMM (M) Viera Bangladesh, Indonesia, Peru 2012 LHL (L) S. Webster, Indonesia 2013

	Laos	2017	MLH (M) H. Catton Laos 2017
Latin America and Caribbean	Mixed	2013	MHM (M) Singh, Africa, Asia and Latin America/Caribbean 2013
	Peru	2012	HMM (M) Viera, Bangladesh, Indonesia, Peru 2012
Middle East	Jordan	2017	HMM (M) P. Schwerdtle, Low- and middle-income countries 2017
	Afghanistan	2014-2017	HMM (M) P. Schwerdtle, Low- and middle-income countries 2017 LHL (M) E. Speakman, Afghanistan 2014

2.10.2 National policies and administration

The importance of effective policies and administration on the successful introduction of midwives into healthcare systems was highlighted in literature from Pakistan, Indonesia and Afghanistan and are discussed more below. Gaps between policy and field realities were seen as a barrier to successful system strengthening using midwives in Pakistan, where programme theory was built on incorrect assumptions. These incorrect assumptions included that midwives' would be willing to work in poor remote areas; this assumption led to significant underutilization of the midwives and was thus tied to their overall low motivation (Mumtaz et al., 2015). Although the article from Pakistan by Mumtaz et al. (2015) has relevance and is well thought through—thus rated highly for coherence and integrity—its relevance to this study is medium as it does not address the impact of standardization of midwives. Pre-service preparation in Pakistan does not meet an ICM standard and the authors do not acknowledge this as a possible hindrance to midwives' ability to move into their new roles. Feeling competent and having a full understanding of the importance of reaching the most marginalized could be both strengthened in a standard pre-service education, and contribute to midwife motivation and well as capacity to provide quality of care and ultimately health outcomes.

The importance of a quality education was addressed in another article focused on Indonesia where policies that incentivize rapid scale-up of midwife education were thought to contribute to gaps in quality and thus capacity (Webster, 2013). This article was ranked low as it is a non-research situational overview, however, it highlights important concerns. It describes that in Indonesia, after deployment of midwives,

maternal mortality rates initially fell dramatically, and then stagnated. The author attributes this stagnation to poor quality pre-service education resulting from a rapid scale-up. What we know from the background literature is that interventions need to be refined as mortality falls, and many factors could have contributed to the stagnation, although quality and availability of care which could be affected by midwives' education is a potential concern (Souza et al., 2014). This concern brings together the relationships between policies, quality of care and ultimately health outcomes.

In the research from Afghanistan, ranked overall low because of the study design, which involved a desk review of policies and eight interviews, stakeholders felt that corruption within the government interfered with implementation of policies, including strategic selection and quality education of midwives. Although the contentions were not corroborated with findings, corruption is so sensitive it is hard to gather strong evidence, and people's perception of it is thus important. The possible realities highlight the importance of understanding the health system and the relationships and motivators within it, in order to maximize the potential to achieve success of a new intervention. One of the sought-after successes was quality of care. These are key points for systems thinking, as both the unseen drivers and the relationships between the different components within the systems are important. Through this lens, the impact of corruption is an important motivator to consider. An understanding of systems thinking could have strengthened the implementation of these programmes.

Research looking at a mentoring programme in India which received an overall rank of high according to the Gough criteria evaluated the cost of mentoring. It was found that it equalled \$5.60 USD per pregnant woman, or around \$460,000 annually for eight districts. Most of the cost went toward mentors' salaries. Other costs included initial and periodic trainings for mentors and hospital staff, which was seen as overall cost effective (Jayanna et al., 2016). This finding is notable in that cost is a concern expressed with mentoring, and thus mentoring "worked" in the sense that it was affordable and made an impact on quality.

2.10.3 Care quality

Studies in Rwanda, India, Nepal, Ethiopia, South Africa and Uganda which ranked overall medium to high looked at service quality associated with mentoring. The research found that mentoring does improve quality, although not always, and not always to the desired extent. More often than not, the impact that mentoring makes is selective, and gaps remain even when improvements are made (Bradley et al., 2017; Fischer et al., 2015; Jayanna et al., 2016; Potty et al., 2017). None of the research on deploying midwives identified for the review addressed quality. Research on deploying midwives was typically focused on national-level health outcomes, whereas mentoring research was found to be project-based. Both are summarized in more detail below.

Research from Rwanda, ranked as high for its strong study design and alignment with this research, describes a mentoring programme directed at maternal healthcare providers and their managers that supplemented government training and supervision. The

research used an observation checklist to evaluate before and after a 15-month mentoring programme. The programme included ensuring logistics and supplies and creating enabling environments. Significant improvements were found in ANC providers' ability to identify high-risk pregnancies as well as to diagnose and treat STIs (Manzi et al., 2018). Although not explicit, a systems thinking approach was used in that important components and their relationships with each other were addressed.

Improved quality in normal labour and obstetric emergency management was found in research on mentoring from both Karnataka and Maharashtra, India; Nepal; and Ethiopia. These findings included pre-referral assessment and management, early breastfeeding, increased length of post-partum hospital stay, and a decrease in harmful behaviours in the maternity ward. However, gaps in implementation even following mentoring were also identified. In Ethiopia, the ability to perform manual removal of the placenta (one of the most lifesaving interventions) did not improve with mentoring. Likewise, in Karnataka, India, midwives with mentoring were not more likely to perform post-partum exams (Bradley et al., 2017; Fischer et al., 2015; Rajbhandari, 2018; Tiruneh et al., 2018). Across the research on mentoring looking at Karnataka, India; Uganda; and Ethiopia, improved sterilization and cleanliness practices were found in the maternity wards, and improvements in facility availability of lifesaving commodities, as well as laboratory capacity to support the management of pregnancy and newborn-related emergencies were highlighted (Fischer et al., 2015; Tiruneh et al., 2018). Improvements in quality

inevitably impact health outcomes and, ideally, best practices will be built into countries' policies.

Some quality concerns from the research from Karnataka, India and Nepal were noted. Although the studies were well-designed, they relied on written testing and simulated skills demonstration to indicate improved implementation. This method may be flawed, as knowledge and skill often do not lead to implementation. The gap between knowledge and skill, and implementation, relates to the way that complex systems motivators and barriers may not be straightforward. Research conducted away from the actual health facility may not reflect the realities of implementation (Manzi et al., 2018). In Nepal there was an attempt to take the broader system into consideration in that both the clinicians and the managers were mentored in the needed interventions to improve the quality. In the study from Maharashtra, India a package of training and mentoring was introduced with before and after observations. The results are reported descriptively so significance is missing, but it is indicative of positive change. In the Ethiopian research, mentoring was part of a larger package that included training, logistics and supplies, and supervision. Within a multi-component package such as this one, it is hard to weigh the attribution, although from other studies we know mentoring is likely to be significant. With that said, the research did align with a systems thinking perspective in that many components and their relationships are considered.

A finding that surfaced across the studies in Karnataka, India; South Africa; Uganda; and Ethiopia was that mentoring improved the quality of services for newborns (Jayanna et

al., 2016; Namazzi et al., 2015). The research from Karnataka, Uganda, and Ethiopia was discussed above. In South Africa, researchers found improvement in both essential newborn care and newborn resuscitation (Horwood et al., 2019). This differed from the Ethiopia research in which there were improvements in newborn care quality with the exception of newborn resuscitation (Tiruneh et al., 2018). The research from South Africa used a checklist and a one-day observation to assess change pre-, mid-, and post-intervention. However, the authors state that quality was difficult to assess and recommend further research with more observation. Like the Ethiopian research, and in line with systems thinking, the South Africa study implemented a package that included (but was not limited to) mentoring, and thus attribution was difficult to assess.

2.10.4 Health seeking behaviours

Analysis of health seeking behaviours revealed that both midwives and mentoring are linked to increased utilization of health services (Rajbhandari, 2018; Tiruneh et al., 2018). When midwives were placed in health facilities and financial barriers were removed, more women sought care. Although the research was limited, it also appears that as quality improves through mentoring, care seeking improves (Rajbhandari, 2018). Factors that interfered with improved care seeking after deployment of midwives were gaps in midwives providing service and time needed to gain trust by the community. Midwives deployed over five years in Pakistan saw more women than those recently deployed (Mumtaz et al., 2015). Among the 12,000 community midwives in Pakistan who were educated and then encouraged to return to their villages to establish private practices,

most did not, and impact on skilled birth attendant rates was minimal. Evaluations found several reasons for this, including midwives' lack of motivation, unreasonable performance expectations, and a lack of community trust (Mumtaz et al., 2015). Thus, midwives' motivations impact health seeking behaviours.

Research from the *Lancet* looked at five LMIC countries that had success lowering maternal mortality rates. In these five countries, intervention components had included educating and deploying midwives as part of a package of national maternal health system strengthening. The programs were assessed looking at national data. In all five countries, the facility birth rate increased. In addition, the number of births conducted by midwives increased, particularly for the lower socio-economic brackets. Similar to the studies discussed in section 2.8 (Care quality), as midwives were part of a package, attribution was hard to assign, but it is likely that both midwives and improved quality were contributors to improved utilization and thus improved health outcomes (Van Lerberghe et al., 2014).

In the research from both Afghanistan and Indonesia, community midwives were deployed to rural health centres and the study found related improvement in ANC, skilled birth attendance, and caesarean section rates (Speakman et al., 2014; Vieira et al., 2012). The studies from Indonesia, as reported in a systematic review, used longitudinal data to evaluate trends over time starting when the midwives were deployed. The area of midwife deployment was compared with an area without midwives. The research found improved facility delivery, skilled birth attendance, and declines in neonatal mortality in

both groups thus linking health seeking and health outcomes. More improvement was documented where midwives were deployed, however, significance was not reported.

The research from Afghanistan is a case study that was rated medium, in part because it used qualitative data collection methods to report on quantitative outcomes. The study employed document review and key informant interviews to evaluate a community midwife program. In addition, although the findings defend the programme based on it having achieved a significant reduction in maternal mortality, other literature highlights the difficulty in assessing the MMR in the very inaccessible context of Afghanistan. Despite this, by some measures, marked reduction in MMR was noted with implementation of policy to deploy midwives.

In Bangladesh, a study with a high overall quality ranking described ICM-standard midwives deployed to existing health facilities that were found to have increased service utilization by 3-5% over baseline in relationship to control facilities for facility delivery, ANC, and health seeking with obstetric complications. This was a very small-scale study that involved introducing midwives into hospitals with existing doctors and midwives, as opposed to into settings with no, or only traditional, healthcare providers, as was the case in the Indonesia and Afghanistan studies. It is notable that, even with the presence of nurses and doctors, the midwives were able to increase the number of women seeking care.

In research from Ethiopia, Uganda, and India, ANC and facility birth rates increased after mentoring programs for midwives were introduced—in Uganda sick newborn visits

increased by over 20% (Potty et al., 2017). Yet, as mentoring was part of a package, attribution was difficult to assign.

2.10.5 Experiences and underlying motivators of midwives, maternity staff and managers

This review found limited research that spoke to the experiences of those involved with midwives and mentoring. The reported experiences were observed to be grouped into two themes: 1) the uncomfortable feeling that midwives had regarding their deployment status, and the impact of those discomforts on their performance, and 2) providers, mentors and administrators' appreciation of and knowledge gained from mentoring. Research quality varied and it was not always possible to discern whether attitudes were presumed or directly expressed.

A report from the *Canadian Medical Journal* that was rated low because it was not based on original research noted high turnover of midwives in the government systems and attributed this to midwives' preference for higher pay in the private sector (Webster, 2013). In Pakistan, midwives stated that it was difficult to set up private midwifery practices, and the distance between their homes and facilities made travelling prohibitive, particularly at night. In addition, midwives were not motivated to take care of the poor and marginalized as there were minimal financial incentives (Mumtaz et al., 2015). Another study found that midwives in Afghanistan were less willing to work in military controlled areas, stating fears about security as well as resistance from family. These same

midwives spoke about the desire for professional autonomy, respect, and for midwifery to be a distinct profession (Speakman et al., 2014).

Maternity staff experiences of mentoring were found to be positive in Uganda and Karnataka, India. Mentees expressed having increased confidence and feeling happy with the mentorship and what they had learned (Namazzi et al., 2015). In India, mentors observed that mentoring contributed to better teamwork among maternity staff. In Laos, a mentorship programme designed for newly deployed inexperienced midwives was found to be well-received by hospital administrators (Catton, 2017; Fischer et al., 2015). It is tricky for researchers implementing a mentoring programme to obtain candid statements from participants on their feelings regarding mentorship. That said, having the participants state specific aspects of the programme that they appreciate likely facilitates some authenticity. In the above research, better teamwork was identified specifically, but there were more generic statements of appreciation which can be hard to interpret.

2.10.6 Health outcomes

Most, but not all, population and intervention-based research shows positive health outcomes from the introduction of midwives (Mumtaz et al., 2015; Singh et al., 2014; World Bank, 2013). These findings are summarized in the following paragraphs.

A systematic review assessing the protective effect of SBAs on neonatal mortality in nine LMICs found mixed results. Where SBAs were protective in Latin America, they were only partially protective in Asia, and not at all in Africa (Singh et al., 2014). The review used secondary data from national demographic surveys and did not give details on the

type of SBA but only that they were defined by WHO (whose SBA definition is inclusive of midwives). The results, however, appear questionable, as it is difficult to imagine how birth without an SBA could be safer for newborns in any setting. As data collection in low-resource settings can sometimes be weak, additional research is warranted on this topic (Ndabarora et al.; Ndabarora et al., 2014).

Another systematic review developed by the World Bank found sparse research on health outcomes and SBAs. In this review, some evidence for reduced under-five mortality was identified in Brazil and Uganda, and decreased MMR rates were documented in Ukraine and Brazil, but a similar intervention in India found no benefit (World Bank, 2013). There are several obvious concerns with making conclusions based on the findings from both of these reviews. One is the non-standard definition of SBA, which spans cadres with significantly less preparation than the global standard of a professional midwife. The other is that they do not take into consideration the essential enabling environment needed for an SBA to provide care.

In Indonesia, an analysis of population data found an initial improvement in maternal mortality with the deployment of midwives, but the literature on continued decline with scale-up of midwives is conflicting, and MMR remains higher than development goals (Webster, 2013). However, another study looking at health outcomes associated with midwife deployment found that neonatal mortality declined in project areas (Vieira et al., 2012). In the aforementioned study on midwife deployment to rural areas in Pakistan, no significant impact was found on MMR. Although skilled birth attendance has been used

as an indicator of a basic maternal healthcare system, some countries and programs have interpreted this to imply that the presence of an SBA is the only needed ingredient to make a health impact. Needless to say, the quality of SBAs' pre-service education, as well as lifesaving commodities, conducive environments for practice, and a liveable wage are also needed.

On a more affirmative note, a recent *Lancet* journal article reported that in Morocco, Indonesia, Mexico, Burkina Faso, and Cambodia, significant progress toward reducing maternal mortality had been made, while using an expanded role of midwives as a core component for a package of maternal health system strengthening (Van Lerberghe et al., 2014). Decreased MMR, concomitant with the introduction of midwives, was also found in the Sri Lanka and Afghanistan studies. The MMR in the Sri Lanka study fell after the introduction of midwives as part of a national multi-faceted maternal health programme that reduced maternal mortality. The results helped the country become a leader for maternal health in the region (Haththotuwa et al., 2012). In Afghanistan, MMR values are contentious, as conflict and remoteness render accurate information hard to gather. However, in the ten years after midwives were deployed, MMR appeared by some assessments to drop from 1600 to closer to 400 deaths per 100,000 live births (Speakman et al., 2014; World Bank, 2013). The positive impact of midwifery deployment at a programme (rather than national) level was demonstrated in Indonesia and Bangladesh. When midwives were deployed, death from obstetric complications, particularly abortion, sepsis, and PPH fell over a control group of facilities with only doctors and nurses (Tasnima

et al., 2011). While very little research on the impact of mentoring on health outcomes was found, one study from Uganda identified a non-significant declining trend for neonatal deaths in mentored hospitals linking quality to health outcomes (Namazzi et al., 2015).

2.11 Discussion

Overall, this review supports that both deploying professional midwives and also mentoring facilities with midwives in LMICs have a positive impact on the lives and health of mothers and babies. With that said there was a range of quality in the data and approaches to research on this topic are not well standardized. There were also, for multiple reasons, notable gaps in researchers' ability to define and measure outcomes.

The limited use of the standard definition of a midwife added to the challenges in this review. None of the studies specifically looked at midwives with education and skills that meet a defined global standard; some specifically mentioned that they do not. Not all the research described pre-service preparation, and some aggregated many types of providers with different degrees of maternal health training under the term SBA. Because of this, the capabilities of cadres with the title midwife varied, and impacted performance and health outcomes (Singh et al., 2014; World Bank, 2013).

In addition to the lack of standardization of the term midwife, there was a lack of standardization in midwives' work environments. It is expected that, where facilities provide the needed supplies, logistics, and salary, midwives will perform at a higher level

than those deployed to set up private practices in remote rural areas without support. More research is needed to identify a basic package to provide an enabling environment for a midwife.

It is of note that, though some studies looked at quality outcomes associated with mentorship, none of the research on the introduction of midwives specifically reported on quality of care. Rather, they reported on morbidity, mortality and rates of delivery with an SBA. Further, studies on deploying midwives in LMICs tend to be at a national level and thus are large scale without adequate refinement of details within the data. This, combined with low quality rankings from weak study designs, made it difficult to assign attribution of results to midwives.

Several of the studies were given low quality rankings because they relied on national MMR statistics to evaluate the impact the introduction of midwives made. As already alluded to, there are several potential confounders in the assumption that midwives alone might shift national MMR. One is that many health system factors will play into the reduction of maternal mortality, and in population studies it is impossible to be aware of and control for all of them. Further, various social determinants—key among these are wealth and education—are associated with strengthened maternal health systems. In addition to these broader variables, the introduction of midwives is often part of a package of other maternal health interventions, thus diluting what MMR reduction can be attributed to. Finally, assessing health outcomes at a population level in LMICs can be

inaccurate. For example, Afghanistan has recently had a large disparity in reported maternal mortality on reputable surveys (Britten, 2017).

In some ways, like lack of adherence to the standard definition for a midwife, there are no standards for mentoring. The 13 mentoring studies ranked in the medium range and variables in mentoring include if the mentor is national or international, the professional background of the mentor (e.g., midwife, doctor, nurse, public health specialist etc.), the preparation and ongoing support mentors are provided, frequency and duration of mentor contact, and whether mentoring is onsite or remote. In this review, only national mentors and onsite mentoring were found; but there was significant variability in the preparation of the mentor and frequency of visits. It is notable, however, that, despite several mentoring models found in this review, all reported some desirable results associated with mentorship. At the same time, like the analyses on the deployment of midwives, mentorship in this literature was often part of a package. Thus, parsing out the findings to determine the impact and experience of mentorship alone was largely not possible.

Despite the good outcomes reported on mentorship, there are gaps. The research on Ethiopia found no change in newborn resuscitation or manual removal of the placenta. Both interventions address leading causes of death and require a moderate amount of technical skill. Thus, they could be a priority and amenable to mentorship (Tiruneh et al., 2018). Research from India found no improvement in post-partum checks associated with mentorship, and the post-partum period is known to be the time of the most maternal

deaths. Both these gaps bring up questions about the potential of these mentorships to effect desired change.

Quality itself is difficult to define, and even more so to measure. Its definition can include both expansion of services and improvements of existing services. In this review, it was not easy to tell from the literature which was the focus. This differentiation is important for designing programs, as one involves creating enabling environments to ensure services and the other capacity building. Both can be part of mentoring, but the focus of each is different.

Measuring quality is time consuming and involves being in the field to see and document changes in practice. Most of the research from this review relied on self-reports from healthcare providers of their knowledge, skills, and/or practices, as the evidence for determining whether quality had improved. While some of the studies included observation, the descriptions were limited in detail and observation variables were not featured in the quality assessment findings. As self-reports from healthcare providers may be biased toward information that researchers want to hear rather than actual practice, there is always a risk that statements will not reflect true clinical care practices. In addition, care practices may not be driven by knowledge and skills. Assuming someone who has knowledge and skill will put that practice into use may therefore not be warranted. It is possible that the research from Uganda is an example of this, where newborn care quality was thought to be improved, but neonatal mortality did not drop (Namazzi et al., 2015).

There are also specific interventions that can be used appropriately, or overused. A simple statistic showing an increase or a decrease does not tell the reader the impact on quality. An example of this is caesarean sections. Viera et al. (2012) report increases in caesarean sections as a positive impact of deploying midwives. Although this may be true if the indications for the women receiving the caesarean sections were appropriate, it is impossible to discern. All too often, increased facility birth leads to unnecessary interventions, including caesarean section.

Gaps in what is needed to offer a basic quality of maternity services can be quite significant in low-resource settings. Systematic reviews of the literature have found that most maternal health interventions will be able to make positive changes. This is because attention to care provision in LMICs is often so under-resourced that it is possible to make initial improvement if time and resources are provided (Stokes et al., 2016). However, making significant, comprehensive, and sustainable change is much more difficult as a wide range of problems are present in the complex health systems of LMIC (Stokes et al., 2016). Both mentoring and the introduction of midwives facilitate relationships between different components of the health system. Mentoring addresses multiple systems components to facilitate an improved care environment, while midwives deliver needed care. Thus, analysis of these interventions aligns well with systems thinking approaches that address complex problems.

2.12 Reflection

As narrative syntheses organize information through the lens of what is effective in specific contexts, it was a natural approach to use for this integrative review. Both the integrative review and the narrative synthesis allowed for a wide range of literature and an in-depth exploration of what works. This approach worked well for this review, as the answer to the question spanned both quantitative and qualitative research, as well as programme descriptions. The risk of using a broad, diverse grouping of studies is that some data sources may not have the same rigor, rendering it impossible to make comparisons. This risk was addressed through using the Gough tool and is reflected in the narrative.

2.13 Summary

By exploring if ICM-standard midwives, and mentoring, improve quality of maternity care in LMICs the literature review contributes to the aims and objectives of this research as it provides a broad understanding of the current knowledge base on the topic and highlights both successes and challenges. Gaps in both literature availability and quality were found.

The review highlighted that there is a need in LMICs for more research on the impact of the introduction of ICM-standard midwives and the benefits of mentoring during the initial phase of deployment. Although the review affirmed the positive potential of both midwives and mentoring, due to lack of standardization it is difficult to make a definitive statement about which intervention models are more effective. In addition, none of the

articles looked specifically at the impact of mentoring on a recently introduced professional cadre. The clear overarching theme was that both midwives and mentoring do improve maternal and newborn health outcomes, but not consistently and not in all contexts. Because of this inconsistency, more research is needed to explore what variables create positive impacts and what barriers need to be avoided. Thus, in order to achieve the aims and objectives of this research it was decided to explore whether newly introduced professional midwives improve maternity care quality and availability in the LMIC setting of Bangladesh. Within this framework, this research also studies midwives' experiences in their new roles, as well as the experiences of the maternity staff they work alongside, with the intention of identifying potential barriers and facilitators to improvements in care quality in midwife-led care settings. The research questions addressing the objectives described in Chapter 1 are as follows:

- 1) Is there an association between newly introduced professional midwives in rural sub-district hospitals in Bangladesh, both with and without mentoring, and improved availability and quality of maternal and newborn health care?
- 2) What are the experiences of the midwives, as well as the maternity staff and managers that they join?

3. Research paradigm and methodology

3.1 Introduction

The previous chapters summarize the literature on the impact of introducing midwives with and without mentorship in maternity units in health systems in LMICs. The following sections will be framed by the research questions:

- 1) Is there an association between newly introduced professional midwives in rural sub-district hospitals in Bangladesh, both with and without mentoring, and improved availability and quality of maternal and newborn health care?
- 2) What are the experiences of the midwives, as well as the maternity staff and managers that they join?

It was clear from the literature that effecting change is complex and both midwife and mentoring programmes have varying degrees of success. This chapter gives a brief overview of research philosophy and explains the thought behind the choice of methodology and theoretical underpinnings for this research.

3.2 Ontology and epistemology

The word philosophy is derived from the ancient Greek words that mean the love of wisdom. The field originated in Greece with philosophers that included Socrates, Plato, and Aristotle (Hunt, 2005). These philosophers began a dialog that spanned centuries and informed the evolution of philosophical discourse that we find today. During the Age of

Enlightenment, philosophy, which was at that time embedded in religion, broke away in pursuit of a more objective perspective. Our current descriptions of what is (ontology), and how we know what is (epistemology), derive from this period (Crossan, 2003).

3.3 Positivism

Positivism, which arose in the early 19th century through the writings of French philosopher Auguste Conte, supports the classical scientific approach (Ivanovich, 2012). Similar to the way philosophy science was separated from the authority of religion, and toward empiricism, positivist researchers seek to find objective patterns by recording observable data and, from that data, confirm universal laws (Crossan, 2003). In the ontology behind positivism, three important tenets are assumed. The first is that there is an objective fixed reality separate from the observer. The second is that reality must be observable by the senses. The third is that humans are unbiased enough to be able to uniformly perceive the objective reality (Crossan, 2003). This research uses positivism to quantify if changes were made with the introduction of midwives, and again with the introduction of mentors. Positivism was also used to analyse survey results looking at people's opinions and experiences. This use of quantitative data reflects a belief by the researcher that there are measurable external realities, and often both the reality and the perception of it can be influenced by unseen forces. Yet, despite that, the measure is accurate enough to contribute to knowledge.

3.4 Constructivism

For the purposes of this paper, constructivism will be used as an umbrella term to describe the many theoretical frameworks that consider subjective experience as part of, if not all of, reality (Crossan, 2003; Mackenzie & Knipe, 2006). Constructivism perspectives emerged from social science research and address the issues of perceived realities, social construction, dominant paradigms, and unseen forces.

The ontology of constructivism is based on a belief that reality is defined by subjective perception, as opposed to a fixed external phenomenon (Goldenberg, 2006). Within this paradigm there is a range of views, from a belief in the existence of an objective reality coloured by subjectivity, to seeing reality as entirely socially constructed—either by the experiencer, by a dominant paradigm, or by other unseen forces (Mertens, 1999, 2012; Misselbrook, 2013; Walsh & Evans, 2014).

The epistemology of constructivism supports an understanding of how people build concepts and theories around their experiences in the natural and social world. It is characterized by complexity and pluralism, the ever-changing interface between external realities and subjective perceptions (Cupchik, 2001; Koro-Ljungberg, 2010). Although healthcare research has greatly benefited from positivist insights, there are also many examples of how incomplete understanding of the underlying feelings and attitudes that motivate actions interferes with healthcare providers' objectivity toward themselves and their clients (Bunniss & Kelly, 2010). For this research, the perspectives of the healthcare providers and managers are seen as essential to explain what is observable, to glean a

deeper understanding of why things are the way they are. In addition, the qualitative portion allowed for insights to arise outside of the prescribed queries of the researcher.

3.5 Mixed methods

Mixed-methods research intentionally combines quantitative and qualitative methodologies. By bringing the two perspectives together and analysing the whole, new understanding is gained and insights are generated. The use of mixed methods has developed over the past 20 years (Shannon-Baker, 2016; Teddlie & Tashakkori, 2009). There has been significant controversy about whether it is possible to mix different philosophies and their associated methods and methodology. The continued discourse regarding if opposing paradigms are exclusionary or can in fact be part of a fluid mental model have been part of methodological wars as well as peace time debate (Shannon-Baker, 2016). The debate includes controversy regarding if paradigms for research—particularly mixed-methods research—are beneficial. They inevitably impose artificial frameworks when, in reality, truth is not easily packaged and often requires a pragmatic approach in real life situations. Currently, mixed-methods research is largely accepted as adding to complex understanding. Where quantitative methodology looks at outcomes, qualitative explores attitudes and perceptions, and the two together deepen understanding (Mackenzie and Knipe, 2006). This allows for greater awareness of how behaviours are influenced by underlying attitudes and perceptions (Palinkas et al., 2015).

3.6 Systems thinking

The origins of systems thinking date back to Aristotle, but were advanced by modern philosophers in the 1920s and 30s. Systems thinking started with general systems theory as a platform for discussing the importance of seeing the whole and internal relationships within wholes, in addition to dissection and analysis of parts (Mingers, 2014; Monat & Gannon, 2015). Systems are described as internally dependent and self-organizing, and may have motivators that are hidden and do not appear intuitive or linear (Adam, 2014). Systems are adaptable but resist change if not all motivators are considered and addressed. Systems thinking has been applied to a range of fields where systems are complex and a more holistic perspective is needed (Balakrishnan et al., 2016; Kroelinger et al., 2012; Russell et al., 2014).

In the 1970s there was an epistemological division, led by an inclusion of social systems and the addition of phenomenology and constructivism, into systems thinking. This inclusion was known as soft systems thinking (Hobbs, 2015). In systems thinking, an iceberg model is depicted with mental models termed as the hidden motivators behind the observable phenomena. Systems thinking is used to address the challenges of making positive change within complex contexts.

Systems thinking was contextualized for health systems by WHO in 2009 through a report on systems thinking for health system strengthening. Since the introduction of this report, greater attention has been given to systems thinking to inform health system policy,

planning, and evaluation in LMICs. Systems thinking has recently been used as a model to address the complex health systems in LMICs (Adam & de Savigny, 2012).

Functional healthcare systems, as defined in the WHO report, encompass the needed policies, resources, and implementation to make equitable services available—most importantly and most difficult to achieve—for the poorest and the most marginalized (World Health Organization, 2000). Health system strengthening is seen as: (a) the process of identifying and implementing changes in policy and practice in a country's health system, so that more effective responses to health system challenges are implemented, and the health of people improved; and (b) any array of initiatives and strategies that improves one or more of the functions of the health system, and that leads to better health through improvements in access to healthcare coverage, quality, or efficiency (Hafner & Shiffman, 2013). The WHO calls for using systems thinking to plan and evaluate health systems strengthening (De Savigny & Adam, 2009).

Systems thinking highlights that complex systems contain many sub-systems within a larger umbrella system. If all the sub-systems align with the goals of the larger system, there will be functionality. More commonly, because of limited vision or self-interest, termed bounded rationality, some sub-systems do not align and may even dominate. This can cause sub-optimization across the entire system, impeding attainment of the larger goal (De Savigny & Adam, 2009; Namazzi et al., 2015; Paina & Peters, 2012). Given this, it is important to consider the views, interests, and power dynamics of all involved stakeholders. The belief is that success in health system strengthening will be determined

by a deeper understanding of the sub-systems or mental models that are unobserved but influence outcomes (Hobbs, 2015; Walsh and Evans, 2014).

3.7 The approach for this research

For this study, a pragmatic mixed-methods approach with a systems thinking theoretical framework was chosen. As the research was a natural experiment, a pragmatic approach was considered effective as it facilitates focus on research questions in a real-life context. It also allows for iterative reviewing of diverse findings to help gain understanding of what will be useful to address specific real problems and questions (Willig, 2013). In fact, both systems thinking and pragmatism can be used as guides for grappling with complexity as they can incorporate diverse perspectives, and allow for digging deep to find less obvious motivators (Yucel, 2018).

The quantitative and qualitative data for the mixed-methods approach were gathered simultaneously during hospital visits. Each hospital was visited only once, and the results were compared and contrasted to see if there were patterns with regard to the differences both within and between the two types of data. After analysis, the qualitative data were used to shed light on the clinical observations and survey results found in the different hospital groups. For example, in hospitals where more skin-to-skin contact was performed, the qualitative data were explored for whether there were differences in feelings and understandings with regard to performing skin-to-skin contact among

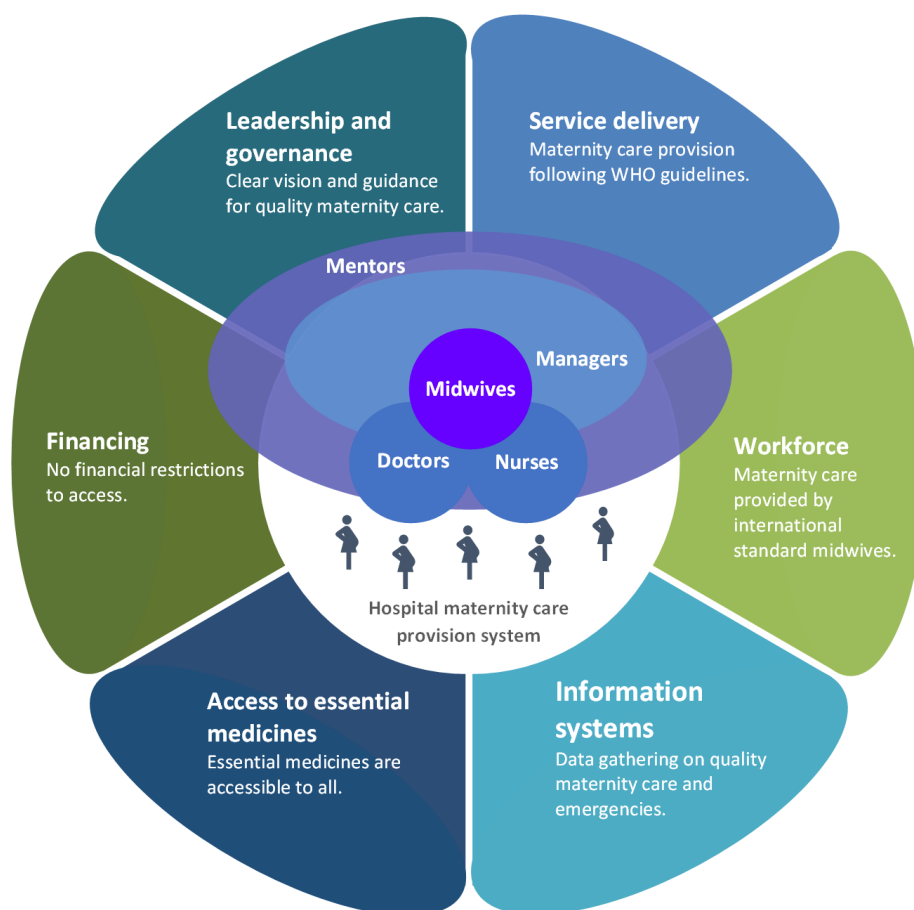
maternity care providers in the different hospitals. If differences were identified, they were examined for insight into components that could inform program strengthening to provide higher quality care.

Triangulation is obtained through comparing results across multiple methods of gathering data, and/or with existing literature and theories (Barbour, 2008; Bazeley, 2013). It is essential for researchers to do this time-consuming work to identify patterns and outliers within study data (Barbour, 2008; Krefting, 1991). Two types of quantitative data collection approaches—survey and observation—and two types of qualitative approaches—interview and focus group discussions—were used for triangulation. All four datasets were compared and contrasted to find relationships and associations within and between the different groups. Important insights were gleaned from both the quantitative and the qualitative data individually, as well as from the analytic conversations between them. The results were not weighted toward either method, but rather analysed equally to draw out a range of insights.

Systems thinking, as contextualized by the WHO, was determined to be an effective framework for this research as it helps to identify barriers and facilitators to systems strengthening. The WHO health systems building blocks facilitate comprehensive planning for and evaluations of health systems in LMICs, thus allowing for deep study of the nuances of effective system strengthening approaches. In the context of this research, implementation of international-standard midwives took place within individual hospitals. While hospitals were the units of analysis, the health systems building block

framework provides a lens through which to view the maternity care system at the hospital level. Figure 5 provides a visual depiction of the system for care delivery led by international-standard midwives through the lens of the WHO health systems building block framework. Specifically, it presents a depiction of the components of a strong maternity care system including the introduction of midwives and mentoring overlaid onto the building blocks. This allows the building blocks to be conceptualized with a specific focus on maternity care quality and availability. The building blocks are depicted in Figure 5 as follows: 1) service delivery is maternity care as guided by WHO guidelines, 2) workforce is midwives providing WHO quality of care as part of interdisciplinary teams, 3) health information systems are specific to the WHO and midwifery framework quality maternity care guidelines, 4) access to medicine is indicated by free and available lifesaving commodities for obstetric and newborn emergency response, 5) finance is free/affordable access to all, and 6) leadership is reflected in managers with a clear vision and the agency to create enabling environments for quality maternity care.

Figure 5 Hospital maternity care provision system with WHO health system components



Graphic informed by:
World Health Organization. (2007). *Everybody's business: strengthening health systems to improve health outcomes: WHO's framework for action*.

As detailed by De Savigny and Adam (2009), certain types of questions may be asked from a systems thinking perspective to help guide inquiries into intervention effectiveness. When evaluating the context within which an intervention is implemented, the italicized questions below can help researchers apply a systems thinking approach. Answers to these questions, informed by the background research, have been supplied as part of shaping this exploration within a systems thinking framework.

Table 8 Systems thinking evaluation questions for contexts evaluations

(adapted from De Savigny and Adam, 2009)

Contexts Evaluation

1. *What facilitates/impedes the intervention?*

Motivations to provide quality care vs. personal gain, enabling environments, supportive co-workers and managers, autonomy/agency of midwives

1. *What other co-interventions are relevant?*

Supportive policies and guidelines, relevant trainings

2. *What else is changing in the system?*

Momentum around health system improvement and reducing maternal mortality

Increasing inequitable access to health care

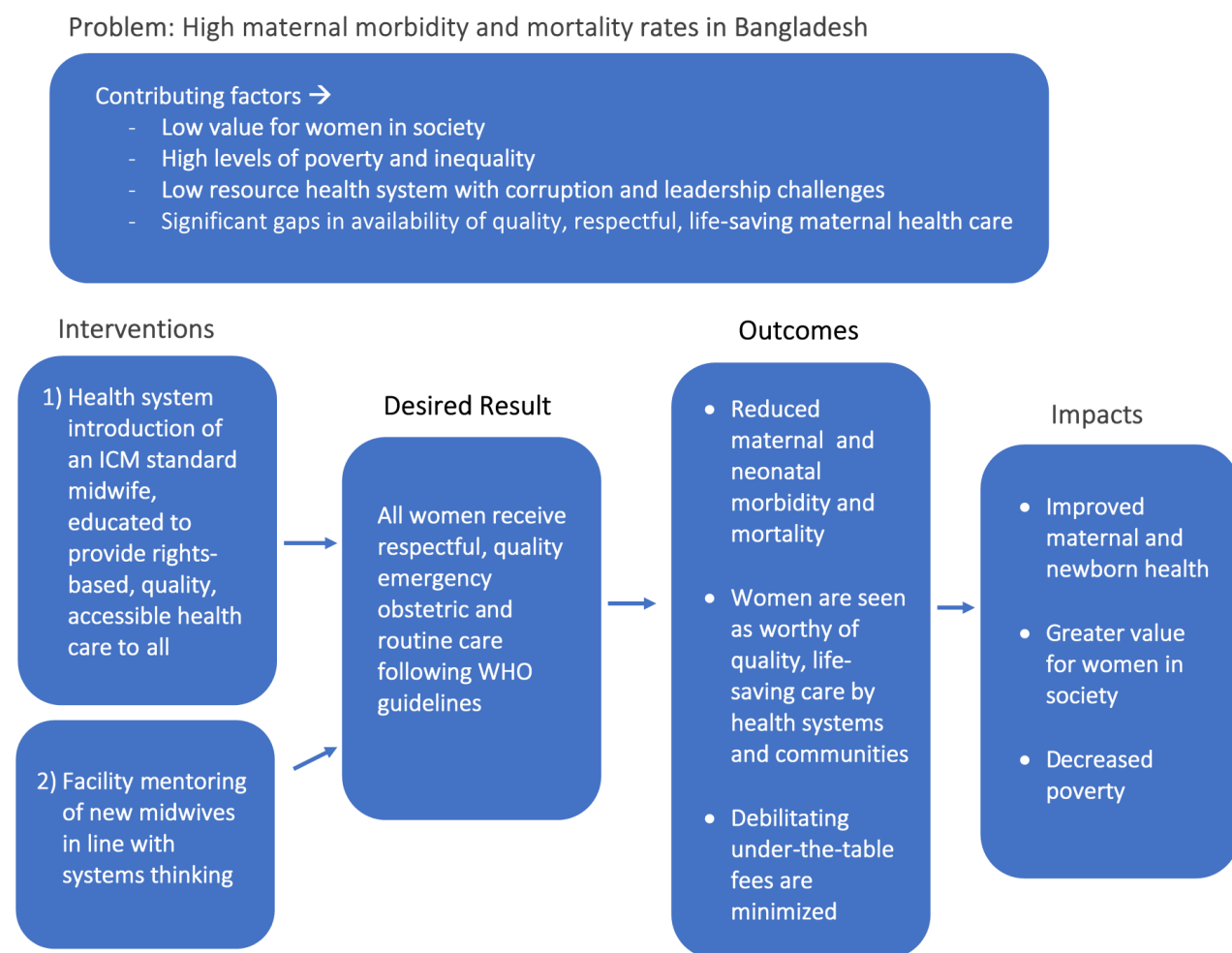
Resources shifting to urban health systems

As described earlier, the components of systems, and the relationships between them, influence how systems work (De Savigny & Adam, 2009; Roux, 2011). Recognizing this study as a natural experiment, the broadest umbrella system is the healthcare system of Bangladesh, which comprises many complex relationships. The health system starts at the central level and continues through district-level managers to sub-district hospitals, which are the system units of this research. The existing components studied within the hospitals comprised hospital directors, nursing managers, the maternity and emergency room staff,

and patients receiving care. In some of the hospitals, midwives were introduced about nine months prior to the data being gathered and in some of those there was a mentoring intervention.

3.7.1 Programme theory

An accepted method of guiding and measuring the quality of programs is the development of a programme theory, also referred to as a driver of change or logic model. Programme theories delineate the expected steps toward achieving desired goals of a project or intervention (Mumtaz et al., 2015; Reed et al., 2014). The programme theory for this project is delineated in the diagram below (Figure 6). Within this programme theory, this research will evaluate the factors that contribute to the problem, as well as the experiences that may shed light on success and challenges of those involved in making the changes.

Figure 6 Programme theory

3.7.2 WHO standards for improving quality of maternal and newborn care

For this research, defining the scope and quality of maternal and newborn health care is guided by two WHO documents, both published in 2016. They are 1) the *WHO standards for improving quality of maternal and newborn care in facilities*, which addresses obstetric and newborn emergencies as well as routine labour and delivery, and 2) the *WHO recommendations on antenatal care for a positive pregnancy experience*. The *WHO*

standards for improving quality of maternal and newborn care in facilities was developed by global experts using the Delphi method to gain consensus on the critical components of care. It includes eight standards with associated quality statements to guide implementation. Selected criteria from Standards 1, 6, 7, and 8 were used in this research. The relevant standards are below, and their associated quality statements are summarized in Appendix 7.3.

Standard 1: Every woman and newborn receive routine, evidence-based care and management of complications during labour, childbirth and the early postnatal period, according to WHO guidelines.

Standard 6: Every woman and her family are provided with emotional support that is sensitive to their needs and strengthens the woman's capability.

Standard 7: For every woman and newborn, competent, motivated staff are consistently available to provide routine care and manage complications.

Standard 8: The health facility has an appropriate physical environment, with adequate water, sanitation and energy supplies, medicines, supplies and equipment for routine maternal and newborn care and management of complications.

Although Standards 2, 3, 4, and 5 may be addressed through the deployment of midwives and facility mentoring, to avoid data overload they were considered outside the scope of this research. This was because either the impact of midwives and mentoring was less

direct, or because methods of data collection did not fit in to existing plans (World Health Organization, 2016b).

Selected guidelines from the two documents for improving ANC were also used. These state that:

- It is recommended that each pregnant woman carries her own case notes during pregnancy (this is an ANC card) to improve continuity, quality of care, and her pregnancy experience.
- Midwife-led continuity-of-care models, in which a known midwife or small group of known midwives support a woman throughout the antenatal, intrapartum, and postnatal continuum, are recommended for pregnant women in settings with well-functioning midwifery programmes.

3.8 The researcher's role

The researcher for this study worked for the United Nations in Bangladesh at the time it was carried out. In this role, she supported the Government of Bangladesh with the introduction of the new midwifery profession, and with maternal health issues in general. The researcher is a midwife with over 40 years of clinical practice experience. Due to her professional role, she was known to many of the newly deployed midwives through social media, and in some cases from visits to midwives' pre-service educational programmes and clinical sites, or from speaking at large professional meetings. For this study, the researcher conducted the interviews and focus groups and was available at all facilities

for initial observations. As some of the participants had knowledge of who the researcher was, this may have influenced their responses toward aligning with what they perceived she represented. This could have influenced them to speak more positively regarding midwives and/or the shifts toward more evidence-based care.

The researcher's interest, expertise, and involvement with the midwifery profession and with the importance of quality maternal and newborn health care inevitably had an impact on her perspective when analysing the data. This may have been an asset in terms of knowing the issues well and being able to pull out relevant and meaningful statements; it could potentially have also been a detriment if bias caused a loss of objectivity and perhaps trained her perceptions to focus on certain things rather than having been an open slate to all possible pieces of information.

As the researcher interfaced with the health facilities in which the research was taking place, there was both an insider and an outsider perspective (Råheim et al., 2016). She was an insider in that she may have been known by the involved participants as someone who works to support the Government on midwifery and maternal and newborn health. Yet, she was also an outsider in that she was not known by most, and not known well by any. In her professional role, she shared a common interest with the participants on the topic, which could have biased conversation and data analysis. Given this, particular attention was given toward reflexivity during data collection and analysis (Råheim et al., 2016).

The researcher worked with a Bangladeshi research team consisting of a research visit coordinator, two anthropologists who were working as professional translators, and eight research assistant diploma midwives who made the majority of the observations and elicited and supported the filling in of the survey. The research team was funded and trained by the researcher. The research midwives were junior to the all the maternity staff and thus less intimidating and less likely to cause behaviour change. The midwives were given clear teaching to not interject their own opinions, but rather document what they observed.

3.9 Rigor and trustworthiness

Rigor—also described as trustworthiness—refers to how we gain confidence in the quality of the data, interpretation, and methods of a study (Connelly, 2016). Quantitative, as well as positivist, research use reliability and validity as standards for trustworthiness. Reliability refers to a tool or process being replicable, and validity refers to the overall use of an accepted scientific method of research (Krefting, 1991). Trustworthiness also entails ongoing triangulation, vigilant reflexivity, and transparency (Krefting, 1991). Within qualitative research, certain concepts attempt to assure a clear understanding of the shared data, without limiting the importance of the subjectivity of the researcher and the research (Råheim et al., 2016). Reflexivity is an attempt by the researcher at self-awareness to intentions and process, as the researcher performs the steps of gathering data, data analysis and interpretation (Bazeley, 2013; Råheim et al., 2016).

Keeping detailed field notes on all decisions assists with transparency (Krefting, 1991).

Particular attention was given in this study to the importance of reflexivity. The professional role of the researcher created the potential for researcher bias. Likewise, the participants may have felt the need to modify what they said in order to answer questions according to what they perceived the researcher may have wanted to hear. She thus attempted to be transparent at every step in terms of her standing as both an insider and an outsider, and the possibility of that standing influencing the conversations with the participants, and in the analysis of the data. While only some of the participants in the study were aware of her role as someone who supports the midwifery profession, others potentially became aware during the research (Råheim et al., 2016). Because this research discusses improving the quality of care, and conversations with healthcare providers who may not be providing optimum quality, care was given to protecting the vulnerability of participants. At the same time, efforts were made to illicit genuine, substantive interactions about motivating drivers and what works for change (Råheim et al., 2016). Rigor was also strengthened through triangulation between the four methods of data collection. In addition, as over 40 people were involved in focus groups, many voices were heard, providing an opportunity for a variety of perspectives. Awareness of reflexivity has been addressed through adhering to transparent field notes, defined methods of analysis, and open discussion.

3.10 Summary

This research used a pragmatic mixed-methods paradigm that combined both the positivist and constructionism ontology and epistemology to address the aims and

objectives, and answer the research questions related to the real life introduction of midwives and mentoring in the natural setting of the health care system in rural Bangladesh. A systems thinking theoretical framework was used to provide a structured lens for evaluating complex systems and how to affect change within them. Through these lenses the research used interviews, focus groups, observations, and a survey to gather real world data in this complex context.

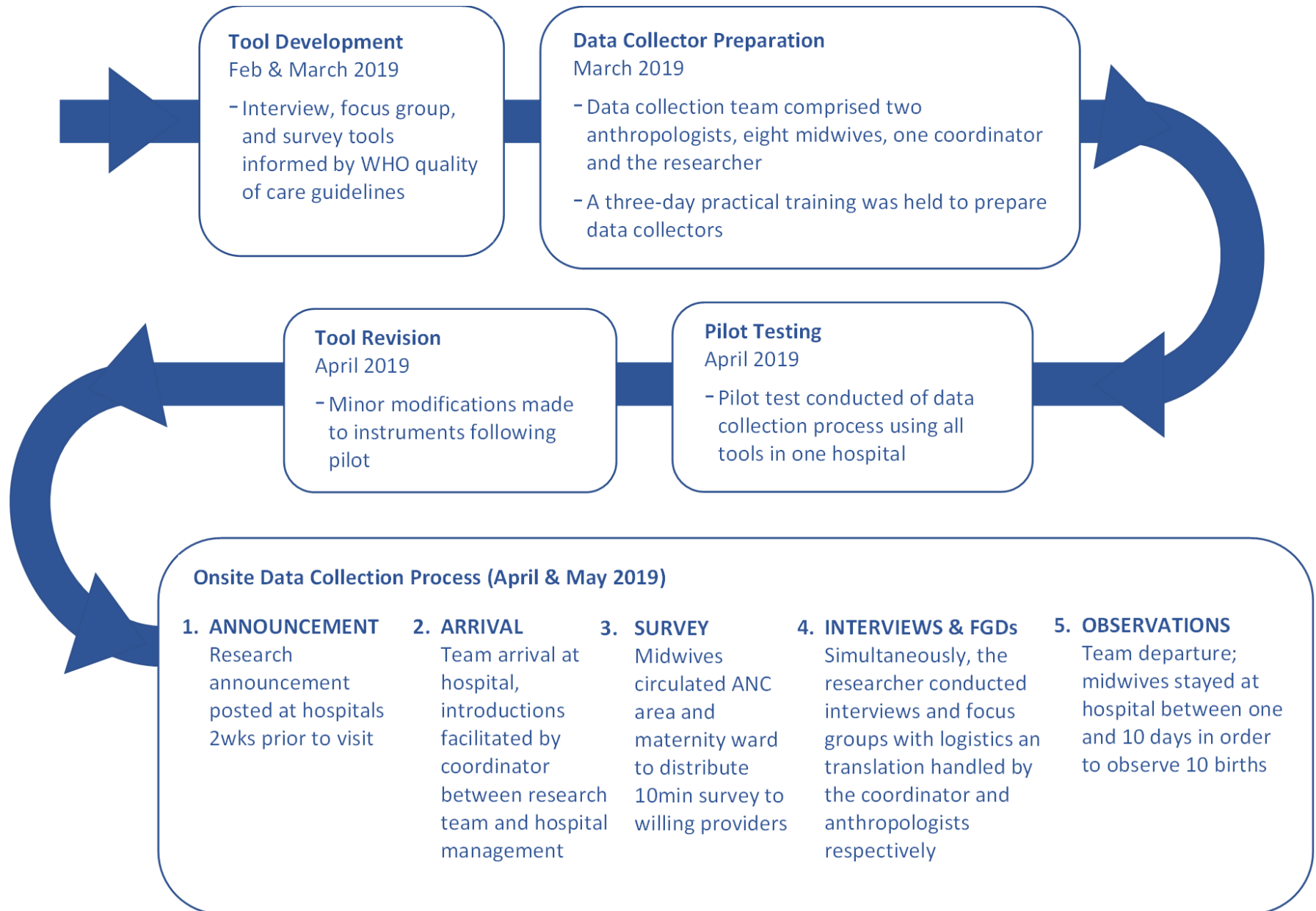
4. Research methods

4.1 Overview

As this was a mixed-methods study, data collection included quantitative observations, information from register books, and survey responses as well as qualitative focus groups and interviews. This range of methods was used to achieve the study's aims of exploring the impact and experiences of deploying midwives (with and without mentoring) and improving care quality. Mixed methods also aided in mitigating the possibility that health care providers might have been reluctant to share their experiences candidly, and instead shape their responses according to what they perceived would please the researcher. This chapter describes how the study was designed and the methods used to obtain and analyse the data.

A schematic of the data collection process and timeline is detailed in Figure 7.

Figure 7 Data collection process and timeline



In total, three quantitative tools and two qualitative formats were used for data collection. The three quantitative tools included 1) a facility readiness tool, 2) a clinical observation tool, and 3) a survey. The first two sought to answer the first research question concerning improved availability and quality of maternal and newborn care and the survey explored perceptions and experiences. The facility readiness tool consisted of direct observations and service utilization data logged in register books. Facility readiness, such as availability of life saving medicines and dedicated space for newborn resuscitation, aimed to detail readiness for managing emergencies and whether the needed space and equipment were in place. Service utilization data were only collected for normal deliveries and gave a sense of how busy the facilities were and if the numbers of births were increasing more in facilities with midwives and mentoring. The intention for collecting these data was to indicate if availability and or quality were affected by the midwives' deployment, and the influence of mentoring, through increases in service utilization. The clinical observation tool aimed to collect information on which clinical interventions were being provided and allowed for the comparison of care provided with that guided by the WHO.

The survey enabled understanding of health care providers' and managers' perceived knowledge, attitudes, and reported use of clinical behaviours as related to quality maternity care. The survey helped to answer the second research question concerning the experiences of midwives and the maternity staff and managers that they joined. This was bolstered by the use of the two qualitative formats—focus group discussions and interviews. Focus groups and interviews provided the opportunity to discuss feelings and

perceptions about improving the quality of clinical care. They also illuminated the experience of working with the new midwives, or being deployed as a new midwife, with the different groups of health care providers. The focus groups allowed for the development of understanding on the providers' ideas, how they interacted on the different topics and their collective understanding. Interviews were largely used for the busy hospital managers and doctors who were less likely to be willing to participate in focus groups. The topics for the focus groups and interviews were similar, but managers were more open when they could share their perceptions and feelings alone.

Both the qualitative and quantitative data were collected concurrently in one visit with a team comprising an organizer, two research midwives, and a translator, all led by the researcher. The national facility organizer who was a peer with the hospital managers would organize the focus groups and interviews soon after the team's arrival. Interviews and focus groups were then conducted by the primary researcher and translator. At the same time, the research assistant midwives would check to see if there were any women in labour or women being seen in the ANC that could be observed. The midwives would also begin to administer the surveys to all willing maternity and emergency staff. Data collection across qualitative and quantitative approaches was thus carried out concurrently. When focus groups and interviews were complete, the primary researcher would leave with the translators and the organizer. The research midwives would then stay until they had observed 10 births, and during this time they would also complete gathering survey responses. All the tools for both the quantitative and qualitative data

collection were developed by the researcher based on gathering data to assess facility readiness, clinical interventions, and health care providers' understanding of the WHO guidelines for quality maternity care and the new midwife profession. The survey design was inspired by an existing evidence-based practice tool that was modified to contextualize it for maternity care. No other existing tools were found that met the specific needs of this study. All the tools were piloted at an initial pilot visit in a rural hospital identical to those in the study. Both during and after the pilot visit, the tools were evaluated and later modified slightly for clarity of information gathered (Boparai et al., 2018).

As discussed in Chapter 3, trustworthiness is a term used when evaluating qualitative research to speak to the need for triangulation of data sources, researcher reflexivity, and maintenance of transparency regarding study protocols. Trustworthiness also encompasses credibility, dependability, and transferability. Credibility refers to using standard procedures for the type of research conducted and being aware of and noting any variability. Dependability refers to keeping the protocol consistent throughout the study. Meanwhile, transferability refers to the researchers giving detailed descriptions of the contexts so readers can determine with accuracy if the research is transferrable to their context.

For this research trustworthiness was assured by following standard protocols for both the quantitative and qualitative aspects of the study. For the quantitative observations the research assistant midwives received training on the data forms, and also on the

importance of being neutral and not trying to influence the behaviour of the health care providers. The tools and the research protocol were piloted, and the analysis was completed using standard testing. For the qualitative component, all tools were piloted, and analysis was completed following qualitative methods guidelines. The protocol and tools, as well as the researcher, were consistent throughout the focus groups and interviews and an attempt has been made to describe the context both in the background and qualitative results sections. In addition, As the research comprised observations of care, it has ecological validity, which is thought to increase generalizability (Tong et al., 2007).

4.2 Hospital selection

Hospital selection was completed by identifying the sub-district hospitals that performed the most births and met the criteria for the three groups—no midwives, at least four midwives without facility mentoring, and at least four midwives with facility mentoring. Nineteen sub-district hospitals were selected. Seven had no midwives and thus no mentoring, six had midwives but had not received facility mentoring, and six had midwives and had received facility mentoring.

Government sub-district hospitals in Bangladesh follow a national template that delineates the building structures, staff configuration, types of medicines and lab test etc., and thus are largely homogeneous. As is typical of the Bangladesh health system, where midwives were deployed, and which hospitals received mentoring was decided centrally.

Thus, whether a hospital had midwives and or facility mentoring was not the result of a certain predisposition of that hospital. However, because the number of hospitals was small, baseline imbalance had to be considered (Beaty & Dickinson, 2014). To address the potential imbalances, hospitals with similar birth rates—in this case those with the most births—as well as similar numbers of midwives on staff were chosen (Ayieko et al., 2011; Leon et al., 2013). As it turned out, the hospitals with facility mentoring were the busiest with a total of 5,559 births in the six months preceding the data collection (October 2018-March 2019). Hospitals with no midwives and those with midwives but no facility mentoring had 2,343 and 2,527 births in the previous six months, respectively.

4.3 Sampling

4.3.1 Quantitative

Convenience sampling was used for the quantitative component of this study. Convenience sampling is a non-probability sampling method used because of its practicality in certain research situations. With convenience sampling, participants are chosen based on availability (Etikan et al., 2016). Convenience sampling was used for this component of the research as both staffing and patient flow remain consistent and homogeneous throughout the week.

The sample size for the quantitative portion was determined through power analysis to find the minimum number of observations needed to detect significant differences in the implementation of the observed WHO quality care interventions between three groups.

Using an alpha of .05 and beta of .8, a total sample size of 159 observations was recommended in order to detect a medium size effect ($f=.25$).

The sample included all consenting emergency/maternity staff who were conducting births, as well as all pregnant and immediate postpartum mothers receiving care during the observations. Recognizing their low numbers, the sampling approach was designed to ensure adequate participation of women and newborns in maternity wards. A total of 169 women agreed to participating in the study's labour room observations: 54 in the no midwives group, 51 in the midwives without mentoring group, and 64 in the midwives and mentoring group. Additionally, 237 maternity staff and managers agreed to take the survey and 473 women attending ANC consented to observation. Each sample exceeded the 159 required to detect a medium effect size as determined in the power analysis.

Based on the literature and informal observation from the researchers' prior visits to hospitals of the same type, it was estimated that the proportion of the selected quality of care indicators being implemented would be less than 5% in the no midwife group, 20% in the midwives without mentoring group, and 50% in the midwives and mentoring group (Anatole et al., 2013; Charan & Biswas, 2013; Fritz et al., 2017). Using these estimated percentages with an alpha of .05 and a beta of .8, the recommended sample size per group for each comparison was $n=60$ for the comparison between the 'no midwives' and 'midwives without mentoring' groups, $n=12$ for the comparison between the 'no midwives' and 'midwives and mentoring' groups, and $n=31$ for the comparison between the 'midwives without mentoring' and 'midwives and mentoring' groups. The number of

observations collected did not meet the sample size recommendation for comparisons between the 'no midwives' and 'midwives without mentoring' groups but it did meet the recommendations for the other two comparisons.

4.3.2 Qualitative

The sampling for the focus groups and interviews was purposeful. Purposeful sampling is a method of selecting participants based on the clients' past experiences or knowledge. It allows the researcher to choose information-rich cases (Palinkas et al., 2015). Purposeful sampling is commonly employed in qualitative research, as it is important that the participants have specific experience and background as a prerequisite for participation (Palinkas et al., 2015). A sample size of 6-8 participants per focus group was chosen for feasibility (i.e., to avoid an overwhelming data load) and falls within what is recommended for a realist approach to develop themes (Dyble et al., 2014; Lester, 1999). Six focus group discussions allowed for both midwives and maternity staff from each facility type to be interviewed.

4.4 Recruitment

Two to four weeks before the data collection started, a research assistant who had received training visited the facilities and displayed posters, made presentations and circulated flyers announcing the research in the emergency and maternity wards and in the ANC clinic. This information made staff aware of the upcoming research with the aim of also reaching as many pregnant women as possible. Following the researcher's visit,

staff conducting ANC verbally informed all pregnant women who presented at the maternity ward about the upcoming research, as literacy is limited for many of the women accessing public facilities (Alaei et al., 2013). The announcements highlighted that data were going to be collected to improve care quality (Ayieko et al., 2011).

Recruitment of the maternity staff and managers for the survey, focus groups and interviews was confidential, and all participants were given a clear explanation of the optional nature of participation in verbal and written form. Examples of the information sheet and written consent form can be found in Appendices 7.5 and 7.6.

Although the staff recruited had to meet the criteria of participating in the care of pregnant women, their length of employment was not a criterion, as a newly deployed person might bring a different perspective than someone with many years of experience. As English was not spoken by all staff, a translator was present for all focus groups and interviews so the ability to speak English was also not a criterion for selection. Recruitment was performed on the day of the research through trained peer or junior research assistants who were midwives not employed at the facility to minimize a sense of coercion that may have been felt if, for example, the invitations had come from management or from the researcher (Grant & Sugarman, 2004).

4.5 Informed consent

Participants' literacy levels were taken into consideration when obtaining consent. All potential participants were assured that participation was voluntary, and that declining

to participate would not affect the care they received or their standing as a hospital employee. The consent statement explained that participants have the right to withdraw from the study at any stage and that strict confidentiality would be maintained. In addition, they were told that after the data was gathered, it would be possible for them to withdraw their information for up to two weeks. After they were read the consent form, questions were answered, and verifications of understanding made, all study participants signed or gave recorded verbal consent. As much as possible, informed consent was obtained for all methods of data collection before the fact. Maternity staff and mothers who were directly observed and had not yet given consent were approached for verbal consent as soon as was reasonable after the observation (Alaei et al., 2013). No data has been used without consent.

4.6 Tools

4.6.1 Quantitative

The three quantitative data tools examining evidence-based maternity care practices were: 1) hospital readiness, 2) clinical observations, and 3) a survey completed by all willing maternity care staff. Each tool is detailed in Table 9 below:

Table 9 Quantitative data collection forms

Hospital Readiness Form	
Hospital readiness	Purpose

	<p>Assess readiness of hospitals to provide basic maternity care, including emergency response</p> <p>Data sources Observation checklist and hospital register books</p> <p>Variables</p> <ul style="list-style-type: none"> • Oxytocin in emergency & delivery rooms* • Magnesium sulphate in emergency & delivery rooms* • Newborn resuscitation area with Ambu bag in the delivery room* • Separate ANC corner • Diploma midwife staffing ANC corner • Midwives staffing maternity area • Register book with midwife identification used for births • Register book for PPH and eclampsia* • Number of births performed by midwives in last 6 months • Number of PPH cases in last 6 months • Number of eclampsia cases in last 6 months <p>*Indicates emergency preparedness variable</p> <p>Analysis Descriptive statistics were generated using frequencies and proportions</p>
Direct Observation Form	
Clinical observations	<p>Purpose Direct observation of clinical practice</p> <p>Data sources Observation checklist</p> <p>Variables</p> <ul style="list-style-type: none"> • Individual patient ANC card used • Skin-to-skin contact for 1 hour • Companionship in labour & delivery • Partograph used during labour

	<ul style="list-style-type: none"> • Upright position for labour & delivery • Delayed cord clamping • Active management of third stage of labour <p>A series of analyses were performed to determine statistical significance</p>
Survey Form	
<p>Evidence-based practice survey</p>	<p>Purpose Assess provider comfort with and use of evidence-based interventions</p> <p>Data sources Provider self-reports, shared verbally in response to question prompts</p> <p>Variables</p> <ul style="list-style-type: none"> • Importance of ANC <ul style="list-style-type: none"> ○ Yes/No questions on whether provider felt capable of, and carried out, these interventions: • Partograph use • Skin-to-skin contact for 1 hour • Initial care for PPH • Initial care for eclampsia <ul style="list-style-type: none"> ○ Likert scale questions asking for respondents' opinions about the importance and or value of these interventions: • Companion in labour and delivery • Non-supine positioning for labour and delivery • Diploma midwives providing maternity care <ul style="list-style-type: none"> ○ True/False checkboxes:

	<ul style="list-style-type: none"> • Whether the facility had recently changed in terms of performing 10 key evidence-based interventions <ul style="list-style-type: none"> ○ If True, whether the introduction of mentors, and separately of midwives, precipitated the change <p>Analysis</p> <p>The survey was piloted in one hospital. Descriptive statistics were generated using frequencies and proportions. However, the data from the True/False checkboxes were not used because it was determined that question interpretation could have been inconsistent and the analysis thus faulty.</p>
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As already mentioned, the survey was inspired by an existing evidence-based practice survey tool. The original tool was designed for nurses and had been validated, though it was not specific to maternity care (Titler et al., 1999). To adapt it for use in this study the content was adapted for maternity care quality using the WHO guidelines described in section 3.7.2. Questions explored perceived knowledge, capacity use, and value, of evidence-based maternal and newborn healthcare interventions. Some of the question formats used were identical to the original tool and others were slightly modified. The survey was written in both English and Bengali and was piloted together with the other data collection tools. Translation was conducted from English to Bengali by a professional translator. A second professional translator translated the Bengali version back to English. The English version was checked by the researcher and minor corrections were made to the Bengali version. The pilot resulted in removal of one question as it was determined that the meanings of the responses gathered were not clear. The survey was administered

to all consenting emergency and maternity staff, as well as facility managers. As answers were simple and both respondents and data collectors were educated in English, most answers were provided in English. The full survey tool is available in Appendix 7.7.3.

4.6.2 Qualitative

Focus group discussions and interviews followed a semi-structured questionnaire guide. Hospitals without midwives had only one focus group with non-midwife maternity staff. Each hospital with midwives had one midwife focus group, and one non-midwife maternity/emergency room staff focus group. Each hospital was assessed for the above mentioned 20 (23 with midwives) variables. As the frequency of emergencies is relatively low in rural hospitals it was not realistic to observe management of emergencies, but it was hoped that utilization numbers and availability of lifesaving medicine and equipment would give some indication of whether emergency management was implemented. The survey of staff opinions covered their relevant capabilities, practices, and values. Quantitative observation is highlighted in the social research as an important method for documenting spontaneous events in a variety of environments (Thomas, 2003). The more specific the observations are, the more likely the data will be of quality. As mentioned earlier, there is a risk that healthcare providers and managers may say what they perceive is wanted from them, even if it differs from fact. Observation was one of the ways this was mitigated. For this research, the observations were binary and were collected using two checklists and a yes/no questionnaire.

4.7 Data collection

4.7.1 Quantitative

The hospital readiness data was sourced from register books as well as direct observations of preparation for emergencies in the facilities. The register books were identified by the staff on duty and data collectors looked within the books for the relevant data.

For the clinical observations, binary observational data were gathered. The direct clinical observation tools contained instructions to guide researchers to identify and record the behaviours being measured. Measurement was “yes” or “no”. “Yes” denoted use of selected evidence-based care interventions or presence of an aspect of facility readiness. Contrarily, “no” denoted lack of use/presence. Observations were made at unannounced times to reduce the risk of the Hawthorne effect (Kurtz, 2017; Leonard & Masatu, 2010; Scales et al., 2011). The length of time spent conducting observations at each hospital ranged from 2-10 days and depended on ensuring that 10 births could be observed. The following objectives were translated into a checklist for the observer that included specific behavioural instructions to guide accurate observation of providers’ use of evidence-based care practices:

1. Information from register books
2. Selected facility readiness components, such as separate ANC corner and newborn resuscitation area

3. Employing evidenced-based routine care

The survey took between 10 and 20 minutes to administer. The research midwives were available for questions, but there was no evidence of language being a limiting factor. Responses to quantitative questions were binary (i.e., categorical), and Likert scale (i.e., ordinal). The survey was administered at flexible times during the days that the researchers were present. Survey participants were able to complete the survey in a space that allowed for confidentiality in their responses.

4.7.2 Qualitative

Six focus group discussions with 6-8 participants and 18 interviews were held. For the focus groups, the non-midwife maternity staff were intentionally separated from the midwives during the process. This allowed for candid discussions in both groups as they explored their ideas and opinions regarding transitioning to a midwifery model and improved quality of care. Among the interviews with managers, six were with nursing supervisors, five were with hospital head managers, three were with obstetrician-gynaecologist doctors, and four were with generalist medical doctors. A translator was present during all focus group discussions and interviews. Table 10 provides a summary of the qualitative data collection methods and respondents.

Table 10 Qualitative data collection methods and respondents

Method	Respondents
Interviews	<ul style="list-style-type: none"> • 6 nursing supervisors • 5 hospital head managers • 3 obstetrician-gynaecologist doctors • 4 generalist medical doctors
Focus group discussions	<p>6-8 respondents each:</p> <ul style="list-style-type: none"> • 1 at hospitals with no midwives • 2 at hospitals with midwives but no mentoring • 3 at hospitals with midwives and mentoring

Interviews and focus group discussions were held with working staff and managers. Focus groups averaged 36 minutes with a standard deviation of 5 minutes and interviews were 20 minutes with a standard deviation of 10 minutes. All involved hospital personnel had some understanding of the English language as all had attended English medium university. However, in Bangladesh, English instruction is often limited to the written components of the education, while speaking is generally conducted in Bengali. This meant that many of the participants had limited speaking and verbal comprehension, although some were proficient. In addition, the primary researcher had lived in

Bangladesh for four years at the point of this research and had very basic word comprehension as well as some cultural understanding, both in general and specific to rural hospitals.

In research, the need for translation presents a potential barrier to understanding. It is important that researchers think through how to minimize the reduction in understanding brought on by both overt and subtle differences of language (Temple & Young, 2004). In an attempt to maximize understanding, two local translators/transcribers were employed who participated in all interviews and focus groups. All sessions were recorded and the translator later provided a written English transcript. During the focus groups and interviews, an attempt was made to translate all spoken English to Bengali and all spoken Bengali to English. At times during the interviews however, participants were fluent enough for translation to be an obstruction and the conversation would proceed in English. During focus groups, conversations would sometimes fluctuate between English and Bengali. Efforts were made when this occurred to back up and translate to ensure everyone's understanding. The translator would then listen to the recording and transcribe an English version. It should be noted that the translators' written English was at times grammatically imperfect and some corrections were made to transcribed data for easier reading. After reading the transcriptions, the researcher reviewed them with the translators to help clarify understandings. Because the translators were not health care translators, there were occasions when the researcher's understanding of the content surpassed that of the translators; at times that meant the researcher modified

the translation slightly. During the focus groups, participants discussed their perceptions, use of, and familiarity with evidence-based maternal and newborn health care. Where relevant, facility mentoring experiences were discussed. While an interview format was used for the managers, questions were focused on the same topics discussed in the focus groups. Both interviews and focus groups included staff and or managers from (a) hospitals with no midwives, (b) those with midwives but without mentoring, and (c) those with midwives and mentoring. The focus groups and interviews gathered information that is both supplemental and complementary to the observation and survey data. It was anticipated that the qualitative information would deepen the understanding from the observations, as well as provide insight into attitudes and perceptions not covered in the survey data (Palinkas et al., 2015).

Focus group and interview participants were selected via invitations to staff and managers who were available during the site visits. All conversations were held in a private space in the hospital and recorded and transcribed verbatim with consent. After each interview, contact summary sheets were written. Field notes were completed at the end of each day.

4.8 Ethical issues

Ethical standards were strived for at every step of the study in order to minimize any untoward effects (George, 2016; Lester, 1999). Starting with the decision to conduct the research, through the details of the research design, recruitment, informed consent,

implementation, and the quality of the reporting, all have been scrutinized for ethical rigor (Emanuel et al., 2000). Ensuring ethical standards is of heightened concern in this study as the research took place in a low-resource country, and was focused largely on women and newborns, some of whom are illiterate (Alaei et al., 2013; Angell 1997). Given the above issues, special ethical consideration is delineated below.

1. Value/risk: As this study explored possibilities for improving the implementation of national guidelines, and no new practices of unknown value will be added, it is assumed that the overall benefit of the research will outweigh the risk (Forssén et al., 2011).
2. Low-resource country: There are a number of concerns regarding research in low-resource countries highlighted in the literature: ethical rigor may be weaker; researchers may test known effective treatments to understand their applicability in weak health systems, thus delaying implementation of known best practices; and real human rights issues may be observed and not acted on (Lavery et al., 2010). This study adhered to the same rigor as would be used in a high-resource setting. Although within weak systems unethical research may be more possible, it is not acceptable (Sluzki, 2001). As known best practices are within the existing guidelines, this research should facilitate, rather than delay, best practice (Angell 1997). Research performed in the face of real human suffering without attempting to address the issues has several negative repercussions, including leaving local communities unhappy with affluent researchers. This study attempts to address

the pressing issue of improving quality of care, and that was explained to participants. The assumption was that by explaining the purpose of the study, this issue was minimized (Lavery et al., 2010).

3. Participant literacy: The literacy rate of women in Bangladesh is 71% (UNESCO Institute for Statistics, 2018). All maternity staff at the hospitals are literate, but some of the women observed in the post-partum period were not. To address this, we used direct verbal communication with potential participants both in the ANC and on the maternity ward, ensuring each participant fully understood the study and the voluntary nature of participation.
4. Women and newborns: Concerns have been raised regarding research on women in some contexts, as they may not be empowered to speak for themselves. Time was provided for the women to consult with their husbands and family regarding participation in this research. Because the most vulnerable women, the post-partum mothers, had minimal contact with the researcher and observations were short and unobtrusive, women had little intrusion into their lives. As newborns were under their mother's care, no contact was made with them, only a visual assessment at a distance.
5. Adequate provision of information: As it was assumed that all maternity staff and women would be somewhat affected by the research, it was ensured that clear announcements were made in the maternity ward to allow all to be informed

about and understand the intent of the research, as well as the voluntary nature of participation.

Considerations regarding potential harm to the participants during data collection were methodically thought through. Although all methods of this research were determined to be minimally intrusive, awareness of the potential for harm was maintained throughout all stages of the data collection.

Throughout the data collection portion of the research, the following additional ethical issues were given due consideration:

1. Recruitment: A peer research aide was used to minimize the power relationship between hospital managers, staff, women, and the researcher. Women were the most vulnerable, as they were recruited by staff who could have been perceived as authority figures. Emphasis was placed on the verbal exchange and questioning the woman to ensure understanding. As mentioned above, women's involvement was designed to be minimally intrusive.
2. Minimizing stress: Both staff and women may be under increased stress due to the busy maternity floor and recent delivery, respectively. Being that the timing of survey and interview completion was flexible, an understanding of the maternity floor demands was arranged. Attention was also given to ensuring a comfortable and supportive rapport with the women, which was considered essential to minimizing stress.

3. Reduction of oppression: In observational studies in impoverished contexts, participants may feel that nothing is being done to help them with their current life challenges. While the research provided no direct benefit to participants, the information given about the research highlighted the project's focus on improving quality of care (Lavery et al., 2010).
4. Expectations: All communication was designed to be clear that the research would not provide any direct benefits.
5. Risk to the researcher: It was expected that poor patient care that could increase risk of morbidity and mortality would likely be witnessed throughout the research. It was also anticipated that this could cause discomfort or distress during data collection. This was mitigated through debriefing and supervisory support.
6. Hospital identification: Attention was given to highlighting good practices and efforts toward improved quality, as hospitals are easily identifiable.

4.9 Ethics approval

Ethics approval was attained from the Faculty of Health and Medicine Research Lancaster University Ethics Approval Committee. An amendment was made to add interviews to the already planned focus groups as, with further thought, it was deemed likely that managers might be more willing to participate if interviewed individually (see Appendix 7.4). Ethical approval was also given by the Centre for Injury Prevention and Research Bangladesh (CIPRB) to perform the research in Bangladesh.

4.10 Data storage and management

All handwritten notes were scanned and stored on personal, password-protected encrypted computers at the end of each day to avoid loss or damage. Quantitative data was imported into and stored in a Microsoft Excel database. R was used to analyse quantitative data, while NVivo was used to analyse qualitative data. Computers were backed up with an encrypted hard drive. All data on non-encrypted devices was deleted as soon as it was transferred to an encrypted device. Data were stored and subsequently destroyed in line with current legislation and policies. Observations and survey data were transcribed electronically. During active data analysis, data were backed up on the Lancaster University server in a password protected Box file. After the thesis is assessed, the anonymized datasets will be saved to a data repository archive and stored in the researcher's password-protected computer. Interviews recorded on an electronic device will similarly be stored in a password-protected computer. Raw data will not be stored on the cloud or sent via email as an additional back up. Paper data will be kept in a locked cabinet and destroyed after 10 years.

4.11 Analysis

4.11.1 Quantitative

Descriptive tables and charts were used to analyse hospital readiness data. Service utilization trends showing differences between hospital types over the previous six months were depicted in a line chart. Frequencies and proportions were generated based

on the clinical observation data. Following the analysis of the descriptive data, fixed-effect logistic regression tests were performed to compare the degree of relationship between variables in the three hospital types for each of the observed data points (Teddle and Tashakkori, 2008). This test delineated significant differences in the use of defined maternal health practices between the three groups. After analysing the fixed-effect models, a mixed-effect logistic regression model—with and without a Bonferroni adjustment—was applied that incorporated a random intercept for each hospital. Application of the mixed-effect model was a deviation from the initial plan used to conduct the power analysis. However, it was determined to be necessary during the analysis to account for variation by hospital that was not due to midwives or mentorship. Essentially, it showed whether the effects found were determined by unique characteristics of individual hospitals, or whether they were consistent within the hospital types. This type of test, also referred to as nesting, is known to require a robust N, the recommendation being that each nest has at least 20 units with it (Sommet & Morselli, 2017). The test was run both with and without the Bonferroni adjustment. The Bonferroni adjustment is the most conservative—and somewhat controversial—calculation to correct for cumulative error when many variables are tested from one sample (Glickman et al., 2014). The calculation changes the commonly used .05 p-value based on the number of variables to be tested, in this case adjusting it to .006. As there were only six or seven “nests” (i.e., the hospitals) for this study within each group, both the mixed-effect

analysis and the addition of the Bonferroni adjustment led to the models being underpowered.

To analyse the survey data, descriptive statistics (such as mean, median, mode, and variance) were calculated. The analysis looked at differences between hospital types as well as type of respondent (i.e., midwives, nurses, and doctors). For binary questions, cross tabulations were performed to achieve proportions (Amery & Lapwood, 2004). Frequency totals were reported and stratified by mentored and non-mentored groups. Comparative tests for ordinal and categorical variables (i.e., simple logistic regressions) were conducted, including confounding variables for age and profession type, to examine relationships with directionality. However, the data were too homogeneous to find meaningful results.

4.11.2 Qualitative

Information addressing the research questions was analysed inductively. The intention when analysing the data was to be curious about what new information was arising as opposed to looking for patterns that fit into existing theories. Data from focus groups and interviews were transcribed from the discussion recordings and both the transcriptions and the written qualitative survey data were studied using context analysis, a method of listening for a sense of the whole rather than fracturing data into pieces (Hycner, 1985; Teddlie & Tashakkori, 2009).

In a cyclical process of immersion and iteration, data were used to both capture a sense of the whole and capture topic areas for coding to facilitate emerging themes. In line with the systems thinking approach, themes, salient points, and notable outliers were highlighted (Bazeley, 2013; Embree, 2010). Data from the survey and focus groups were analysed separately.

4.12 Summary

The data for this study were gathered from 19 busy government sub-district hospitals—seven with no midwives, six with midwives, and six with midwives and mentoring. Hospital selection was based on choosing those with the highest delivery caseload. Three data collection forms were used for the quantitative analysis, two based on observations and one a survey. Qualitative focus groups and interviews were conducted using a structured open-ended guide. Quantitative data were analysed descriptively and, when possible, through fixed-effect and then mixed-effect logistic regression. Qualitative data used NVivo to aid the iterative process of identifying themes.

5. Results and findings

In this section, the quantitative and qualitative findings are presented. Quantitative data are presented first, followed by qualitative, and then a mixed-methods summary. The quantitative data provide a picture of the observable differences in care, whereas the qualitative data give depth and insight. Results are examined through a systems thinking theoretical framework to guide an understanding of how unseen motivators, and systems adaptations, were at play with the introduction of midwives.

Table 11 shows the numbers of surveys completed, and observations, interviews and focus groups carried out at each hospital type.

Table 11 Completed surveys, observations, interviews and focus groups by hospital type

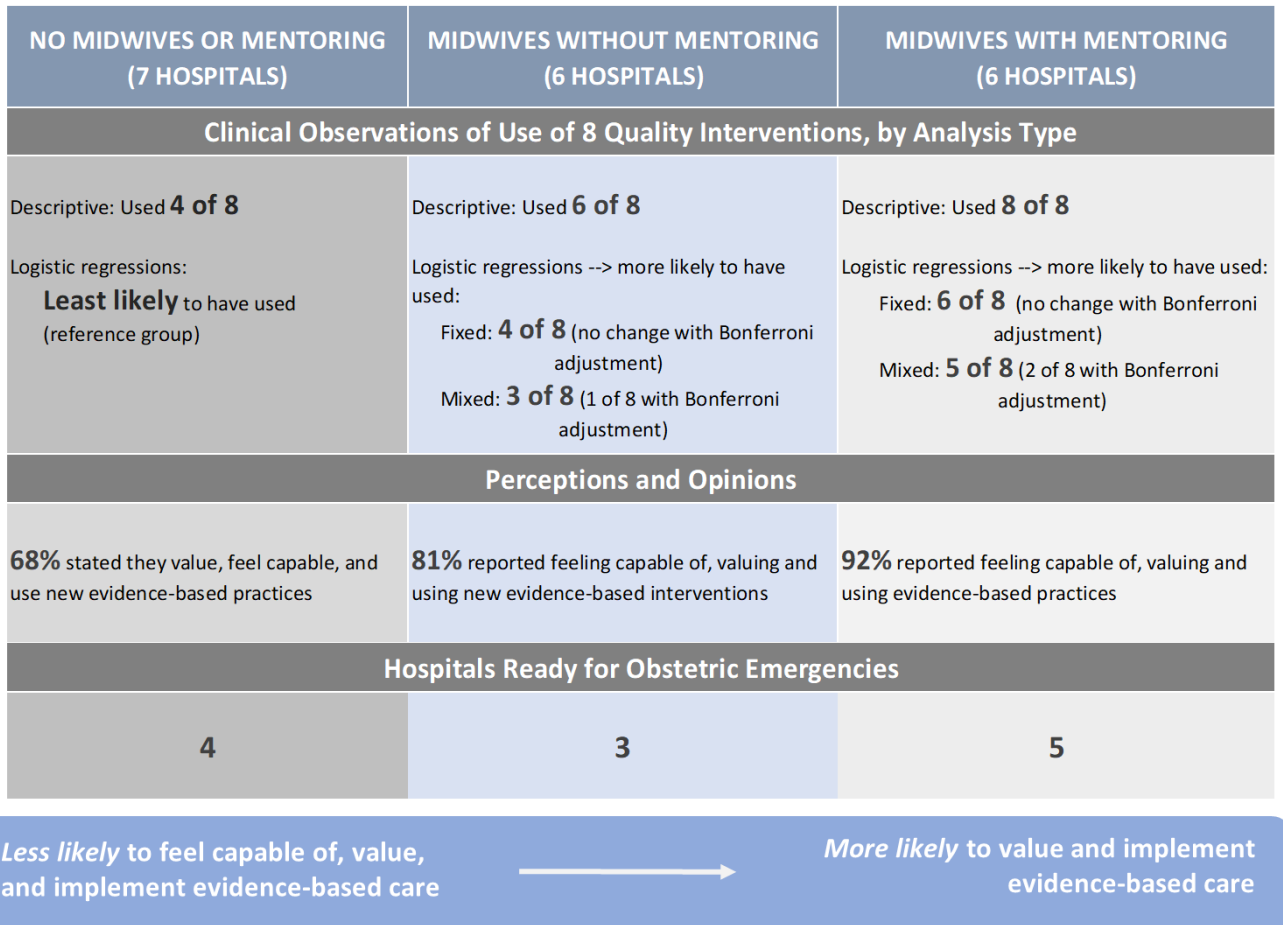
	No midwives	Midwives	Midwives and Mentors	Total
Completed surveys	97	60	80	237
Observations	181 (54 labour; 127 ANC)	192 (51 labour; 141 ANC)	269 (64 labour; 205 ANC)	642 (169 labour; 473 ANC)
Interviews	7	5	6	18
Focus group discussions	1	2	3	6

5.1 Quantitative

Within the hospitals, 642 clinical observations and 237 staff surveys were completed. Of the clinical observations, 169 were observed in the labour room, and 473 were observed in the outpatient ANC. In the hospitals with no midwives, there were 127 ANC and 54 labour/births; with midwives without mentoring, there were 141 ANC and 51 labour/delivery observations. There were 205 ANC visits and 64 labour/births observed in the hospitals with midwives and mentoring.

Hospital readiness data are presented first, followed by clinical care observations and then maternity staff survey responses. The analysis revealed a continuum, with the least use of new quality interventions in the hospitals with no midwives and the most in hospitals with midwives and mentoring. Figure 8 provides a condensed outline of the findings. The full description follows.

Figure 8 Evidence-based practice continuum: quantitative results

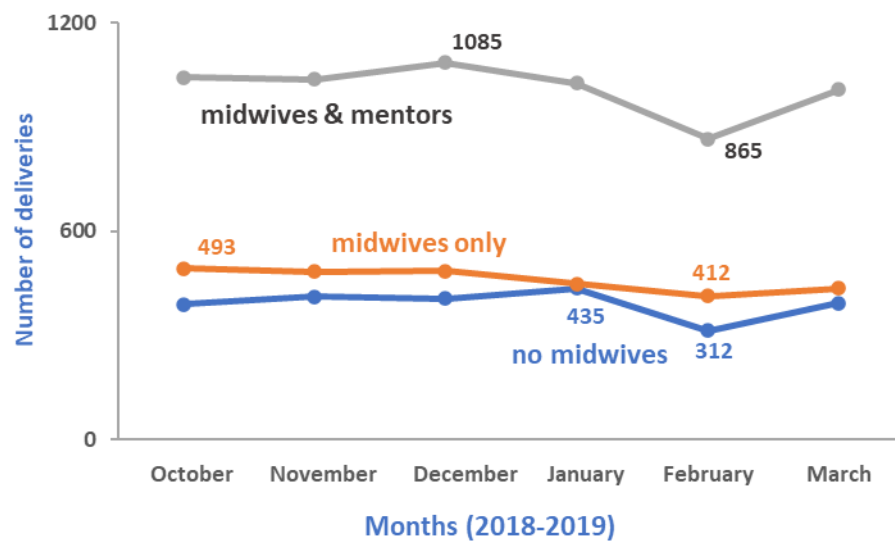


5.1.1 Hospital readiness

Data from the facilities are reported descriptively and summarized graphically, as the small number of hospitals and convenience nature of the sample prevented performing inferential analysis of differences. The service utilization data also had limitations, as numbers of observations for most variables, except for births, were insufficient. In the three hospital types (no midwives, midwives without mentors, and midwives with

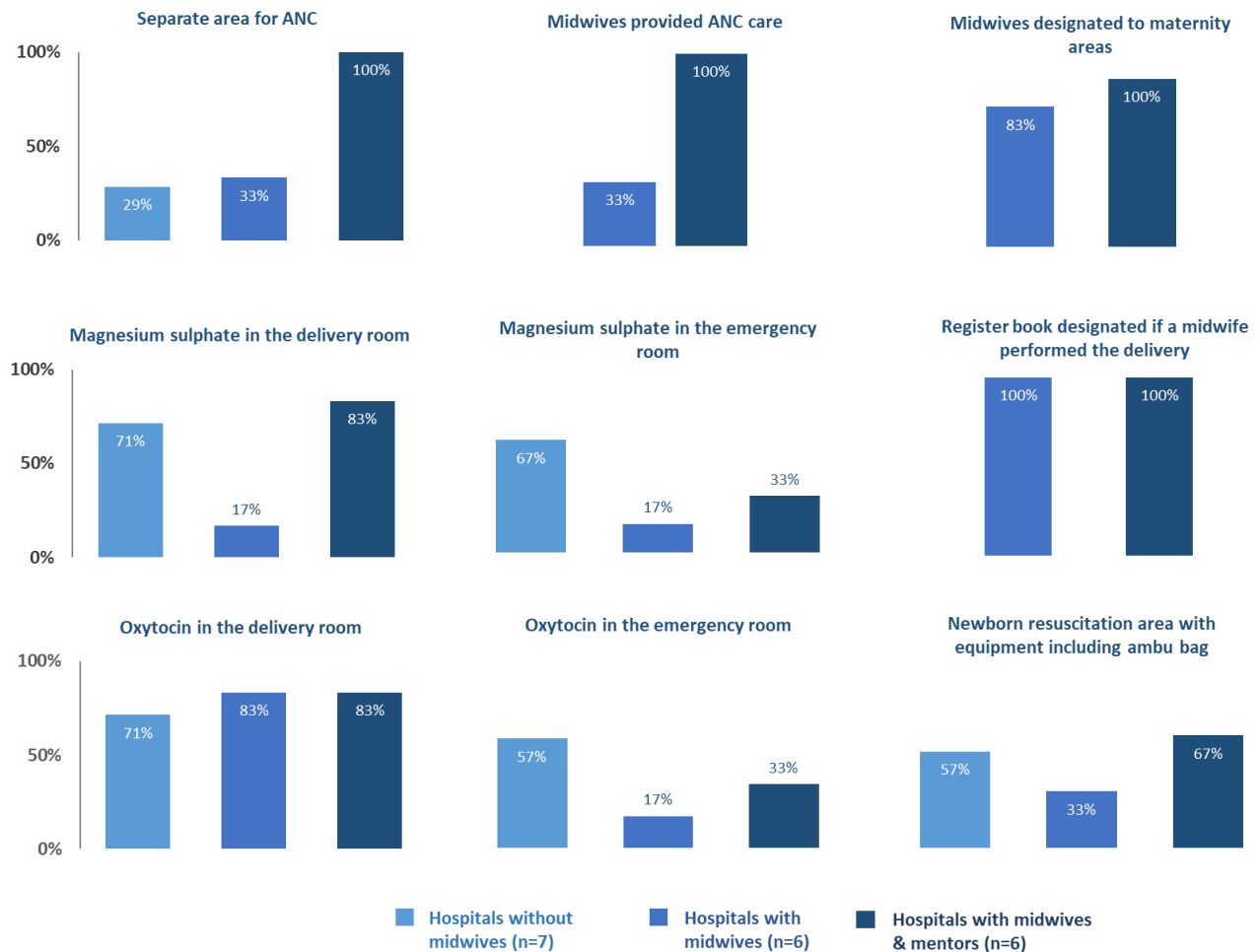
mentors), 2,343, 2,527, and 5,559 births took place, respectively. Numbers of women with PPH, eclampsia, and caesarean sections were either unavailable or so low that analysis was either not possible or not meaningful. Further details on births and readiness findings for each hospital are available in Appendices 7.8.1-7.8.3. Trends in numbers of births in the sampled hospitals did not change during the first six months of the midwives' deployment (Chart 1).

Chart 1 Monthly births in each facility type during midwives' first six months of deployment



There were differences, however, between the hospital types in preparation for emergencies and in using midwives to their full competencies (Chart 2).

Chart 2 Hospital readiness by hospital type
(no midwives = 7, midwives = 6, midwives & mentors = 6)
 (hospitals without midwives excluded from midwife-specific variables)



The observed differences between hospital types are further described in the following sections and displayed in table form Appendix 7.8.4.

5.1.1.1 Hospitals with no midwives

The hospitals with no midwives and those with midwives without mentors were found to have similar rates of separate ANC corners (2 out of 7, 29%) versus (2 out of 6, 33%). Both

were less likely to have separate ANC corners than were those with midwives and mentoring (6 out of 6, 100%).

Additionally, hospitals without midwives were more likely to be prepared for emergencies than were those with midwives but no mentoring, except for oxytocin in the delivery room (5 out of 6 facilities [83%] versus 5 out of 7 [71%]), but slightly less than those with mentoring. Hospitals without midwives were almost as likely to have an equipped newborn resuscitation area (4 of 7 hospitals, 57%) as were those with mentoring (4 of 6 hospitals, 67%) and more likely than those with midwives but without mentoring (2 of 6 hospitals, 33%).

5.1.1.2 Midwives without mentoring

Hospitals with midwives without mentorship were the least likely to be ready for emergencies, with only 1 of 6 (17%) having magnesium sulphate in either the emergency or delivery room and oxytocin in the emergency room, and only 2 of 6 (33%) with newborn resuscitation areas in the delivery room. Both types of hospitals with midwives had delivery register books that identified midwives as the birth attendant in all facilities (6 out of 6, 100%). Midwives in hospitals without mentorship were less likely to be staffing ANC services (2 out of 6, 33%) than were those in hospitals with mentorship and slightly less likely to be fixed to the maternity ward (5 out of 6, 83%).

5.1.1.3 Midwives with mentoring

All six hospitals with midwives and mentoring had separate ANC corners staffed by midwives, assigned midwives to the maternity areas and had a delivery register that identified whether midwives performed births. All but one had a register book recording obstetric emergencies coming from the community. Most (5 of the 6) had basic obstetric emergency preparedness in the delivery room, and two were prepared in the emergency room. Four of the six hospitals (67%) with mentorship were prepared for newborn resuscitation.

5.1.2 Clinical observations

Results from the fixed-effect and mixed-effect regression models are shown in Table 12. To account for multiple testing, in addition to the standard .05 alpha level, Bonferroni corrections were used to adjust alpha to a level of .00625 in consideration of eight tests being conducted. The logistic regression models looked at hospitals with only midwives and hospitals with both midwives and mentors against hospitals without midwives. The mixed-effect regression analysis includes a random intercept variable to control for unknown factors within hospitals that may have had an influence on outcomes. Without the Bonferroni adjustment, one variable lost significance; after its inclusion, four variables lost significance. Although this shows weaker evidence of an association, in some ways there is a positive implication in that even though the mixed-effect model was underpowered, finding significant results suggests a large effect size. As mentioned in the

previous chapter, because in the power analysis a fixed-effect regression was intended, the sample size planning did not account for the added complexity of the mixed-effect model and the Bonferroni adjustment for multiple testing. Asterisks in Table 12 indicate statistical significance in relation to the reference group (i.e., hospitals without midwives); double asterisks indicate statistical significance after application of the Bonferroni adjustment.

Table 12 Odds ratios and 95% confidence intervals for fixed- and mixed-effect logistic regression models

Fixed-effect models								
<i>Dependent variable:</i>								
	ANC Card	Partograph is used	Upright lateral labor	Companion present	Delayed cord clamping	Skin-to-skin contact (1hr)	Active management of the third stage of labor	Upright lateral delivery
Intercept (reference group: no midwives)	1.08 (0.76-1.55)	0.17** (0.08-0.35)	1.67 (0.97-2.86)	55.00** (7.61-397.44)	0.13** (0.05-0.30)	0.15** (0.07-0.34)	16.67** (5.20-53.43)	0.35** (0.19-0.66)
Midwives without mentors	0.74 (0.46-1.21)	7.64** (3.00-19.43)	9.60** (2.65-34.73)	0.91 (0.06-14.92)	56.14** (16.83-187.29)	102.95** (25.08-422.64)	2.94 (0.30-29.24)	2.16 (0.93-5.00)
Midwives with mentors	4.72** (2.83-7.86)	174.00** (35.27-858.38)	11.60** (3.22-41.73)	4.22E+07 (0.00-Inf.00)	438.67** (51.00-3,773.22)	88.71** (24.42-322.24)	5.13E+07 (0.00-Inf.00)	18.14** (6.83-48.21)
Observations	472	166	168	169	159	161	164	160
AIC	555.45	138.06	126.84	25.88	89.94	99.18	38.86	179.88

Note: *p<0.05; **p<0.00625 (Bonferroni-adjusted alpha)

Mixed-effect models

	<i>Dependent variable:</i>							
	ANC Card	Partograph is used	Upright lateral labor	Companion present	Delayed cord clamping	Skin-to-skin contact (1hr)	Active management of the third stage of labor	Upright lateral delivery
Intercept (reference group: no midwives)	0.9 (0.09-9.08)	0.01 (0.00-1.34)	1.85 (0.68-5.02)	55.00** (7.61-397.45)	0.08** (0.02-0.38)	0.04* (0.00-0.85)	17.30** (5.19-57.75)	0.33 (0.03-3.46)
Midwives without mentors	0.37 (0.01-12.67)	295.58 (0.22-4.03e+05)	12.41* (1.96-78.56)	0.91 (0.06-14.92)	139.24** (11.55-1,678.31)	2,999.12* (7.06-1.27e+06)	2.94 (0.28-31.10)	1.36 (0.04-47.59)
Midwives with mentors	13.67 (0.49-379.26)	1.05e+05* (14.03-7.86e+08)	15.17** (2.47-93.24)	4.11E+13 (0.00-Inf.00)	1,095.66** (48.76-2.46e+04)	3,086.90* (6.76-1.41e+06)	1.39E+14 (0.00-Inf.00)	126.58* (2.49-6,431.42)
Observations	472	166	168	169	159	161	164	160
AIC	393.7	93.19	124.13	27.88	89.23	90.13	40.86	145.41

Note: *p<0.05; **p<0.00625 (Bonferroni-adjusted alpha)

Both descriptive and regression analysis results are discussed for each variable in the following sections. Differences between hospitals with only midwives and hospitals with midwives and mentoring were also tested, and results are included. Each narrative summary is preceded by a mini visual summary that shows the descriptive results for the variable in a lollipop chart and then the fixed-effect and mixed-effect regression results. The percentage results in lollipop charts, also displayed in a table in Appendix 7.8.5, reflect the earlier alluded to continuum shown in Figure 8. The continuum indicates less comfort, value for, and use of evidence-based practices in hospitals without midwives and a gradual increase in comfort, value, and use in the two types of hospitals with midwives. Along the continuum, hospitals with midwives and mentorship were the most likely to value and use the evidence-based practices. In each visual summary, separate mixed-effect regression results are shown where the addition of the Bonferroni adjustment changed the significance of the result. This was not necessary to do for the fixed-effect regression

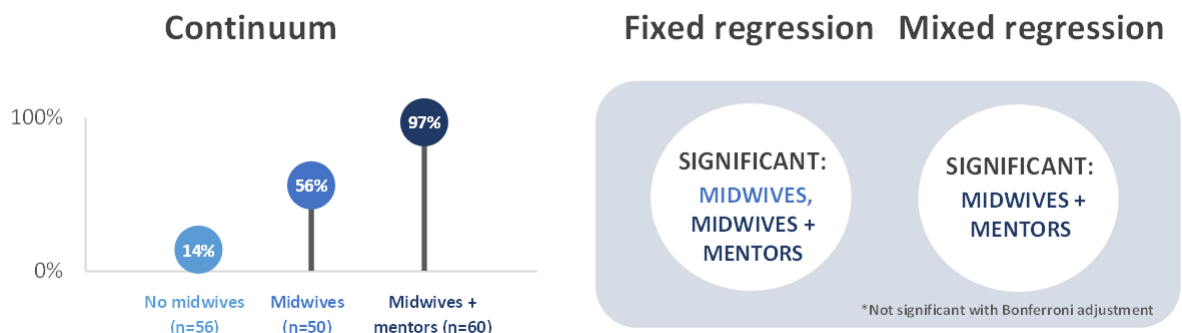
models, as the addition of the Bonferroni adjustment did not change the significance of the fixed-effect model results.

5.1.2.1 ANC Card



In hospitals without midwives, 52% of women observed received an ANC card. This was 45% in hospitals with midwives without mentoring and 84% in hospitals with mentors. The fixed-effect logistic regression showed significantly greater use of ANC cards ($p < 0.001$) in hospitals with midwives and mentors in comparison to hospitals without midwives (OR=4.72, 95% CI = [2.83-7.86]). No significant difference was observed between hospitals with only midwives and hospitals without midwives ($p = 0.233$). Difference between hospitals with midwives and mentors and those with only midwives was also tested using a fixed-effect model; it was observed that hospitals with midwives and mentors were significantly more likely ($p < 0.001$) to use ANC cards than were those with only midwives (OR=6.34, 95% CI = [3.89-10.5]). No significant differences were detected between hospital types using the mixed-effect logistic regression model.

5.1.2.2 Partograph



Partograph was used 14%, 56%, and 97% of the time in the no midwife, non-mentored, and mentored hospitals, respectively. Based on the results of the fixed-effect logistic regression, a significant difference ($p < 0.001$) was observed between both midwife groups and the reference group, with hospitals with midwives ($OR = 7.64$, 95% CI = [3.00-19.43]), and those with midwives and mentoring ($OR = 174.00$, 95% CI = [35.27-858.38]) having a greater likelihood of partograph use than those without midwives. In addition, hospitals with midwives and mentors had a higher likelihood ($OR = 22.79$, 95% CI = [6.14-148.62], $p < 0.001$) of partograph use than did those with midwives without mentorship. This indicates that mentoring may have had its own influence on partograph use, apart from the influence of midwives alone.

The mixed-effect logistic regression performed with a .05 p-value showed a significantly greater likelihood of partograph use among hospitals with midwives and mentors compared with those without midwives ($OR = 1.05e+05$, 95% CI = [14.03-7.86e+08],

p=0.011). Applying the Bonferroni correction resulted in no significant differences being detected between the hospitals.

5.1.2.3 Companionship for labour and birth



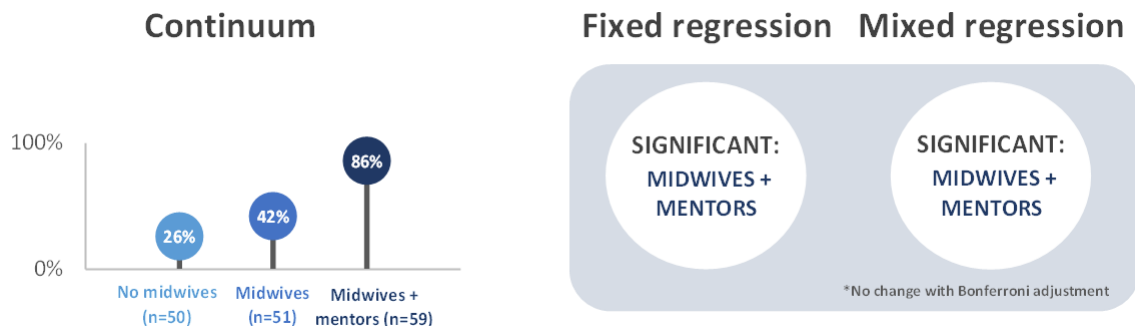
Companionship during labour and birth was close to 100% in all groups. No significant differences were found in the regression analyses.

5.1.2.4 Upright position for labour



Upright position for labour was found 63%, 94%, and 95% of the time in the no midwife, non-mentored, and mentored hospitals, respectively. Use of the fixed-effect logistic regression model showed a significantly greater likelihood of women labouring upright in hospitals with only midwives ($p=0.001$) and in those with midwives and mentoring ($p<0.001$) compared with hospitals without midwives (OR=9.60, 95% CI = [2.65-34.73]) and (OR=11.60, 95% CI = [3.22-41.73]), respectively. No significant difference was identified between the two hospital types with midwives. The mixed-effect logistic regression model showed significant differences between the reference and comparison groups, with upright labour also being more likely in hospitals with mentors (OR=15.17, 95% CI = [2.47-93.24], $p=0.003$) and hospitals with midwives (OR=12.41, 95% CI = [1.96-78.56], $p=0.008$) than in hospitals without. Potentially due to the small hospital sample, the application of the Bonferroni adjustment led to a significant difference only being identified between hospitals with midwives and mentors and hospitals without midwives.

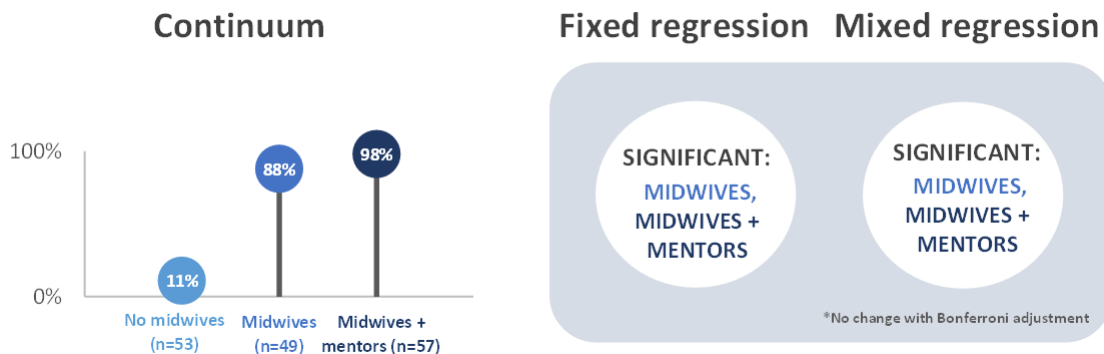
5.1.2.5 Upright position for birth



Upright position for birth was found 26%, 43%, and 86% of the time in the no midwife, non-mentored, and mentored hospitals, respectively. Using the fixed-effect model,

upright birth positioning was found to be significantly more likely in hospitals with midwives and mentoring ($p < 0.001$) in comparison with the reference group (OR=18.46, 95% CI = [6.83-48.21]), whereas a significant difference ($p = 0.073$) was not found between hospitals with only midwives and those without. Application of the mixed-effect model using the .05 p-value revealed a significantly greater likelihood of upright birth occurring in hospitals with midwives and mentors compared with those without midwives (OR=126.58, 95% CI = [2.49-6,431.42], $p = 0.016$); no difference was found using a .006 p-value.

5.1.2.6 Delayed cord clamping



Delayed cord clamping was seen 11% of the time where there were no midwives, 88% of the time where there were only midwives, and 98% of the time in hospitals with midwives and mentoring. Both the fixed- and mixed-effect models revealed a significantly greater likelihood of the practice of delayed cord clamping being carried out (all tests had a p-value of < 0.001) in hospitals with midwives both with and without mentoring compared

with hospitals without midwives. The respective odds ratios in the fixed-effect model suggest a greater likelihood of delayed cord clamping occurring in hospitals with midwives, both without mentoring (OR=56.14, 95% CI = [16.83-187.29]) and with (OR=438.67, 95% CI = [51-3,773.22]). Neither the fixed- nor the mixed-effect models identified a significant difference between the two hospital types with midwives. No difference in significance was identified with use of the Bonferroni adjusted .006 p-value—all initial test results remained significant.

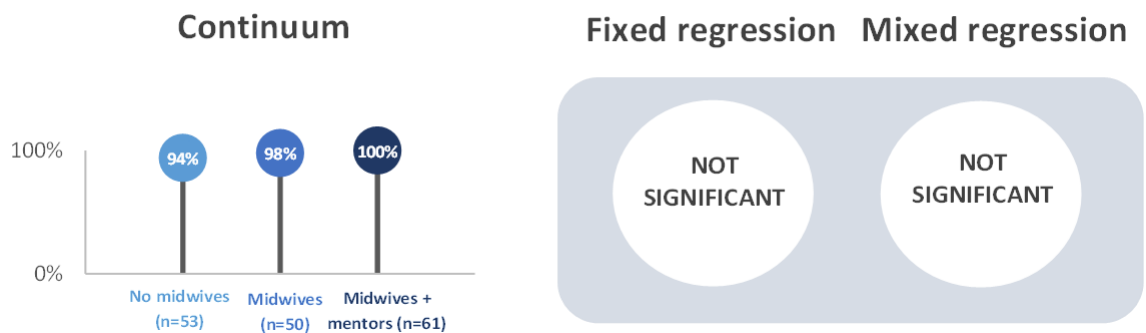
5.1.2.7 Skin-to-skin contact



Skin-to-skin contact was seen 13%, 94%, and 93% of the time in the hospitals with no midwives, with midwives, and with midwives and mentoring, respectively. The fixed-effect regression model showed that hospitals with mentors and hospitals with only midwives were significantly more likely ($p < 0.001$) to perform immediate skin-to-skin than in those without. The odds ratio was 88.71 (95% CI = [24.42-322.24]) for hospitals with mentors and 102 (95% CI = [25.08-422.64]) for those with only midwives. Significance was not found when comparing the two hospital types with midwives to each other. Application of the mixed-effect model also identified a significant difference to $p = 0.01$

between the two hospital types and the reference group—the odds ratio was 3,086.90 (95% CI = [6.76-1.41e+06]) for hospitals with mentors and 2,999.12 (95% CI = [7.06-1.27e+06]) for hospitals with only midwives. However, no significant difference was seen with the Bonferroni-corrected p-value of 0.006. Thus, though there is indication of significance, the small sample size may have affected the significance to the most conservative calculations.

5.1.2.8 Active Management of 3rd Stage of Labour (AMSTL)



AMSTL was observed 94%, 98%, and 100% of the time in hospitals without midwives, with midwives, and with midwives and mentoring, respectively. No significant differences were found in any of the regression analyses.

5.1.3 Survey

The survey results are described in this section. Although attempts were made to analyse the responses using logistic regression, survey data were too homogeneous to yield meaningful results.

5.1.3.1 Capabilities and actions

Results from providers' reports of the care interventions they felt capable of carrying out, and implement, along with their views on the importance of a separate space for ANC are displayed below in Charts 3 and 4. Overall, providers in hospitals without midwives described less use of quality care than do providers in the other facility types. There were exceptions, but they did not seem to follow a predictable pattern. One example was that providers in hospitals with no midwives reported stabilizing emergencies more than did those in facilities with midwives without mentoring. Further detail by provider type is in Appendix 7.8.6.

Chart 3 Providers' self-reported capabilities and use of evidence-based maternity practices

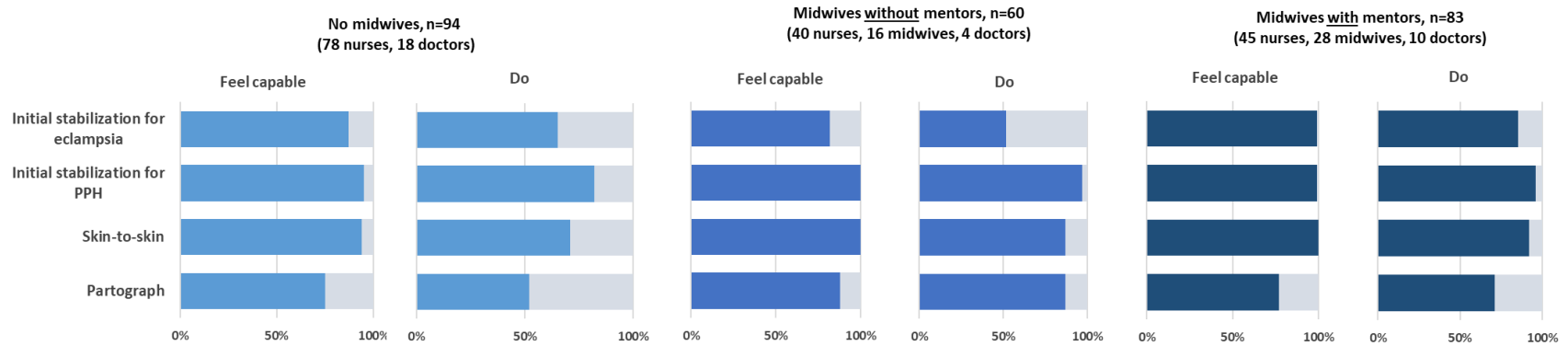
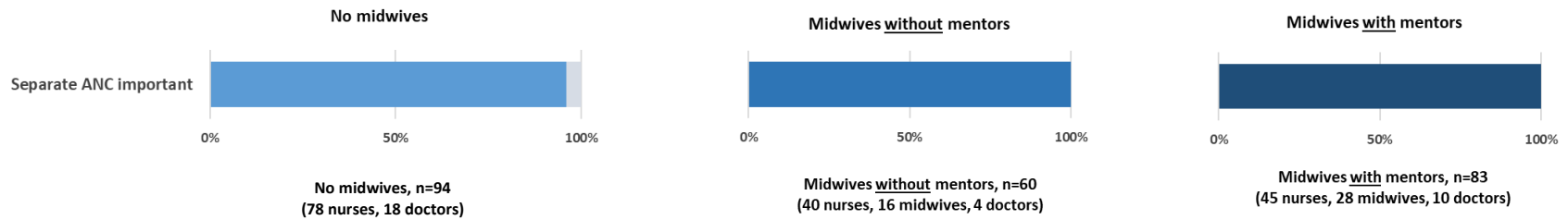


Chart 4 Providers' views on importance of having a separate space for ANC

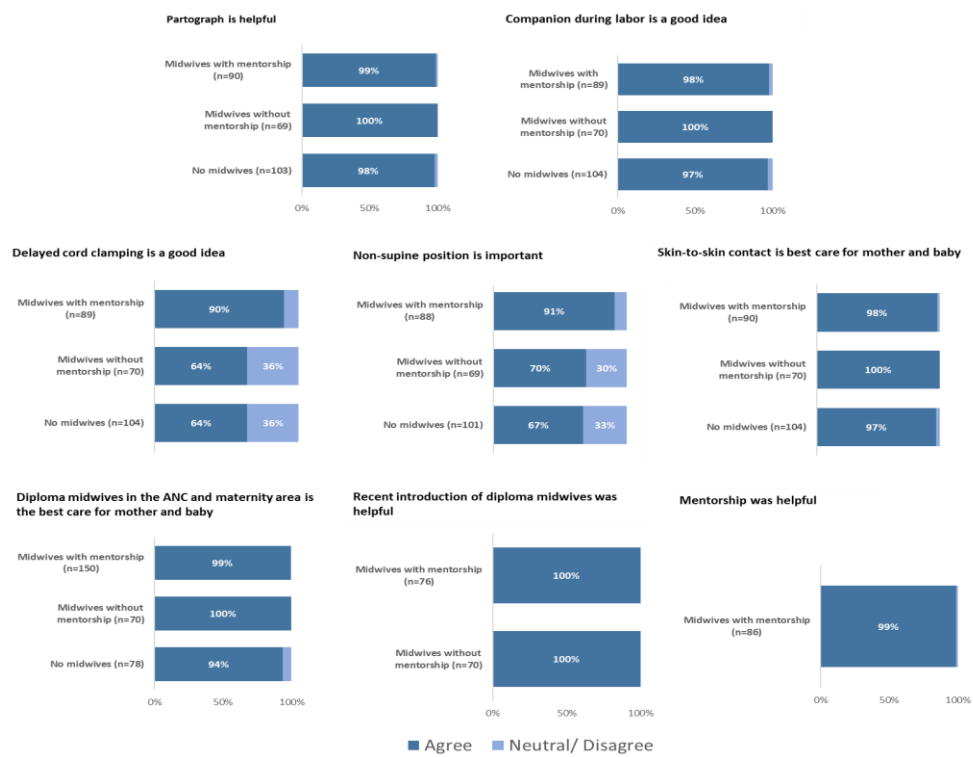


*Responses include doctors, nurses and midwives

5.1.3.2 Agreement on value of evidence-based practices (Likert scale)

Summary results from the Likert scale questions on providers' value of evidence-based practices are presented in Chart 5 below. Detailed results are shown in in Appendix 7.8.7.

Chart 5 Provider agreement on value of evidence-based practices



*Responses include doctors, nurses and midwives

As with the capabilities and actions answers, many of the responses were homogeneous, although some had interesting variations. Almost all participants agreed or strongly agreed that partographs were important, that companionship during labour was important, and that skin-to-skin after birth offered the best care for babies. However, there was some discrepancy in terms of delayed cord clamping and non-supine positions. For non-supine positions in hospitals with mentoring, more than 90% of participants stated that it was important, and in hospitals without midwives, 67% did. Responses to whether participants agreed that delayed cord clamping was a good idea were similar—36% agreed in hospitals without midwives, whereas more than 90% did so in hospitals with mentorship.

5.1.4 Conclusion

5.1.4.1 Facility readiness, service utilization, and clinical observations

Overall, data show improved interest in, and provision of, maternity care with the addition of midwives, and then again with the addition of mentors. The descriptive analyses were for the most part confirmed by the fixed-effect logistic regressions. Less, but still some, significance was found with the addition of the random effect for hospitals when using the mixed-effect logistic regressions, including with the Bonferroni adjustment.

The fixed-effect logistic regressions found that six out of eight variables had significant differences between the different hospital types, with four being significantly different for both types of hospitals with midwives, and two (ANC card and upright position for birth) only being significantly different between hospitals with midwives and mentoring and hospitals without

midwives. Of those where both hospital types with midwives were found to be significantly different from those without midwives, only one variable—partograph use—was found to be more likely in mentored hospitals than in those with midwives but no mentoring. Thus, hospitals with mentorship demonstrated more positive adaptation to quality clinical care over those with midwives alone for three variables—ANC card use, partograph, and upright position for birth. In the mixed-effect logistic regression, the number of variables that had significant differences between the hospitals was reduced to two for the most conservative .006 alpha level and five if an alpha of .05 was used. One of the variables—upright birth—was significantly more likely to occur only in hospitals with mentoring in comparison with hospitals without midwives. The other—delayed cord clamping—was significantly more likely to occur in both types of hospitals with midwives compared with those without. This reduction in significance could be the result of the small number of hospitals in each hospital type.

5.1.4.2 Facilities with no midwives

In facilities with no midwives, 52% of providers used an ANC card during antenatal care. In the labour room, use of partograph, skin-to-skin contact, and delayed cord clamping were used the least (11–14% of facilities), and companionship and AMSTL were used the most (94% and 98% of facilities). Upright positioning for labour and birth were used 37% and 26% of the time, respectively.

The fixed-effect regression model showed that hospitals without midwives were significantly less likely than were hospitals with midwives (but without mentoring) to use a partograph, use

upright positioning, perform delayed cord clamping, or ensure skin-to-skin contact. In addition, when compared with hospitals with mentoring, those without midwives were also significantly less likely to use an ANC card or support upright positioning for delivery.

When using the mixed-effect regression model, hospitals without midwives were only found to differ significantly from hospitals with midwives for the variable delayed cord clamping. When mentoring was added, hospitals without midwives were also significantly less likely to perform upright position in labour.

5.1.4.3 Midwives without mentoring

In hospitals with midwives but no mentoring, less than half (45%) of providers used an ANC card during ANC visits. In the labour room, most interventions were used more than 88% of the time, apart from upright position for birth and partograph use, which were observed 42% and 56% of the time, respectively. Delayed cord clamping, skin-to-skin contact, upright positioning for labour, companionship during labour and delivery, and AMTSL were used 88%, 94%, 94%, 98% and 98% of the time, respectively.

The fixed-effect regression model showed that hospitals with midwives but without mentoring were significantly more likely than those without midwives to use partograph, skin-to-skin, delayed cord clamping and upright labour. Controlling for individual hospital variation using the mixed-effect model with the Bonferroni adjustment showed that hospitals with midwives were only significantly more likely to follow the practice of delayed cord clamping than those without.

5.1.4.4 Midwives with mentoring

In facilities with midwives and mentoring in the labour room, all interventions were used more than 84% of the time, with ANC card and upright position for birth being the least frequently used (84% and 86% of the time, respectively). The frequency of use of the other interventions were skin-to-skin (93%), upright position for labour (95%), partograph (97%), delayed cord clamping (98%), and AMTSL and companionship (100%).

Using the fixed-effect model showed that hospitals with mentoring performed significantly better than hospitals without midwives in terms of use of ANC card, upright positioning in labour, delayed cord clamping, skin-to-skin, upright birth and partograph. Using the mixed-effect model with the Bonferroni adjustment showed only the practices of delayed cord clamping and upright position for labour to be significantly more likely in hospitals with mentoring.

5.1.4.5 Survey data

Although the most striking observation regarding the survey data was that most participants answered “Yes” to most questions, there were some notable trends. Staff in hospitals with no midwives were the least likely to report feeling capable, and that they were implementing and value quality care. Midwives were consistently more likely to report feeling capable of and implementing evidence-based practices than the other providers, and midwives with mentoring more so than those without. Nurses in hospitals with no midwives reported feeling less capable and being less likely to intervene than other nurses, and nurses in mentored hospitals were as or more likely to report feeling capable of and using the evidence-based practices.

5.2 Qualitative

Eighteen interviews and six focus group discussions were conducted, transcribed, and analysed. Table 13 provides a breakdown of the interviews and focus groups held in each health facility setting: 1) no midwives, 2) midwives without mentoring, and 3) midwives with mentoring. Non-midwife maternity staff included nurses, general doctors (non-OBGYNs), and emergency room paramedics.

Table 13 Interviews and focus group discussions held in each type of setting

Data collection approach	Type of health facility setting			Total
	<i>1. No midwives (7 facilities)</i>	<i>2. Midwives without mentoring (6 facilities)</i>	<i>3. Midwives with mentoring (6 facilities)</i>	
Interviews	7	5	6	18
Focus groups	1	2	3	6

After the hospital visits, the translator-transcribers shared the English transcriptions with the researcher. The transcripts were read, and any questions regarding translation were discussed with the translators. Translation issues appeared primarily with medical terms that were unknown to the translators. The transcriptions were then uploaded into NVivo. Within NVivo,

coding was performed. Coding consisted of reading the transcripts and identifying topics or words that participants repeated. This was an iterative process for the researcher to absorb subtleties over time. The most representative quotations that covered both the breadth of the ideas expressed, and that represented the general proportion of that sentiment within the themes from each of the facility levels and staff and managers were chosen. Data reduction and display through reading, reflecting, and seeking out emergent themes was used to capture a sense of the whole (Bazeley, 2013). Eighty-six codes were identified and sorted into separate folders in NVivo. The coded data were then combined into themes. Themes were separated by hospital type, and into midwives as opposed to other maternity staff, to compare and contrast the shared experiences. There were thus five different potential categories for each theme (Table 14). The 10 initial themes were later slightly modified for clarity.

Table 14 Example of the process of the codes that contributed to a theme “resistance to change”

Theme	Potential categories
Resistance to change	<p>No midwives</p> <ol style="list-style-type: none"> 1. Only non-midwives <p>Midwives</p> <ol style="list-style-type: none"> 2. Experiences of the midwives 3. Experiences of the non-midwife maternity staff and managers <p>Midwives with mentoring</p> <ol style="list-style-type: none"> 4. Experiences of the midwives 5. Experiences of the non-midwife maternity staff and managers

Table 15 shows an example of the coding process for one of the themes. Codes typically had 5-15 related quotations. The words in each quotation that directly relate to the code are highlighted.

Table 15 Quotations and codes contributing to the theme “resistance to change”

Example quotations	Codes	Theme
<p><i>“We don’t even know about these positions, and we are habituated to doing delivery in lithotomy position.”</i> —Obstetrician, (midwives without mentor)</p> <p><i>“We are also habituated with lithotomy position”</i> —Midwife 1, (midwives without mentor)</p>	Habituated to old ways	Resistance to change
<p><i>“We don’t allow any companionship. We don’t appreciate this.”</i> —Nurse 6, (no midwives)</p> <p><i>“One hour is not comfortable”</i> —Nurse 3 (no midwives)</p>	Not comfortable with certain new interventions	
<p><i>“If they don’t hand over the baby immediately after the delivery to the party (family), they think that there might be some problem with the baby or the mother.”</i> —Hospital manager 2 (midwives without mentor)</p> <p><i>“Patients always prefer lithotomy, that’s why we didn’t use that (upright positions).”</i> - —Nurse 5 (midwives without mentors)</p>	Women and their families want the existing routines, they do not want change	
<p><i>“I cannot mention that officially, but it happens, it is the motivation for nurses to want to perform the deliveries.”</i></p>	Nurses receive tips for performing deliveries	

<p>–Doctor 2, (midwives without mentors)</p> <p><i>“I think the controversy of this is that the midwifery service is the better idea, and they execute the service for free.”</i></p> <p>–Hospital Manger 1, (midwives without mentors)</p>		
<p><i>“We do many works. We have work pressure. We do other work, and there is a lack of manpower. We cannot give time to them.”</i></p> <p>–Nurse 3 (no midwife)</p> <p><i>“We don’t have enough time to do that”</i></p> <p>–Nurse 5 (midwives without mentor)</p>	Not enough time	
<p><i>“Most of the time they (midwives) only help.”</i></p> <p>–Obstetrician 1 (midwives without mentor)</p> <p><i>“Do they (the midwives) deliver? I see you only deliver, and they are just your helping hand.” The nurses then replied that “yes only we do the delivery.”</i></p> <p>–Doctor1 (midwives without mentor and nurses 1-7 (midwives without mentor)</p>	Midwives as nurses’ helpers	
<p><i>“A few days ago, we made a training session for the nurses for maintaining the partograph (a globally recognized tool to document labor progress and maternal and fetal health); we</i></p>	Need more training	

<p><i>think that we need more training.”</i> —Resident Medical Officer 1, (no midwives)</p> <p><i>“The nurses are not well trained; even we (the doctors) are also doing lithotomy.”</i> —Obstetrician 1, (midwives without mentor)</p>		
<p><i>“From the student life, we have learned only lithotomy position. We didn’t even watch any other position.”</i> —Midwife 2 (midwife without mentors)</p> <p><i>“If someone shows us in front of our eyes, then it will be easier to learn.”</i> —Midwife 1 (midwife without mentors)</p>	Never saw it done	
<p><i>“The nurses used to do the delivery care, but after the introduction of midwives, the nurses cannot accept the midwives.”</i> —Hospital manager 1, (midwives without mentors)</p> <p><i>“After the introduction of the midwifery service, the nurses working before in that particular department, delivery service, they have some problems; they cannot accept the midwives.”</i> —Hospital Manager 1, (midwives without mentors)</p>	Nurses cannot accept midwives/competition	

The final 10 themes were decided on after multiple iterations. The themes were chosen to disaggregate common topics and highlight salient points related to the aims and objectives of the research. The themes focused on 1) the midwives' own experiences of moving into their new roles and, 2) maternity staff's and managers' perceptions and experiences related to the new midwives' service provision. In addition, maternity staff, managers, and midwives shared their experiences of improving care quality. The final themes are summarized in Table 16 and described in the following paragraphs below.

Table 16 Themes that emerged from the qualitative data

Theme 1

Imagined and experienced benefits of midwives

Awareness among nurses and managers that midwives could be helpful was notable in that, where there were no midwives, the imagined benefits were overwhelmingly positive, whereas, where there were midwives but no mentoring, most saw the midwives as too inexperienced and not capable enough to make positive change. This is a significant finding as it leads to midwives' scope of practice being limited by their supervisors. Where there was facility mentoring this situation was improved and midwives' potential was more fully met.

Respondent Type	Hospital Type		
	No Midwives	Midwives	Midwives with Mentoring
Non-Midwife Maternity Staff	83% Majority (5) Midwives imagined to be very beneficial for improving maternity care	72% Majority (45) Midwives seen as helpful but inexperienced and lacking capacity to be autonomous	87% Majority (41) Midwives seen as positive change agents
	17% Minority (1) "We don't know about midwives"	28% Minority (10) Midwives seen as improving care	13% Minority (6) Midwives seen as inexperienced and needing support in difficult situations

Theme 2

Familiarity with and use of improved care quality

Midwives and mentors were associated with increased comfort with, and use of evidence-based care. This theme plays out across the continuum in that, where there were no midwives and where there were midwives and no mentors, nurses had some familiarity with WHO standard quality maternity care, but they were not comfortable using it. When midwives were introduced, midwives expressed comfort with, and most were observed using the quality practices. With mentoring, the nurses were more comfortable, and the midwives were enabled to use the quality-of-care practices and thus all state they were providing quality of care.

Respondent Type	Hospital Type		
	No Midwives	Midwives	Midwives with Mentoring
Midwives	Not relevant	85% Majority (40) Familiar and using	100% All Familiar and using
		15% Minority (7) Familiar but not using	Minority No minority opinion
Maternity staff and managers	85% Majority (37) Some familiarity but discomfort	86% Majority (69) Nurses familiar but less comfortable	92% Majority (35) Midwives and mentors associated with increased comfort with and use of evidence-based care
	15% Minority (6) Comfort and using	14% Minority (11) Familiar and using	8% Minority (3) Stated barriers to using quality care

Theme 3

Resistance to change

Entrenched habits, social/patient/family pressure, and under-the-table payments were found to lead to resistance to change. This theme also found a continuum where non-midwife maternity staff and managers in hospitals without mentors expressed similar levels of resistance to change, but with mentoring there was much less resistance. Most midwives wanted change, but without mentoring many were complacent with existing systems. With mentoring most midwives felt they were making change.

Respondent Type	Hospital Type		
	No Midwives	Midwives	Midwives with Mentoring
Midwives	Not relevant	60% Majority (17) Expressed they wanted change/were making change	89% Majority (26) Were making change
		40% Minority (11) Stated complacency with existing systems	11% Minority (3) Stated barriers to change
Maternity staff and managers	51% Majority (17) Uncomfortable with change, entrenched habits, social/ patient/ family pressure	54% Majority (75) Stated barriers to change	77% Majority (33) Welcomed change
	49% Minority (16) Stated comfortable with change	46% Minority (63) Wanted change/were making change	23% Minority (10) Small amounts of resistance

Theme 4

Under-the-table fees

Under the table fees were a cause for increased competition between nurses and midwives as nurses lost tips if they turned over the maternity area to the midwives. In addition, the desire to provide free care for the poor arose spontaneously from some of the midwives. Managers identified charging as a limitation for caring for the poor, and as the reason why nurses did not want the midwives to move into autonomous roles.

Respondent Type	Hospital Type		
	No Midwives	Midwives	Midwives with Mentoring
Midwives	Not relevant	100% Majority (3) Midwives talked about the importance of free care to all	100% Majority (2) Talked about caring for the poor. Talked about the importance of free care to all
		0% Minority (0) Talked about charging fees	0% Minority (0) Talked about charging fees
Maternity staff and managers	100% Majority (3) Talked about not being able to care for the poor because of under the table tips	86% Majority (6) Talked about charging fees, and that this created competition	75% Majority (3) Wanting to care for the poor
	0% Minority (0) Talked about care for the poor	14% Minority (1) Talked about wanting to care for the poor	25% Minority (1) Talked about charging fees

Theme 5

Management of obstetric emergencies

Non midwife maternity staff described numerous barriers to caring for women with obstetric emergencies. Midwives talked about being competent and willing to manage obstetric emergencies but those without mentoring often spoke of resistance from managers. With mentoring most stated that they were managing emergencies.

Respondent Type	Hospital Type		
	No Midwives	Midwives	Midwives with Mentoring
Midwives	Not relevant	79% Majority (27) Stated they were competent and willing but limited by managers	81% Majority (9) Stated they were managing emergencies
		21% Minority (7) Midwives were responding to emergencies	19% Minority (2) Stated they were competent and willing but limited by managers
Maternity staff and managers	52% Majority (16) Resistance from managers, nurses as gatekeepers, fear among managers of community backlash	86% Majority (116) Resistance from managers, nurses as gatekeepers, fear among managers of community backlash	81% Majority (27) Midwives competent and willing to manage obstetric emergencies; maternity staff and managers state that they were doing so
	48% Minority (15) Talked about managing emergencies	14% Minority (19) Talked about managing	19% Minority (6) Concerned about midwives' capacity

Theme 6

Barriers and facilitators to midwives' practicing autonomously and to their full scope

A number of issues were identified as barriers to midwives practicing autonomously, most commonly youth and or inexperience was cited. Managers mentioned competition between nurses and midwives limiting the midwives. Midwives spoke of not having their own separate units. Mentoring was seen by many as facilitating relationships between nurses and midwives.

Respondent Type	Hospital Type		
	No Midwives	Midwives	Midwives with Mentoring
Midwives	Not relevant	94% Majority (15) Midwives shared that women and/or nurses saw them as too young and inexperienced to work autonomously Midwives expressed wanting separate units	94% Majority (15) Midwives experienced support to practice fully as midwives from managers, nurses, and mentors
		6% Minority (1) Midwives experienced support from managers and nurses to work autonomously	6% Minority (1) Midwives experienced managers or other maternity staff not wanting them to fully practice
Maternity staff and managers	Not talked about	73% Majority (27) Midwives described as helpers for the nurses and as inexperienced Managers talked of competition between nurses and midwives	97% Majority (32) Mentoring described as effective in facilitating midwives moving into their roles
		27% Minority (10) Effective ways of facilitating midwives moving into their roles described	3% Minority (1) Midwives described as helpers for the nurses and as inexperienced Managers talk of competition between nurses and midwives

Theme 7

Maternity staff, managers', and midwives' perceptions of midwives' competence to move into their role

Perceptions of midwives' lack of competence were expressed as a reason to limit midwives' autonomy. This was particularly notable where there was no mentoring. Nurses and midwives expressed that women were concerned about midwives' competence. This was less prevalent in hospitals with mentoring. Midwives consistently perceived themselves as competent.

Respondent Type	Hospital Type		
	No Midwives	Midwives	Midwives with Mentoring
Midwives	Not relevant	76% Majority (26) Midwives perceived themselves as capable and able to move into their role but were limited by external factors	100% Majority (25) Midwives saw themselves as capable and practicing autonomously
		24% Minority (8) Midwives saw themselves as able to fully move into their role	0% Minority (0) Midwives saw themselves as limited role
Maternity staff and managers	Not relevant	100% Majority (5) Perception of gaps in competence caused limitation in midwives' autonomy managers/nurses/patients concerned midwives not competent	95% Majority (21) Midwives were seen as competent and able to practice autonomously
		0% Minority (0) Saw midwives as competent and capable	5% Minority (1) Midwives as needing support in complicated cases

Theme 8

Midwives' pride

Midwives spontaneously expressed that they felt pride in providing good care to the poor; this was true in both mentored and non-mentored sites. Although the number of quotes was relatively few, there were no questions about pride in the guide, and yet 6 midwives spontaneously talked about it. Midwives talked further regarding ensuring free improved quality care.

Respondent Type	Hospital Type		
	No Midwives	Midwives	Midwives with Mentoring
Midwives	Not relevant	100% Majority (3) Midwives spontaneously expressed pride and speak specifically about providing improved quality FP and maternal health services to the poor.	100% Majority (3) Midwives spontaneously expressed that they felt pride in providing safe care and improving the health of mothers and babies
		0% Minority (0) No minority opinion	0% Minority (0) No minority opinion
Maternity staff and managers	Not relevant	Not relevant	Not relevant

Theme 9

The experience of mentorship by hospital staff

The hospital staff reported a greater sense of having a supportive team and a better understanding of midwives' competencies with mentorship. In addition, some spoke specifically regarding mentors' impact on the relationship between nurses and midwives. This relationship is crucial as nurses had power over the labour room in that they had seniority over the midwives and were thought by many managers to be more skilled. Many assume the role of the mentors is about capacity building, but in fact establishing relationships to facilitate enabling environments appears to be at least as key.

Respondent Type	Hospital Type		
	No Midwives	Midwives	Midwives with Mentoring
Midwives	Not relevant	Not relevant	100% Majority (4) Felt empowered by mentors
Maternity staff and managers	Not relevant	Not relevant	0% Minority (0) Did not find mentors helpful
			91% Majority (11) Sense of supportive team, less competition between nurses and midwives, better understanding of midwives' competencies among other providers, more evidence-based care and emergency management.
			9% Minority (1) Did not find mentors helpful

Theme 10

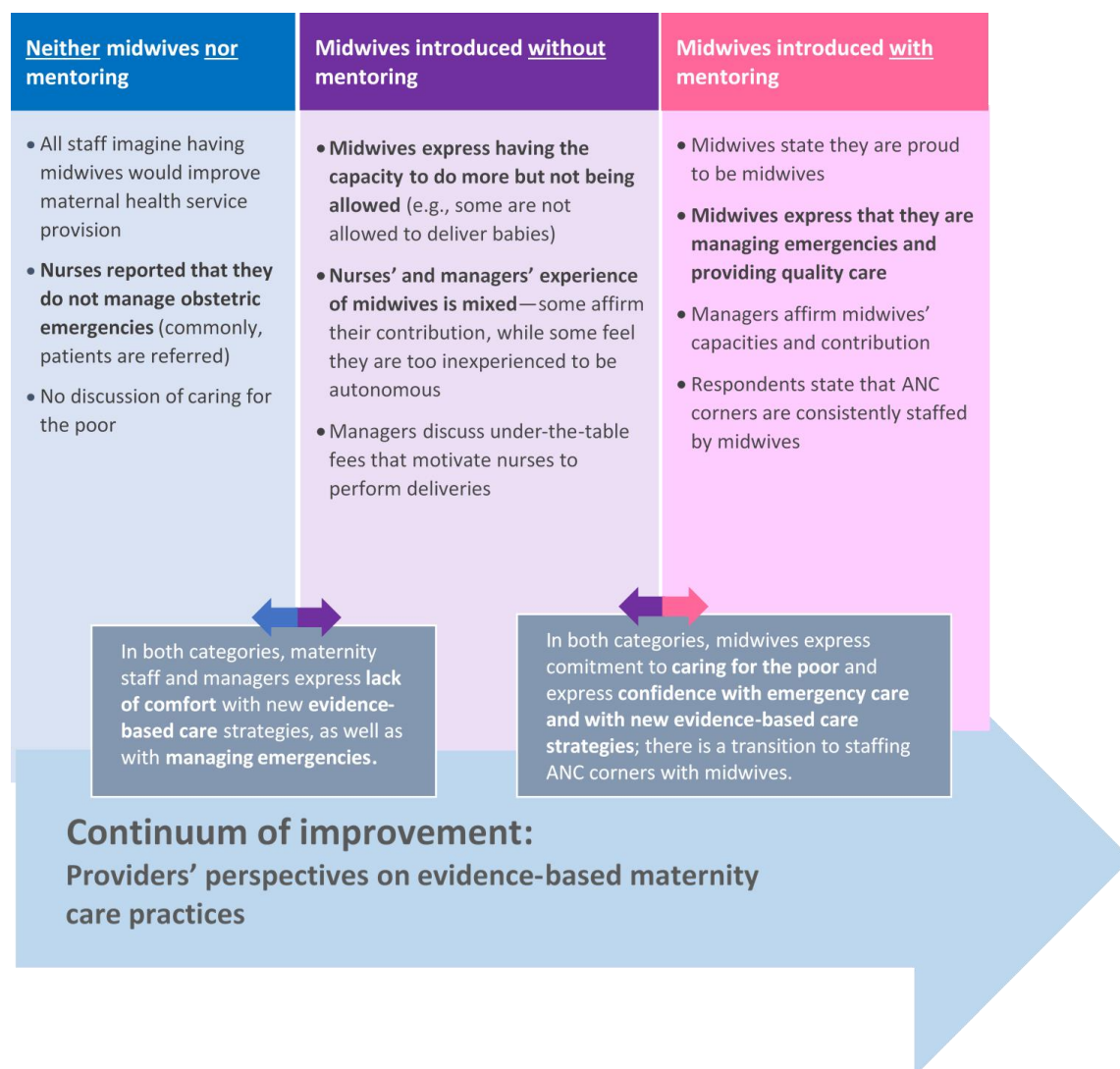
Midwives and other health care providers desire to care for the poor

Midwives spontaneously expressed that they wanted the poor to know that they would care for them for free. No other health care provider expressed this. Some managers and non-midwife providers spoke of the limitations regarding caring for the poor, including under the table tipping which is known to be ubiquitous in the Bangladesh health system.

Respondent Type	Hospital Type		
	No Midwives	Midwives	Midwives with Mentoring
Midwives	Not relevant	100% Majority (2) Spoke of providing free care to the poor	100% Majority (3) Midwives spontaneously expressed that this was important and spoke about initiatives to ensure that poor women know they will not charge.
		0% Minority (0) Spoke of limitations to caring for the poor	0% Minority (0) Spoke of limitations to caring for the poor
Maternity staff and managers	100% Majority (3) Mentioned as difficult/not possible to provide free care	100% Majority (4) Mentioned as difficult/not possible to provide free care; spoke of under-the-table tipping	50% Majority (2) Spoke of caring for the poor
	0% Minority (0) Spoke of caring for the poor	0% Minority (0) Spoke of caring for the poor	50% Minority (2) Spoke of limitations to free care

The analysis is divided into three sections reflecting the three hospital types. The themes are described in each of the hospital types and then compared in the summary. The qualitative data give particular insight into the systems motivators. The below diagram highlights themes that stood out within the three settings.

Figure 9 Summary of themes across the different settings



There was homogeneity across the three groups around feelings regarding midwives and experiences related to transitioning to more evidence-based care. However, the experiences, attitudes and perceptions within each theme varied across groups. For most of the themes, the variation in experience was on a continuum where the system adapted positively with the introduction of midwives, and more so with mentoring. Although there was overlap in

experiences across groups, movement towards improved quality was least where there were no midwives and most in the groups with midwives and mentoring. An example of this was that all talked about performing some evidence-based care. However, those without midwives also expressed significant discomfort with the quality improvement interventions, and where there were midwives and mentoring, some still had reservations, but most expressed confidence and even enthusiasm. Other experiences were distinct to certain groups such as those related to mentoring.

The interviews and focus groups were all facilitated in English with Bangla translation, apart from when the interviewee was as fluent in English as the translator. English transcriptions were developed by the translator based on recordings of the conversations. Although the translators' ability to translate concepts appeared to be satisfactory, English grammar and spelling was often imperfect. To address this for ease of reading, corrections were made by the researcher in some of the quotations.

5.2.1 No midwives

Seven health facilities without midwives were visited. One focus group and seven interviews were conducted in these facilities. Respondents expressed their views about the potential benefits of midwives. Emerging themes circulated around experiences and beliefs regarding transitioning to improved care quality and availability, which included caring for the poor, antenatal care, evidence-based routine care, and addressing emergencies.

Summary of themes in hospitals without midwives:

We are aware of movement towards improved quality, and we have made some changes, but we are comfortable with the way we do things, and we do not feel fully prepared to change.

—Nursing Supervisor 1, no midwives

5.2.1.2 Imagined benefits of midwives.

Nurses and managers expressed a desire to have midwives on their staff. The imagined benefits of having midwives included more maternity staff and staff with more skill and expertise related to maternity care. They felt that they had less expertise in maternity care than midwives did, and managers felt they would need to provide less support to midwives to achieve quality and availability of care than what is needed of them to support nurses. Within the focus groups was consistent agreement with the following sentiments:

“(We need midwives) because the midwives are expert on maternity, and they are trained and very skilful. We are not that expert on what they are. We have learned only by our experiences.”

—Nursing Supervisor 2, no midwives

Managers talked about gaps in the quality of care provided by nurses and stated that they think that midwives are the real experts in maternity care. They expressed that if midwives were present, pregnant women would have better outcomes. Managers also expressed concerns about having to put resources into training nurses to build their capacity. They expressed that midwives would have the needed knowledge and skills to provide services without additional

training. Nurses shared that they did not have a complete enough understanding of the new evidence-based care changes to provide the highest quality services.

5.2.1.3 Barriers and facilitators to improved care quality and availability.

A range of experience was discussed during the focus groups and interviews. Some experiences were prompted by the open-ended questions, whereas others emerged spontaneously. One of the most notable emergent topics was on caring for the poor. While there were no questions on this topic, respondents brought it up spontaneously. This theme was most pronounced in hospitals with midwives. However, it was also touched upon by a manager in a hospital without midwives, who shared:

“I decided to increase delivery in this sub-district hospital because I want to work for poor people. They come here for delivery, and we want to support.”

—Hospital Manager 1, no midwives

In the facilities without midwives (where under-the-table fees are a common occurrence), only this manager talked about the importance of serving the poor. The manager continued to say that, though there are many poor people in the catchment area for his hospital, most cannot afford care at his facility because of unofficial fees. He then quoted the average unofficial charge that had been published in the most recent national survey. None of the nurses in the hospitals without midwives spoke about caring for the poor.

As all sub-district hospitals have been given a government order to establish ANC rooms distinct from the general women's consultation areas, ANC rooms were often reported first when asked about recent improvements. However, when talking in more depth, most respondents shared that ANC was still included as part of general consultations. The two comments below exemplify the duplicity in the responses:

"If a mother gets proper treatment at ANC from the very beginning, she will definitely be a healthy mother, and the nation will get a healthy baby; that's why we started ANC."

— Nurse 6, no midwives

"The obstetrician and sister (nurse) see all the female consultations and the ANC patients together; there is no separate ANC."

—Nursing Supervisor 2, no midwives

In hospitals without midwives, the nurses had some familiarity with the new quality improvement maternity care terms, and a few discussed their implementation. At the same time, about half described not having enough understanding, and some spoke specifically about not wanting to change. An example from a nursing supervisor conveyed:

"We don't allow any companionship. We don't appreciate this."

—Nursing Supervisor 1, no midwives

Managers had little awareness of what evidence-based care entailed. They perceived a need for training but also expressed that making changes even after training is difficult. A general doctor reflected:

“A few days ago, we made a training session for the nurses for maintaining the partograph; we think that they need more training.”

—Resident Medical Officer 3, no midwives

Regarding family companionship during labour and birth, opinions were mixed. Those who were in favour talked about wanting the family to see the good care and that companionship was helpful for the mother. Those who opposed were concerned about difficult or demanding family members.

All maternity staff spoke about using only supine positions for birth. Although some were aware that other positions are now recommended, most stated a lack of experience with the new delivery positions and a comfort with how they have always done it. Some spoke about patients preferring or expecting the supine position. This common sentiment was expressed by a nurse:

“In maximum cases, we use lithotomy position... Upright position is the best position because it is comfortable for the patients, and the chance of tear is very low in this position, but in lithotomy position, the chance of tear is very high...We don't even know about these positions, and we are habituated to doing delivery in lithotomy position.”

—Nurse 5, no midwives

Immediate skin-to-skin contact between mother and baby following birth, and continuously for the first hour, in combination with delayed cord clamping is a well-known global standard among all health-care providers in Bangladesh. Currently, however, the most common practice is to perform a modified version of skin-to-skin contact for just 1-2 minutes while the cord is cut and

then give the newborn to family members. The nurses felt that keeping the baby skin-to-skin would increase their workload. When nurses were asked if they were performing skin-to-skin contact, all replied positively and spoke about its benefits. Most also continued to qualify their responses, stating that they are too busy to leave the baby with the mother for the first hour or that they do not have adequate training to really understand the importance and feel uncomfortable doing what is being asked. For example:

“We perform skin-to-skin only for one minute because one hour is not comfortable; it is not possible to conduct skin-to-skin contact for an hour; we do many works. We have work pressure. We cannot give time to them, so skin-to-skin for an hour in a room immediately is not feasible.”

—Nurse 3, no midwives

As described in the Background and Context, caesarean section rates are rising quickly in Bangladesh, and currently about 60% of women delivering in public facilities receive a caesarean section. Managers and maternity staff are aware that the high caesarean rates may deter patients from coming to the facility. They also identify that doctors may feel more comfortable performing caesarean sections over normal births. This quotation from a hospital manager reflects a prevailing concern:

“Our medical officers are not too good at normal vaginal delivery. In our community, people are not interested in institutional delivery because they are afraid of it, and they think that if someone comes to the hospital facility then they may undergo a caesarean

section. They are afraid of this. Somehow, it's true in a sense. We all know that [the number of] caesarean section is too high in Bangladesh. But especially in the Sylhet region we are economically solvent, so the caesarean section rate is too high."

—Resident Medical Officer 1, no midwives

The Background and Context also highlighted that there are gaps in rural hospitals providing initial stabilization of obstetric emergencies. Providers stated a variety of reasons for this, including the eventual need to refer the patient and the potential for hostility from patients' families, particularly if there is a death.

In about half of the facilities with no midwives, the maternity staff clearly said that they do not manage emergency cases. The other half described managing emergency cases, however, after more probing, admitted that they do not. All talked about doctors as opposed to nurses as managing emergency cases. Some nurses said that they provide initial treatment, but most stated that if the situation is critical, they only refer women to another (higher level) hospital. The following statements express the major sentiments, which is that they know what they should do, and sometimes they do it, but frequently they do not:

"If any patient comes from home with a PPH or if a patient we deliver faces a PPH, we give primary management; if they come with eclampsia, we just refer the patients."

—Hospital Manager 1, no midwives

“Firstly, we receive her, then doctor visits her and primarily suggests saline to stop bleeding, but most of the time we don’t accept PPH patients; better we refer somewhere else.”

—Nursing Supervisor 1, no midwives

The reasons behind providers referring without stabilizing or providing initial treatment include being concerned about patients dying (and thus angering the community), looking bad in reports to authorities, and not feeling adequately equipped with the resources to provide the needed care.

5.2.2 Midwives

Two focus groups and five interviews were conducted. Themes included caring for the poor, improved care quality and availability, including antenatal care, and emergencies. New themes related to experiences associated with the midwives emerged.

Summary of themes in hospitals with midwives:

They have seen some improvement in quality since the midwives joined; however, non-midwife maternity staff and managers are hesitant to let midwives move into autonomous roles.

Midwives feel capable, and have made some strides, but feel resistance moving into autonomous midwifery roles from the nurses and managers.

5.2.2.1 Experiences and perceptions of midwives and transitioning to evidence-based care from non-midwives

The feelings expressed about midwives were mixed. Resistance to midwives as autonomous care givers and affirmations of midwives' contributions were both expressed. Nurses and managers talked about competition between nurses and midwives, nurses' difficulties in accepting the midwives, and concerns about midwives' capacity. Managers spoke of nurses' competition with the midwives and nurses feeling that the midwives were encroaching on their territory as part of the reason they express that midwives are not capable and thus unable to step fully into their roles. These concerns from a manager reflect the sentiments expressed by many:

“The nurses used to do the delivery care, but after the introduction of midwives, the nurses cannot accept the midwives. That’s why the nurses believe that the midwives are not capable regarding knowledge and skill.”

—Hospital Manager 1, midwives without mentors

Both doctors and nurses talked about inexperience and lack of expertise as a reason for restricting midwives' clinical autonomy. In some facilities, midwives only assisted nurses during births and were even assigned to general wards while nurses performed the births. Notably, in the area of obstetric emergencies, many expressed that they did not feel that the midwives were competent.

“They [the midwives] are practicing more like the nurses. The midwives not only work on the labour unit, but they also see the other patients. Sometimes the midwives manage wards, and the nurses are doing the delivery because of the limitations of midwives.”

—Doctor 1, midwives without mentoring

“Regarding PPH emergency, they are not capable to manage primary treatment. I think the deployed midwives have no sufficient skill, so in this case we usually refer patients to the tertiary hospital.”

—Hospital Manager 1, midwives without mentoring

In addition to sharing their concerns about midwives’ capacity to provide care, some maternity staff and managers expressed that they perceived that women feel uncomfortable with the midwives providing ANC, delivery, and emergency care. They specifically spoke about women wanting to be cared for by doctors and/or by more experienced nurses.

“The community wants emergency treatment from the doctors, not from the midwives. If they see that treatment is provided by the midwives, not from the doctor, they will lock the hospital.”

—Hospital Manager 1, midwives without mentoring

Contributing to the competition between nurses and midwives are the well documented but frequently unspoken under-the-table payments that are ubiquitous in delivery rooms in Bangladesh. Although staff and managers often resisted talking about this, or denied it, some

mentioned it in the context of nurses allowing midwives to practice autonomously. The below quotes from a hospital manager and a doctor shed light on the concern:

“Yes, I cannot mention that [tips in the delivery room] officially, but it happens; it is the motivation for nurses to want to perform the deliveries.”

—Doctor 1, midwives without mentoring

“The relationship [between midwives and nurses] is improving as time goes on. I think they [midwives] will be accepted. I think the controversy of this is that the midwifery service is the better idea, and they execute the service for free.”

—Hospital Manager 1, midwives without mentoring

Some nurses admitted to accepting money, for themselves or for their assistants, but they minimized the amounts, making it seem like it was trivial. For example:

“We get money only when the patient’s party feels satisfied and give us a tip, though it’s not more than 5 USD!”

—Nurses 2,3,5 midwives with mentors

In contrast, in some hospitals, maternity staff indicated that midwives were improving the quality of care and practicing independently. The maternity staff spoke specifically about interventions that midwives were capable of and motivated to perform, which were new additions to the care given in the hospital. These interventions included partograph use, companionship, delivery position options, skin-to-skin contact, post-partum management (including family planning),

breastfeeding, managing obstetric emergencies, and using recently introduced equipment for newborn resuscitation. A nursing supervisor reflected:

“[Since we have midwives] the necessary care has improved, third-stage management is approximately 100% now, the use of a newborn handheld suction device has also increased, previously there was no ANC, PNC corner, but now we have this.”

—Nursing Supervisor 1, midwives without mentor

In some facilities, there was talk about nurses supporting midwives as they develop their skills and then midwives building nurses’ knowledge around evidence-based maternity care practices. In one example, midwives conducted births, but nurses were close by if help was needed. There was also mention of clinical exchange in which midwives who were expert in certain clinical areas shared their knowledge with the nurses, while nurses shared their expertise in other areas with midwives.

“The nurses are spending more time as a nurse than the midwives; that’s why the midwives need to learn from the nurses, but the nurses learn partograph from the midwives.”

—Nursing Supervisor 1, midwives without mentor

The maternity staff in these hospitals made similar, though more positive, statements about the new quality care interventions as those in the hospitals without midwives did. Doctors and nurses spoke of needing more training, being comfortable with existing habits, having too much work pressure and not enough time to implement the needed changes, and patients’ families not

wanting the evidence-based care practices. However, they also talked about recent quality improvements, many of which were discussed in relation to the midwives bringing new expertise. Although they said that change requires both time and knowledge, and some talked about being open to trying new interventions but needing more training. One doctor expressed:

“The nurses are not well trained; even we (the doctors) are also doing supine. When we feel confident about other positions, then we give our opinion that what delivery will be executed in which position. We are also habituated with supine position.”

—ObGyn 1, midwives without mentors

Statements regarding skin-to-skin contact were also like those in facilities without midwives. Issues of not enough space and time as well as patients’ families wanting to hold and see the baby immediately were described as impediments to nurses allowing skin-to-skin for the recommended full hour.

Perspectives on managing obstetric and newborn emergencies within the two hospital types were also similar. However, some respondents talked about more expanded emergency services since the midwives’ arrival. Doctors talked about not wanting to take a chance that someone might die in their facility, in part because of anticipated retaliation from the community. Others talked about feeling unsupported in rural facilities as compared to tertiary facilities as influencing their decision to refer rather than admit and treat.

“The problem is the hospital. In the tertiary hospital when they manage this kind of patient, they work like a team. They can get any help from anyone; that’s why they feel

confident to do that [manage critical patients]. But in our facility, no one feels confident because they are not confident about what will be the consequence. They also feel concerned about what reaction the patient party will show.”

—Hospital Manager 1, midwives without mentors

5.2.2.2 Midwives on their service provision and experiences.

Midwives in non-mentored facilities spontaneously spoke about ensuring that services are available to the poor. They talked about reaching out to communities and assuring them that services would be offered without fees.

“We are introducing (ourselves) to the community, that we are midwives, and we will serve you for maternity care. We discuss with them about family planning and tell them that they don’t need money for these treatments, including delivery. Our nurses don’t discuss these with patients, but now we are providing ANC/PNC and doing counsel to the patients.”

—Midwife 1, midwives without mentors

As under-the-table payments are ubiquitous in Bangladesh, it is significant that midwives were attempting to change the system and care for the poor. This sentiment was also affirmed by the earlier quotation in which a doctor explained that the competition between nurses and midwives is at least in part fuelled by the midwives offering free services.

Midwives consistently indicated that they felt competent in their roles. When asked if they were comfortable providing midwifery care, midwives consistently said, “yes” and added that patients

appreciate them. Midwives spoke about women seeking them out for ANC services, even though officially the doctors were supposed to be providing this care:

“They [the patients] want us, and if they don’t see us, or we are not present, then they search for our phone number from the doctors. We give them much time and talk properly to them. That’s why they like us. Sisters [nurses] don’t give time to patients to treat because they work in general wards. We try to give our best service.”

—Midwife 6, midwives without mentoring

Midwives talked about the services they offer being higher quality than those offered by the nurses. They spontaneously described specific examples of how their care is different:

“Of course we do [ANC] different! They [nurses] don’t ensure about the palpation; it is only done by us. When the patients come for ANC treatment, we tell them to tell their neighbours to come to the ANC. If we see any dangerous signs, we tell them to come to us and alert about it. We also let other patients know what danger signs are so that they can be aware of these.”

—Midwife 4, midwives without mentoring

These quotations demonstrate that midwives see themselves as competent, and more knowledgeable than nurses, even in a context where they are junior and where nurses do not consistently acknowledge their expertise.

Midwives from non-mentored hospitals did talk about sometimes carrying on non-evidence-based routines such as delivery in the lithotomy position. However, they also expressed comfort with and use of the newer quality of care interventions. During the midwife focus groups, there was unanimous affirmation that midwives always perform delayed cord clamping and skin-to-skin contact for one hour, and they reported that the nurses they work with have changed their routines and have started using these interventions as well.

Midwives also talked about sometimes knowing the quality of care standard, but not carrying it out because more senior nurses were using different practices and, in that context, it was hard for midwives to initiate the needed change. One midwife shared:

“Since the beginning of this hospital, partograph is not maintained by the nurses, and we should have maintained partograph since we deployed here, but we didn’t. It was our fault!”

—Midwife 1, midwives without mentoring

Another example of midwives having challenges with shifting labour room routines and in achieving improved quality was in routine augmentation of labour, a commonly performed harmful intervention. Midwives reported that they see the nurses doing it, and they all agreed that it is not a good idea, and it is something they would like to change, but they have not been able to yet. They spoke of wishing they could have their own labour room separate from the nurses so they could make their own decisions. One midwife said:

“If we get our own separate labour room, we can do it differently. Women do not need deep injection routinely; we only use it for active management of 3rd stage.”

—Midwife 1, midwives without mentoring

When asked if they thought they could help the nurses change, the common affirmation was:

“Yes. It is possible, but it will take more time. We have to make them understand that it is wrong.”

—Midwife 3, midwives without mentoring

Midwives in all hospitals consistently talked about capability and desire to treat patients with emergencies. Midwives described concerns around not being allowed to treat emergencies but consistently stated that they want to:

“If the patient comes, we will surely treat them. We will try to manage at stabilization. I will not feel good if a patient is having bleeding and she is refused to receive. It will hurt me!”

—Midwife 1, midwives without mentoring

They also described their supervisors preventing them from treating emergencies. Several midwives echoed this sentiment, talking about feeling confident managing emergencies but at the same time being aware that their managers wished to avoid handling emergencies:

“I am confident about my ability to manage this [obstetric emergencies], but it may happen that my seniors are trying to avoid this.”

—Midwife 1, midwives without mentoring

Others talked about needing to be part of a team to confidently handle emergencies. They described feeling that treating emergencies without the support and encouragement of doctors puts them at risk if something goes wrong. Others mentioned that the nurse in charge is who decides what they will do, that they manage emergencies if she wants them to, but if she does not, then they cannot go against her. The midwives expressed frustration around being limited in their scope of practice as well as having a limited voice. They specifically pointed out that their managers and supervisors restrict their autonomy. For example, a midwife said:

“In order to develop maternity care, we need help. If you [the researcher] make the authority understand about our work instead of telling us it would help us for working as a midwife.

—Midwife 1, midwives without mentoring

What midwives shared was in many ways notably different from what the maternity staff and managers expressed in relation to the midwives’ capabilities. However, midwives did describe being aware of and concerned about attitudes towards their youth and relative inexperience.

One shared:

“Senior staff nurses stay with us because the community doesn’t rely on us because we are new. The nurses stand there and help us, but we do the delivery and do care of the newborn baby. We are small!”

—Midwives 1&2, midwives without mentors

When asked who tells them the community does not trust them, the response was:

“In maximum case didis [nurses] say that to us, but in some cases I also heard them [community members] saying that.”

—Midwife 1, midwives without mentors

Hierarchical social norms are deeply engrained in Bangladeshi society. As midwives are currently the most junior clinical staff, they often feel they cannot speak up. Midwives did not address this issue directly, but they did refer to it. When asked if they had told the authority that they were capable, one midwife responded:

“The authority should know that we are experts, but maybe the authority also doesn’t know about the capacity we have.”

—Midwife 2, midwives without mentors

5.2.3 Midwives with mentoring

Summary of themes in hospitals with midwives and mentors:

We are happy with the improved care the midwives have brought!

We feel proud!

Discussion of attitudes and perceptions about the mentorship programme added to the topics discussed in the previous sections. For reference, the background and roles of the mentors can be found in detail in section 1.7 Bangladesh maternity care profile.

Overall, in settings where mentoring was ongoing, midwives' contributions toward improved care quality and availability was recognized and affirmed, and all respondents expressed comfort with the new quality care interventions as well as standard emergency obstetric care. Respondents communicated a general sense that the availability and quality of care was improving.

5.2.3.1 Feelings about mentorship

The feelings expressed about mentorship were overwhelmingly positive from midwives, maternity staff, and managers. The managers explained that the mentors contributed toward establishing positive relationships between midwives and nurses. They described that this was accomplished by the mentors 1) facilitating communication between nurses and midwives, and 2) supporting the establishment of enabling environments for midwives and for improved quality care. In addition, the maternity staff spoke about how the mentors helped them stop carrying out harmful practices (such as overuse of certain medicines) and become more comfortable with new interventions for quality care. None of the respondents expressed discomfort associated with the mentors.

There was also conversation about midwives being mentored and then teaching the nurses.

There was agreement that the nurses welcomed this teaching. As explained by one manager:

“The mentors guided the midwives, and the midwives guide our sisters; mentors are here for updating the knowledge of our midwives, so I feel we need them.”

—Hospital Manager 1, midwives with mentors

Midwives spoke positively about the mentorship across interviews:

“It’s a very good program; we learn many things. Our new mentor observes our work and advise us what to improve. She communicates well and stays with us for longer period in the hospital.”

—Midwives 5, midwives with mentors

5.2.3.2 Experiences and perceptions regarding midwives and transitioning to evidence-based care: non-midwife maternity staff and managers.

The mentored sites were the only sites where nurses talked about caring for the poor, although even within these sites reference was made to some charges with the explanation that there are unpaid volunteers who need to be paid by the women:

“Maximum is free, although the maternity aids (non-clinical support staff), sitting here are not getting any salary of their service officially. So they are dependent on the tip given by the time of delivery. This is the only cost for patients.”

—Nurse 2, midwives with mentors

One doctor spoke at length regarding the challenges of caring for the poor. She explained that if they receive poor women and provide initial management, then it may be difficult to refer to hospitals that can provide higher-level care, as there is no free transport, and women have no money. As a result, the hospital could be forced to care for a woman whose acuity is more than what the care providers feel ready for. In addition, although the government does provide some medicines, stocks may be low, which means that women and their families may need to purchase.

If the woman is extremely poor, she may not be able to afford medicine. This causes stress for the health-care providers and a sense that it is better to refer. These statements reflected that thought was being put into the issues, and there was an openness to talk through them.

Where there was mentoring, there was less talk of tension between the existing nurse-doctor teams and the midwives and more talk of nurses and midwives coming to an understanding:

“Initially they [the midwives] had problems with the senior nurses; now it is better.”

— Hospital Manager 1, midwives with mentors

In addition, in these settings, more maternity staff talked about both themselves and the women appreciating the midwives. Staff also gave specific examples of the good care the midwives provided. A nurse shared:

“When women come, they appreciate the midwives. Even they say that the treatment is getting better day by day.”

—Nursing Attendant 1, midwives with mentors

A hospital manager shared:

“There is enormous improvement after employing midwives, like delivery position, regarding hydration, use of IV cannula. People are happy.”

—Hospital Manager 1, midwives with mentors

Maternity staff spoke about midwives providing quality care autonomously and how maternity wards now had the needed expert staff. The nurses talked about how the midwives had more

expertise and confidence than they do, as the midwives received more specialized education. Nurses gave examples of ways that the midwives had expanded services, including patient counselling and education, promoting vaginal births over caesarean section, and expressed that what the ANC midwives provide is “correct.” Nurses in the mentored hospitals were less concerned about the midwives’ youth but rather referred to them as being young but mature and “not inferior” in knowledge. Supervisors described feeling more relaxed about the care being given by midwives as opposed to nurses and expressed that midwives have more expertise. Nurses and managers also talked about the midwives motivating the nurses to make changes toward improved care quality. A nurse shared:

“Before the midwives joined the facility, we were not familiar with these techniques. When we saw these practicing in front of our eyes, then we felt motivated to do the proper service.”

—Nurse 2, midwives with mentors

The staff and managers at the mentored facilities were the most likely to state that they do manage obstetric emergencies and that that has changed for the better recently. There was still a mix of responses, and concern could still be heard in their voices, but there were many positive statements as represented in the comments below:

“Previously we didn’t take any actions for PPH cases, but recently we try to give primary care to stop bleeding or shock.”

—Hospital Manager 1, midwives with mentors

Most of the non-midwife maternity staff talked about midwives providing initial stabilization of emergencies and supporting doctors to ensure ongoing care. In addition, they talked about the nurses helping the midwives if needed,

“They are taken to the labour ward directly, and the midwives’ manage them; if they need help the nurses help them.”

—Nursing Supervisor 1, midwives with mentors

Other nurses indicated that the midwives have more skill and confidence in managing emergencies than they do. When asked if she was capable of resuscitating an asphyxiated newborn, a nurse stated that nurses are not comfortable with the new Ambu bag but that the midwives are:

“No, I don’t, the midwives do. I do mouth-to-mouth. The Ambu bag is very new, so I am not comfortable with it.”

—Nurse 1, midwives with mentors

In some cases though, nurses and managers described concerns about midwives managing emergencies. Concerns came from nurses and managers as well as from women. Examples are that nurses in one focus group talked about women lacking confidence in midwives’ ability to perform an emergency intervention for first trimester bleeding, and in another instance an obstetrician talked about midwives not being experienced enough to manage PPH and eclampsia yet. A manager reiterated that women want doctors to treat emergencies but expressed hope that that might change.

Maternity staff in mentored facilities were more likely to be comfortable and state they are doing new quality of care interventions. In addition, nurses spoke of respectful care, and doing what women want, but they also expressed concerns that women do not always want the new quality improvement changes. When asked about upright birth positioning, a nurse shared that they know that they are good, but sometimes older mothers do not want to do something new:

“This position is good for delivery; the mentor taught us all the position and its effects. We don’t feel any challenge of that, but if the woman doesn’t want to do her delivery in this position, then we change this. In maximum cases, new mothers accept what we tell her to do, but old[er] mothers are not easy to manage.”

—Nurse 1, midwives with mentors

As opposed to the feeling expressed in the no midwife group where nurses clearly conveyed that they were not comfortable with companionship, in the mentored group, the nurses explicitly talked about companionship helping women feel comfortable:

“As a patient feels comfortable having someone from her family, that’s why we also feel okay.”

—Nurse 2, midwives with mentors

Many maternity staff described the adoption of evidence-based practices including patient teaching, upright positions, use of partograph, avoiding routine use of oxytocin, delayed cord clamping, and skin-to-skin for one hour. When asked specifically about delayed cord clamping, all nurses the focus groups stated that they are doing this and that they find no challenges.

“We use oxytocin rarely now for routine inductions; we do skin-to-skin and delayed cord clamping. We tell the women to walk.”

—Nurse 6, midwives with mentors

As with newborn resuscitation, some nurses stated that only the midwives employed certain quality of care practices such as use of the partograph. In the focus group, all nurses stated that only midwives use partographs. When maternity staff were asked what has helped them make changes to more evidence-based care in their units, they described both the introduction of the new midwives and the importance of mentoring. One respondent shared:

“It was both the midwives and the mentors who made changes to the delivery position, and [appropriate use of] IV fluid for delivery, and increasing ANC.”

—Hospital Manager 1, midwives with mentors

5.2.3.3 Midwives on their own experiences

As mentioned above, midwives in mentored facilities gave priority to taking care of the poor. The below sentiment captures what was expressed by all in the midwife focus group.

“Most of the people who come to the facility are poor people. When we provide them secure hospital delivery without money, they feel motivated about the care.”

—Nurse 1, midwives with mentors

Midwives in hospitals with mentoring talked about relationships with other maternity staff and managers. In the hospitals that received mentoring, midwives consistently spoke about being supported saying,

“They [the nurses and managers] support us, we work as a team, everyone supports us.”

— Midwife 4, midwives with mentors

Indeed, midwives openly spoke about feeling supported in practicing to their full scope and being able to implement change, as they saw it was needed. The midwives explained that the nurses are supportive toward making changes and do not create problems.

Most midwives said that they worked only in the maternity area, although some midwives stated that they do work on the general ward but only to fill gaps, not as a routine. The midwives clearly stated that they were the ones to respond if there were needs on the maternity ward. While they indicated awareness that women coming for care sometimes think they are young and inexperienced, they demonstrated self-assurance in their ability to counsel women in a way that instills trust and confidence. Midwives specifically spoke about providing care in a way that makes women “feel happy.” When asked if they have the capacity to manage specific clinical situations, they consistently affirmed that they do, citing examples of managing evidence-based routine care as well as emergencies such as PPH, eclampsia, and newborn resuscitation. Although, like in the non-mentored group, some talked about needing the support of their managers:

“Since I deployed here, I never saw any patient with an emergency refused without any kind of primary check-up. If any patient comes to the emergency with post abortion

bleeding or other vaginal bleeding, they are instantly referred to us inside the hospital.

Midwives are having more skill in managing complications than what the nurses have."

— Midwife 1, midwives with mentors

Midwives from the mentored group spoke with the most confidence and affirmation regarding respectful evidence-based practice. They shared specific details of what they do both in the ANC and in the labour room setting. Midwives in the mentored hospitals unanimously described providing autonomous quality ANC and feeling capable, without challenges, and that women appreciated their work,

"At labour room, we demonstrate exercise, we talk about oral hydration, we demonstrate positions, we provide evidence-based practice, we use partograph, skin-to-skin contact, helping babies to breathe [newborn resuscitation]. PPH midwives are doing, GBV, counselling."

—Midwives 6 and 8, midwives with mentors

When asked what has helped them make changes, midwives spoke about implementing improved quality of care interventions based on learning about evidence-based care. They shared that they had learned from the mentors as well as from the internet. They also described being assertive and raising their voices to assure quality of care. This is notable due to the hierarchal setting within hospitals, where the new practices may not have been considered priorities by managers. One midwife described this, saying:

“When the partograph papers are used, we asked our in-charge for more, and then they give [them to] us again.”

— Midwife 2, midwives with mentors

In the context of Bangladesh, this type of proactive request is often an exception rather than the norm due to traditions that encourage respect and subservience toward superiors and authority figures.

Midwives also made references to doing *“what is best for the women,”* and women *“making their own choices.”* One explained:

“Women prefer upright positions because this position helps the mother to breathe well, and the baby can come out easily. We let the mother decide what position works better for her.”

—Midwives 7 and 10, midwives with mentors

When asked about routine episiotomy, a cut in the vagina that is needed when there is foetal distress, but often used routinely, which causes unnecessary tissue trauma, another midwife affirmed the importance of doing what women want, saying:

“Mothers don’t want episiotomy, so we only use when indicated for foetal distress.”

— Midwives 6, midwives with mentors

Like the maternity staff, midwives in the mentored hospitals talked about sometimes meeting resistance from nurses when trying to provide evidence-based care. The following quotation

refers to the routine use of oxytocin, which is known to increase the risk of asphyxia in newborns but is practiced routinely, as it can speed up labour:

“When families come to this facility with a pregnant woman, the first thing they want us to do is push the patient with IV channel. It’s very challenging to convince them. After observing the patient, we advise exercising of the women in labour, but sometimes they don’t allow (. ...) At first, we try to convince them. If that don’t work, we give them a plain saline for their mental satisfaction.”

—Midwife 4, midwives with mentors

5.2.4 Conclusion

The above findings from the three hospital types allowed for comparison and contrast. A progressive transition was observed in thoughts and feelings around improved care quality and toward the introduction of midwives, who were seen as a new human resource that could strengthen the health-care system and improve the provision of care. There were commonalities between all three hospital types, with hospitals with no midwives sharing some of the same interest in and comfort with new more evidence-based quality improvements as did those with midwives and mentoring. However, staff in hospitals without midwives also expressed more comfort with the older routines and a resistance, or feeling of less ability or capacity to change, than those with midwives did.

In hospitals without midwives, staff imagined that midwives would have the expertise to improve care quality, whereas some respondents in hospitals with midwives questioned their expertise.

It seemed that some underlying motivators within the system, including unofficial payments and hierarchical power structures, may have coloured the other maternity staff's feelings about the midwives.

Midwives in general were enthusiastic about their profession, knowledgeable, and, at least in their statements, already making changes, although they did talk about external limitations. In hospitals with mentoring, midwives spoke more confidently and were more definitive about being able to implement the needed care.

Managers and staff from all hospitals talked about improved quality in maternal health care in the last six months. The major difference was that, where there were midwives, and even more so with the addition of mentoring, midwives (and to some extent all maternity staff) spoke confidently regarding the details of what quality of care looks like. In contrast, maternity staff at hospitals without midwives were much less consistent in their understanding, confidence, and comfort.

In mentored hospitals, all maternity staff spoke about managing emergencies, though with some limitations. Alternatively, in the other systems, respondents described critical cases being referred, fear of community backlash, and midwives feeling that their ability to provide emergency care is limited by their managers.

5.3 Mixed-methods summary: Transitions toward improving quality

5.3.1 Midwives

In hospitals without midwives, about half of interview and focus group respondents expressed that midwives would be helpful. In hospitals where midwives were introduced, there was apparent controversy about whether they were capable of working independently. This was most notable in hospitals without mentoring. Almost all survey respondents from hospitals with midwives agreed that midwives were helpful.

5.3.2 ANC

In focus groups and interviews, ANC was consistently highlighted as important. Almost all survey participants affirmed the importance of a separate ANC room, and over 80% agreed it should be staffed by midwives. However, in hospitals without midwives, less than one-third of the facilities had a separate ANC room, and less than half spoke of using an ANC card. Even in hospital systems with midwives (but not mentorship), only one-third had a separate ANC room, only 25% of midwives worked in the ANC room, and just over half used an ANC card (which was not found to be significantly different from hospitals without midwives). With the addition of mentorship, all facilities had separate ANC rooms, all midwives worked in the ANC room, and 84% were using the ANC card. The midwives stated that they provide a higher quality of ANC than was previously offered, and that was acknowledged in some of the statements of the other maternity staff. As described by the health-care providers, and as reflected in the observed data, ANC services offered by midwives in mentored facilities came closest to meeting a global standard for quality. The midwives in these hospitals were capable of describing that they understood standard ANC and that it was lacking in services provided by the doctors as well as in the system that was in place before the midwives had arrived.

5.3.3 Inpatient maternity areas

Midwives and other maternity staff in mentored facilities were the most likely to express comfort with and use of evidence-based care interventions in the labour areas. The statements made by non-midwife maternity staff in both hospitals without midwives and hospitals with midwives but without mentoring reflect some awareness of, and openness to, potential change but also discomfort with new practices. Those without mentoring explicitly talk about wanting more training and clinical exposure.

5.3.4 Partograph

Almost all health-care providers expressed that partograph use is important; however, midwives were more likely than nurses and doctors to feel comfortable with and state that they used partographs. Partograph use across the three hospital types appeared as a continuum, with more use in hospitals with midwives. The mixed-effect regression model, without the Bonferroni adjustment, showed that it was significantly more likely in hospitals with mentorship compared with hospitals without midwives. Only one mention was made of partographs in hospitals without midwives, and that was that the nurses had been trained on their use but that more training was needed. Where midwives were introduced, there was much more talk of partograph use—both nurses and midwives spoke about their use by midwives. Some even spoke about midwives teaching nurses how to use them. Many fewer nurses than midwives though talked about partograph use, and many of these discussed it in the context of needing more training.

5.3.5 Companionship for labour and birth

Almost all survey respondents stated that companionship in labour was important, and in observations, nearly all women had companions. Despite this, some nurses expressed disdain for labour companions. In focus groups in hospitals without midwives, they described companions as difficult or demanding. In focus groups in hospitals with mentorship, they talked about companions interfering with their efforts to provide evidence-based care. Nurses also talked about the benefits of companions though, including that women want to have a companion and that they like to show the companion that they are treating the women well. In addition, nurses talked about the fact that midwives encourage women to have a companion.

5.3.6 Upright position for labour and birth

In hospitals with midwives and mentors, over 90% of respondents agreed that upright positioning for labour and birth is important. In the other two hospital types, 60% agreed. In the focus groups and interviews in hospitals without midwives, all talked about being comfortable and habituated with supine positioning (non-upright). In hospitals with midwives, however, nurses spoke about being open to other positions but needing training, whereas midwives consistently talked about being comfortable with and using upright positions. In mentored groups, this sentiment was more pronounced. Upright labour was more common than upright birth and both progressively increase across the midwives and midwives with mentorship hospital types. Using the mixed-effect regression model, upright birth was found to be significantly more likely in hospitals with mentorship compared with those without midwives, whereas upright labour was significantly

more likely in both hospital types with midwives. With the Bonferroni adjustment though, only upright labour was found to be significantly more likely to occur in mentored hospitals compared with those without midwives.

5.3.7 Delayed cord clamping

As with upright positions for labour and birth, in hospitals with midwives and mentoring, over 90% agreed that delayed cord clamping is important. In the other two hospital types, about 60% did, with those with midwives being more likely to strongly agree. In the focus groups and interviews, delayed cord clamping was only mentioned in hospitals with midwives. In hospitals with no mentoring, midwives affirmed that they all performed this intervention, but nurses did not talk about it. With mentoring, both nurses and midwives shared that they performed delayed cord clamping and felt comfortable doing so. The mixed-effect regression model with the Bonferroni adjustment showed that care providers in both hospital types with midwives were significantly more likely to practice delayed cord clamping than those without.

5.3.8 Skin-to-skin contact

Nearly all respondents agreed that skin-to-skin contact is important, and most said they could perform it. However, fewer did so in hospitals without midwives, whereas all midwives stated that they performed it. In the focus groups in hospitals without midwives, participants shared that they did not perform skin-to-skin contact, because it takes too much time, and they are too busy. This sentiment continues to be shared by nurses in hospitals with midwives, but less so—some explained that womens' families tend to not want it, while others stated they are

comfortable providing it. In hospitals with mentoring, all affirmed that it is a practice they employ. The mixed-effect model without the Bonferroni adjustment showed a significantly greater likelihood of skin-to-skin contact in both types of hospitals with midwives compared with hospitals without midwives. With the Bonferroni adjustment, the difference is no longer significant.

5.3.9 Active management of the third stage of labour

AMSTL was performed in over 90% of clinical observations across all hospital types. The survey had no questions on this topic, and it was not brought up in focus groups or interviews.

5.3.10 Emergency obstetric and newborn care

Only hospitals with midwives and mentorship had register books that tracked numbers of critical obstetric cases received from communities. Emergency room stocks of oxytocin and magnesium sulphate (for treating PPH and eclampsia, respectively, which are the top two leading causes of maternal death) were present in a higher proportion of hospitals without midwives (57%, 4 of 7 facilities), compared with hospitals with midwives. This revealed a gap in emergency room preparedness. In the delivery room, over 80% of all hospitals with midwives (10 out of 12) had oxytocin, whereas fewer hospitals (slightly over 70%, 5 of 7) without midwives did. The difference between availability of magnesium sulphate in mentored versus non-mentored hospitals is notable in that, for those without mentors, only one of the six (15%) had the medicine, whereas five of the six (85%) of those with mentoring had it in stock. This could be, as noted in the qualitative comments, that in facilities with midwives, women with signs of eclampsia were

transferred immediately from the emergency room to the delivery room, but only where there were mentors was the delivery room prepared for eclampsia management. That all hospital types had equivalently high levels of oxytocin in the delivery room is more indicative of it being used for routine labour augmentation than to respond in cases of PPH.

Timely treatment of obstetric emergencies in health facilities has significant gaps in Bangladesh (National Institute of Population Research and Training, Associates for Community and Population Research, et al., 2018). Midwives were introduced to fill these gaps; however, in most rural hospitals, midwives have not been able to fully move into this role.

Midwives in facilities with mentoring expressed more confidence than those in non-mentored facilities did, along with a feeling of being enabled to provide emergency care. To some extent, this may reflect that mentoring builds their skills. It may also reflect that mentoring has increased managers' willingness to care for women presenting with obstetric emergencies. Overall, the increased priority given to responding to obstetric emergencies likely encouraged midwives to fill gaps in this service provision.

5.3.11 Service utilization

Although the quality and availability of clinical care improved over the nine months following the deployment of midwives, and more so with mentoring, the numbers of births per month in facilities with midwives did not increase in any of the hospital types. It may be that facility catchment populations need more time to become aware of and accept improved care quality and that this needs to happen before service utilization substantially increases. Further, this

research suggests that due to the hierarchies between cadres and midwives' lower status, barriers to facility delivery such as under-the-table tipping and refusal to care for women with critical obstetric emergencies, service underutilization may continue even where midwives are placed. In line with this, research indicates an association between midwives' length of practice and increased service delivery for up to five years, as awareness and trust from the community takes time to develop (Mumtaz et al., 2015). This indicates that attaining the full benefits of a midwifery service may not be immediate and that a degree of delay should be considered when planning and evaluating midwives' impacts on the health system.

5.4 Reflections

The data show a continuum of increased acceptance and use of evidence-based practices across hospital types. Maternity staff in hospitals without midwives described discomfort and lack of familiarity with certain aspects of quality care, and observation data confirmed that their use of evidence-based interventions was relatively low, in fact lower than their self-reports. Meanwhile, staff in facilities with midwives and mentorship demonstrated the most comfort and familiarity and were much more likely to be observed providing quality care. Midwives described feeling capable and that they were providing good care, both with and without mentoring. However, without mentors, they were more likely to feel constrained, and observations revealed less implementation of quality interventions. At the same time, as is found in other research, even with mentoring, some desired changes were not accomplished. For example, delivery rates did not increase in any of the facility types, and gaps in facility readiness remained. In addition, some non-midwife maternity staff and managers continued to feel hesitant to transition to improved

quality and availability of care, particularly the management of emergencies. These findings reflect a system that is adapting to positive change with the introduction of midwives and mentoring.

Three major areas for which there was resistance to midwives moving into an expanded role were identified: 1) competition between nurses and midwives in the inpatient maternity wards, 2) doctors holding on to outpatient ANC services, and 3) midwives being allowed to move into the largely unfilled role of providing initial stabilizing to women with obstetric emergencies coming from the community. For the first and second, there were clear monetary disincentives, and for the third, a fear of culpability on the part of the managers seemed to demotivate them from supporting midwives in this critical lifesaving role. All of these exemplify underlying unforeseen motivators that interfered with systems making positive adaptations.

Equally notable was the spontaneously arising theme that midwives felt proud of providing maternity care to the poor and that in hospitals with midwives and mentoring, other maternity staff shared this sentiment, thus motivating a positive adaptation within the hospital system. As part of pre-service education, ICM-standard midwives receive messaging that their duty is to save lives and ensure basic rights to all. This research found that this influence seemed to have an impact, even after deployment. Midwives spoke passionately about how the service they provide is of a higher quality and has no cost to women and their families; they also described reaching out to let communities know this.

Competition between the existing nurses and doctors and the recently introduced midwives was predictable. The introduction of midwives disrupted a clear motivation of monetary incentives along with a role and identity of maternity provider for nurses and some managers. In addition, managers' fear of taking responsibility for critically ill women appeared to create resistance to actions needed for midwives to fully step into their roles and for change to be realized.

That said, the introduction of midwives alone did appear to facilitate positive adaptations, and mentoring built on this. Mentoring helped shift attitudes and perceptions within the existing systems. In the interviews and focus groups, both managers and maternity staff spoke of mentors helping to resolve conflicts between the midwives and other maternity staff. This helped create enabling environments for midwives and supported the transition to improved quality. Thus, if midwives have a champion who holds more power, can speak for their importance, and who can openly discuss the entrenched habits of poor care quality, it can be harder for the system to hold onto its old patterns. In this study, mentored midwives who had transitioned to improved care quality felt proud of what had previously been resisted. Importantly, mentors were able to help facilitate this transition in a way that felt acceptable to all.

6. Discussion

6.1 Overview

In this discussion, the findings of this research were reflected on in the context of the global literature and light was shed on the way forward. The research began with the researcher's interest in midwifery and maternal health. The researcher is a midwife working in global public health, living in Bangladesh when the study was carried out. Her work led to an interest in professional midwives' impact on provision of quality maternity care in LMICs, specifically Bangladesh. She was particularly interested because previous training of nurses and community health workers in midwifery in Bangladesh had been ineffective in improving care quality. This interest led the researcher to choose the aims and objectives for this research.

As this study used a team of young midwife research assistants to gather delivery room observations and collect survey data, it contributed toward a culture of midwives evaluating their own work. This in and of itself is an achievement. The broader aims of this research were also largely met, and the research question was answered. The achievements include that a positive association was found between midwives and improved quality and availability of maternity care, and mentorship strengthened this association. In addition, it was determined that non-midwife health care providers' attitudes and experiences regarding quality of care were positively associated with the introduction of midwives, and this association was stronger with mentoring. Another achievement was that remarkably, unlike previous providers of maternity care in

Bangladesh, midwives expressed feeling pride in providing free accessible quality care to the poorest women.

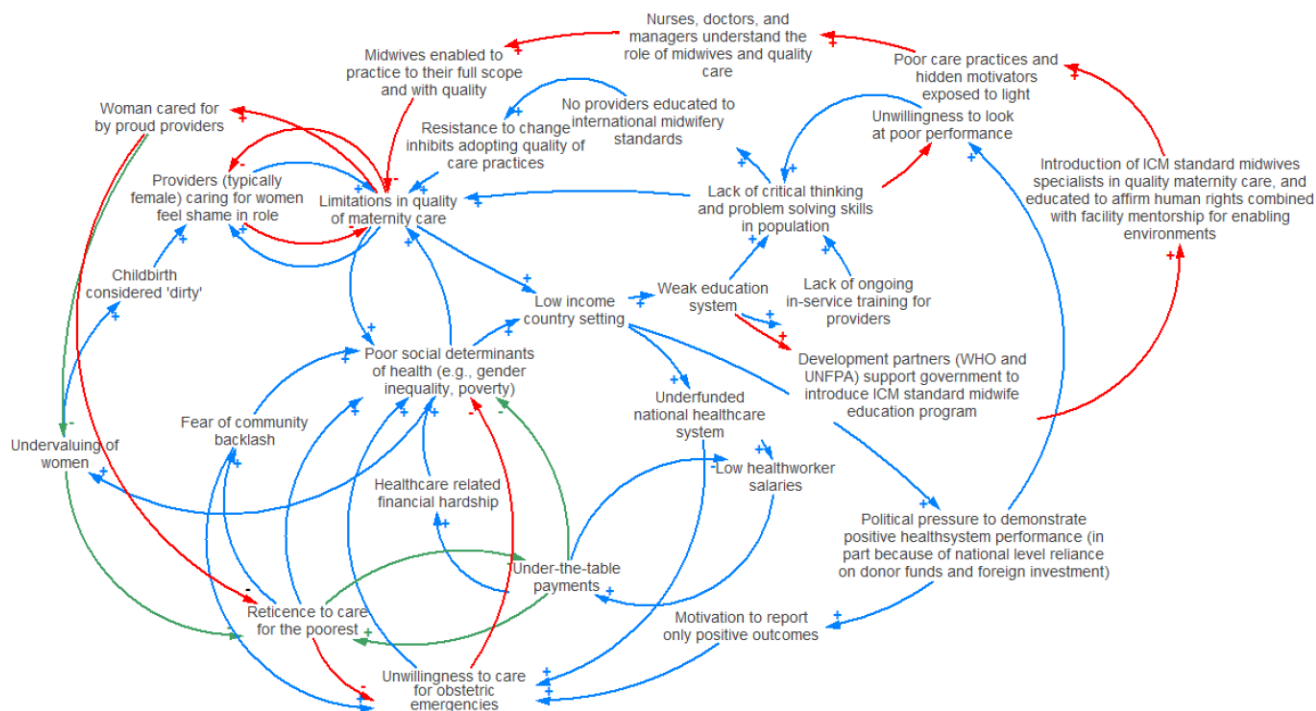
The loop diagram in Figure 10 below depicts the complexity of subtle relationships that led to both a sub-optimally functioning health system, and the system strengthening that resulted from the inherent adaptability of the system to the newly deployed midwives and mentoring. It displays in detail the interrelationships between key variables. Blue arrows depict the system prior to midwives' introduction. Some of the blue arrows are based on the findings from this research from hospitals with no midwives, and others reflect existing literature. Red arrows depict both intended systems adaptations that did make positive change, as well as some adaptations that were not intended but noted after the midwives' deployment. Green arrows reflect a prediction for the potential of midwives given existing literature and the indications surfaced through this research.

Figure 10 Maternity care system and influence of ICM-standard midwives

Blue arrows = System prior to midwives' introduction

Red arrows = Intended and unintended systems adaptations following midwives' introduction

Green arrows = Predicted potential of midwives based on literature and this research



This figure depicts the dynamic interactions between the health system variables relevant to this study depicted in Figure 5 (Hospital maternity care system with health systems components) and Figure 6 (Programme Theory). The diagram is read starting at the centre with poor social determinants of health. Arrow directionality indicates influence: + signs indicate reinforcing loops while – signs are balancing. Blue arrows delineate cycles that tie together and perpetuate sub-optimal functioning. These factors include Bangladesh LMICs having underfunded health systems, low staff salaries, demotivation to care for the poorest, tipping, and high community financial burden contributing to poor social determinants of health. Red arrows depict observed

adaptions and green arrows are potential adaptions that this study's findings point toward as well as areas for future research. The introduction of midwives and mentoring brought needed improvements, enabled midwives, improved quality, facilitated midwives to feel pride in their work, and potentially empowered women, reduced financial burden, and contributed toward improving social determinants of health.

The discussion is organized into the following sections, all of which elaborate on the above diagram:

- 1)** Barriers to available quality maternity care – stigma, power dynamics, perceptions of midwives' competence causing limitations in performing their official role/scope, under-the-table fees/corruption.
- 2)** Responding to obstetric emergencies – A desire for zero case fatalities, fear of repercussions from community, impact on national MMR, notable gaps in the literature, midwives' competence and willingness, impacts of international standard education.
- 3)** System dysfunction and mentorship – Sub-optimization; facilitation of better understanding of midwives' competencies, scope of practice and intended role; midwives' shifting roles from helpers to lead providers; and improved quality, including response to obstetric emergencies.
- 4)** Values and respectful care – Midwives' pride in quality maternity care provision for the poor conveying inherent value for women's life, good health, and experience.

- 5) Reflections – The impact on human rights, the contribution to systems thinking, and research methodology.
- 6) A new approach – Suggestions for programs, practice and research.

6.2 Barriers to available quality maternity care

We know that service provision without quality will not save lives or uphold rights (World Health Organization, 2016b). As depicted in the loop diagram, resistance to implementation of quality care was apparent. The literature heralds midwives as promoters of quality care. However, nine months into their deployment, resistance to quality of care improvements continued.

Resistance to changes in healthcare delivery is driven by stakeholders benefitting from the existing systems (Alenchery et al., 2018; Meadows, 2008). It is motivated by fear of losing autonomy, old habits, perceived increased workload, and patient demand for outdated practices (Mittman et al., 1992). These motivators revealed themselves in that nurses and managers described comfort with, and that women asked for, older clinical practices. An example was that nurses preferred transferring babies to other family members instead of ensuring one hour of skin-to-skin contact with mothers. Nurses also believed that quality practices take time to implement.

In recent years, there has been increased focus on implementation. Identified facilitators include providers' knowledge, skills, beliefs, motivations, and goals (Michie et al., 2005). ICM-standard education prepares midwives with the needed knowledge, skills, and motivation for quality maternity care for all. Yet, this research highlights that resistance to change among more senior

non-midwife maternity care providers remained after the introduction of the midwives. Competition between doctors, nurses, and midwives is known historically and cross-culturally, including limitations on scope of practice (Turkmani et al., 2013). As health care became more regulated, and different cadres were professionalized, there was inevitable overlap in scope that led to power dynamics and friction (Ayala et al., 2015).

As occurred in many societies, Bangladeshi doctors and nurses usurped traditional midwives as the first professional maternity care providers typically for the affluent. In contemporary Bangladesh, as in many LMICs, traditional midwives attend most births for women in the lowest socio-economic quintiles. Often from an educated, elite background, doctors and nurses have been seen as the better alternative to lower class traditional midwives. An example of this stigma from the United States and Europe is that language in obstetric textbooks has ridiculed non-professional midwives (Smith & Condit, 2000).

With the elevation of the midwifery profession, often in parallel with the empowerment of women, a competitive class and gendered hierarchical dynamic emerged. Stigma toward midwives remains—in some settings, midwives are perceived as threatening to power structures, as they tend to be autonomous advocates for women, as opposed to serving the medical hierarchy (Benoit et al., 2010; Fahy, 2007; Turkmani et al., 2013). We see these overtones in this research where the more junior midwives enter a system that has been dominated by nurses and doctors. Many expect midwives to assume a role of helper rather than change agents and leaders of quality respectful care. Although in this research midwives largely moved into autonomous roles improving services, they faced resistance from the health system they entered. This

resistance included competition and undervaluing from nurses, doctors, and managers, as well as scepticism from women regarding midwives' competence as lead maternity care providers.

Competition between nurses, doctors and midwives is likely exacerbated by the hidden under-the-table tipping found in this and other research, a factor that can cause providers to vie for births, which offer a tipping opportunity. The literature delineates how under-the-table fees cause financial burden, poorer care quality, and less patient satisfaction. In the context of healthcare systems, corruption plays a hidden influence. Tipping shifts motivation from upholding a goal of quality to one of self-interest (Habibov, 2016; Naher et al., 2020; Witter et al., 2013). This encourages those with the most power, rather than the most expertise, to attend births.

6.3 Responding to obstetric emergencies

In addition to competition with the nurses for births, this research demonstrates that most non-mentored midwives faced resistance from managers and senior maternity staff to their treating obstetric emergencies. The identified reasons were that managers did not want responsibility for potential deaths. The concerns included not having the needed lifesaving commodities, 24/7 services, high-level professionals, midwife capability, and referral systems. As a result, fear of community backlash for deaths, as well as having to report an undesirably high case fatality rate, led to care refusal.

Perceptions of midwives' emergency management capabilities differed across hospital types. Midwives without mentoring shared that they felt capable of and willing to respond to obstetric

emergencies but feared repercussions from managers. In contrast, where mentors supported enabling environments for midwives, maternity staff and managers spoke with confidence about midwives' abilities. It may be that expressed concerns regarding midwives' capabilities were in part a manifestation of the managers' larger resistance to treating emergencies.

Apart from one case study by Afrin et al. (2015), there was no precedent found in the literature for the refusal to treat obstetric emergencies or actions to prevent midwives from providing emergency care. That said, there is documentation of gaps in quality treatment—including the needed human resources and lifesaving commodities—and there is research that highlights that women being transferred from lower to higher-level facilities have sometimes not received initial treatment per standard care recommendations. This supports that this is likely not an isolated finding (Afrin et al., 2015; Alwy Al-Beity et al., 2020; Owolabi et al., 2020). Further research could refine this understanding.

As opposed to what is found in this research, the current literature reflects an implicit assumption that if midwives are made available, emergencies will be addressed (Beek et al., 2019). Indeed, in situations where interdisciplinary teams function well, midwives provide initial emergency care knowing they have full support of the medical team. However, this research demonstrates that, in situations where doctors are reticent to provide emergency obstetric care, midwives can feel unable to act independently, but mentorship can provide the needed enabling environment.

6.4 System dysfunction and mentorship

In using a systems thinking lens to evaluate the impact of the introduction of midwives and mentoring, important relational dynamics were found. Sub-optimal reinforcing feedback loops born from poor social determinants of health drove under-the-table tipping and reticence to care for critical obstetric cases (Figure 10). Under-the-table tipping and hesitance to care for critical cases are politically sensitive, hidden drivers motivated by self-interest that limited midwives' scope of practice, and fuelled resistance to improving care.

As discussed in the systems thinking literature, the relationships between system components constitute sub-systems with bounded rationality. Meadows (2018) asserts that certain sub-systems may cause sub-optimization and domination by less altruistic goals that constrain larger system goals. Sub-systems such as tipping and reticence to care for emergency cases, can thus become dominant influencers within the overall system. This research reflects this concept in that self-interest, fear, and a desire to receive positive feedback from authorities undermined the larger goal of improved maternity care.

Systems thinking literature suggests that it is important to bring identified problems to light through stakeholder discussions (Meadows, 2018). In this research, midwives identified the problem, and started the conversations with relevant healthcare providers and managers. This improved awareness and communication, but some motivators seemed recalcitrant, such as under-the-table payments and emergency care refusal.

Sensitivity to exposing entrenched hidden patterns of poor-quality was not found in the broader healthcare literature. However, the literature highlights non-intuitive and non-linear motivators. Hidden sensitive motivators may not be anticipated by outsiders and thus may be difficult to identify. It could be that actions motivated by hidden motivators are seen as counter intuitive or non-linear, when in fact they are predictable if the motivators are understood. This research brings out the possibility that counter intuitive action may be generated from hidden, unspeakable (as opposed to counter-intuitive or non-linear) motivators.

Mentorship is mentioned in the LMIC literature as an effective method for improving implementation. This research confirms this finding as mentored facilities provided better quality than those with only midwives (Wallen et al., 2010). The impact of mentorship could be the result of capacity building. However, it is likely that discussing problems with managers and other maternity staff was important. Perhaps because the mentors were doctors, thus from an elevated profession in the medical hierarchy, their status allowed them to address the resistance and begin to override some of the more hidden motivators.

This research describes that in addition to facilitating a shift toward quality, mentoring helped the nurses accept the midwives, see their capacity, and give them autonomy. These findings thus suggest that mentorship for new midwives is an example of applying a systems thinking approach. By intentionally creating champions for the new less powerful cadre, the resistance within the system was softened and positive change was facilitated.

The involvement of stakeholders, sometimes referred to as system networks, ensures that all stakeholders in the tightly linked networks of complex adaptive systems have a voice (Meadows, 2008). As mentioned above, one of the benefits of mentoring found in this research was the facilitation of a relationship between maternity stakeholders. Because the mentors involved everyone in their efforts to support midwives, the maternity care systems within the hospitals more fully adapted to accepting midwives as lead care providers.

This need for all stakeholders to be involved highlights the importance of mentoring the facility as opposed to mentoring any one component of the system, in this case midwives. The importance of a unified message as well as assuring all concerns were heard, was likely one of the reasons why mentoring was effective. To use skin-to-skin contact again as an example, it is important that midwives have the expertise to implement it, but it is equally important to address nurses' concerns regarding having adequate time to implement it.

6.5 Pride, quality, and equitable care

The findings surfaced an unexpected sense of pride among the midwives. Literature from high-income countries demonstrates that where midwives have been enabled to practice their full scope, their pride has improved, and so has care quality (Muthuri et al., 2020). This has been found even in stressful work environments (Menke et al., 2014). This study corroborates this association in a low-income country setting. Pride among the midwives was especially notable given that childbirth had historically been seen in Bangladesh as a dirty task performed by the lowest level providers.

There is another layer that is important to look at. While pride can reinforce providers' motivation toward quality care provision, the experience of quality, respectful maternity care may contribute toward an elevated sense of self-worth among women—both midwives in their roles as providers and women as maternity patients (Melo et al., 2017; Walsh & Devane, 2012). It is well-known that individuals and communities internalize the values and attitudes of the people in their environment (David & Derthick, 2013; Zurbriggen, 2013). The concept of internalized oppression describes the idea that humans inevitably internalize others' views toward them (Williams, 2012). This concept has been highlighted as related to class, race and gender in philosophical discourse by Hegel, Sartre, and Fanon (Hudis, 2015). With regard to maternity care, this may mean that if a woman is treated as if she is dirty, her life is not worth saving, or she does not deserve respect, she may internalize this message, as will her family, community, and her health care providers. On the other hand, a care giver's pride in their work, and provision of respectful quality care, may have the potential to affirm women's value and shift internalized messaging of women from dirty to valuable (Walsh & Devane, 2012). These linkages may extend beyond the individual and influence societal shifts as well. The social science concept of the butterfly effect describes that small changes can sometimes have larger-scale consequences (Braithwaite et al., 2017). In this case, this shift may not only impact women, but also their families, the larger community, the healthcare system, and even society more broadly. For instance, if healthcare systems view women as dirty, stigmatize their care, or refuse care during emergencies, they then contribute toward not only women viewing themselves as undeserving of quality care, but their families and communities, providers, and society itself carrying this view

as well. However, with respectful care from a proud provider, a woman who had previously been considered dirty, and likely internalized this, can experience improved self-worth, and be considered with higher regard by her family and community.

Investing in professional midwives is a commitment to quality maternity care while employing lesser-educated providers risks compromise. Included in quality care is upholding rights of the most vulnerable. It may be that education coupled with an enabling work environment has the potential to instil passion/pride. Perhaps because these midwives were adequately educated and enabled, they felt more pride than lesser-educated providers. While this does not prove that adhering to a global standard of midwifery education improves maternal healthcare rights, it does give strength to the contention.

6.6 Reflections

Tolerance for less than a basic quality of maternity care appeared as complacency to the existing systems in this study. When those who oversee maternal health programs do not prioritize the importance of global standards of education for birth attendants and/or the needed interventions to ensure enabling environments, this inaction becomes part of the complacency toward women's rights violations. This constitutes a message to women and communities that women are not valuable and is a missed opportunity for rights upholding empowerment. In Fanon's work, internalized oppression is seen as something that liberals and left thinking affluent people may perpetuate. In the example of this research, there is a complacency within the Government, and among development partners, that such treatment of women is an inevitability

in LMICs, as opposed to an unacceptable violation. The complacency among these institutions, and the individuals within them, with less than quality care, and the lack of care provision for women with obstetric emergencies, could be an example of the theories expounded by Fanon and others (Fanon, 1961; Hudis, 2015).

When an investment is made toward ensuring quality care delivered by proud healthcare providers, a statement is made that women are worthy of that investment. When this is initiated from within a healthcare system, it sends a message of women's worth (Curtin et al., 2019; Walsh & Devane, 2012). Doing so has the potential to overturn the mistreatment and neglect that is present in maternity care settings and perhaps even ultimately strengthen women and the societies they live in.

Empowering women may be an unintentional outcome of strengthening the quality of maternal health care, where the web of connections innate to complex systems can potentially facilitate a powerful positive adaptation. Bangladesh's public healthcare system, and the individual hospitals within it, reflect the broader society's deeply ingrained undervaluing of women, in particular poor women. Complex systems, however, are adaptive. The influence of mentorship facilitated a health system adaptation where midwives appeared to improve care availability and quality. In addition, though unanticipated, another change was also identified—the existence of pride and altruism in providing affordable quality care to poor women. This pride will likely create a feedback loop within the hospital system that will continue to strengthen quality and empower the midwives and the women they care for.

Assuring free health care to the poorest will not only save lives and uphold rights, but has the potential to improve the financial status of the lowest socioeconomic quintiles who too frequently must take on debilitating debt to receive lifesaving obstetric care (McIntyre et al., 2006). With their stated commitment to ensuring care for the poorest, midwives have the potential to make a positive impact particularly in contexts where their worth is valued through earnings as well as enabling environments. In a context where the burden of healthcare related poverty is high, the midwives appear to have started to shift the system toward more equity for the most marginalized.

The literature also highlights the importance of field work and direct observations of clinical care (Ampt et al., 2007). This research finds that to determine implementation levels, observation as opposed to reports from staff and managers, proved to be more accurate. Although observation is seen in the literature, researchers in LMICs more commonly rely on provider and manager reports. This research found that self-reports from doctors and nurses yielded exaggerated outcomes in the direction of the desired response. Although survey responses and observations tended to correlate, most respondents overstated their implementation of evidence-based practices. As a result, survey responses were largely homogeneous, which prohibited significance testing for differences across hospital types. On the contrary, significant differences between hospital types were found in the observation data. While the purpose of this research was not to compare data collection methods, it is important to note the disparity in results found across the two methods.

Tied to this, and related to observation, are concerns around hidden challenges such as under-the-table fees, and patient care refusal. Given that key motivators in systems often remain hidden, the importance of being in the field observing is further supported. When observations are made, and the issues of concern are visible, people are more likely to speak candidly.

6.7 Limitations

Although most of the goals of the research were achieved, there were limitations. The limitations of this study included insufficient information on the management of obstetric emergencies, short duration of interviews and focus groups, possible loss of subtleties in the translation process, a large amount of data, and that the findings reflect only one type of hospital in a single country. Furthermore, differences between hospital types could have influenced results and the small number of hospitals within each hospital type resulted in a loss of power in the mixed-effect regression models.

Though it was possible to observe a large number of routine births, emergencies were rare, and it was not possible to observe emergencies in large enough numbers to collect meaningful data. To compound this problem, health facilities did not keep good records of obstetric emergencies coming from the community as many were transferred before admission. This meant that our understanding of whether midwives impacted care of women with obstetric emergencies was limited to statements made by the midwives, maternity staff and managers.

Focus group discussions and interviews were conducted with health care providers and managers during work hours, as holding them after office hours did not seem to be an option. Many lived far away and valued time off due to long working hours and facilities being understaffed. As a result, discussions were short in length with focus groups averaging 36 minutes (standard

deviation 5 minutes) and interviews averaging 20 minutes (standard deviation 10 minutes). An attempt by the researcher was made to engage participants longer than this as interview length is recommended up to 90 minutes to ensure a full understanding of emotions (Seidman, 1991). However, although there was initial interest, most became distracted by work issues. In spite of this, it was felt that the understandings gleaned were valuable, although a certain depth may have been lost.

There were language barriers that needed attention as focus group and interview participants all had adequate understanding of written English to have passed university courses, but English was not their native language, and for many not a language that they were conversant in. As noted, attempts were made to ensure understanding through written translations for the survey and translators. However, the translators themselves did not have perfect English and at times conversations were ongoing in both English and Bangla and subtleties could have been lost in translation. In addition, the expertise of the translators, although professionals, was not fully known as educational systems are weak in Bangladesh. As medical translators were unavailable, and the translators who supported this research were general translators, at times they did not understand certain medical terminology. This could have interfered with both the questioning and the responses. Furthermore, translation requires a depth of knowledge of both language and the topic being discussed to be high quality. Subtleties in language can be lost to a translator that is not completely fluent in both languages or does not fully understand the content (Temple & Young, 2004).

There was a lot of data which at times was difficult to organize. A large amount of qualitative data was gathered which then needed to be understood and organized through the eyes of the different facility levels and provider types. This meant that for each theme there were five different lenses of interest. For some of the themes, participants did not speak on the topic, but

even their silence could be notable such as how without midwives there was little mention of caring for the poor. The presentation was restructured a number of times to facilitate organization of data. A conscious attempt was made to not have the structure dictate the interpretations but rather let the themes emerge. However, as there was a predetermined intention to compare and contrast different groups, as well as examine the quantitative data with the qualitative data, there was a risk of missing understandings that did not make sense in this structure. Specific focus was given to data that were different than what would be expected such as a midwife feeling uncomfortable with quality of care, or nurses praising it.

In addition, this research is from one LMIC country context, and one level of rural health facility within that country. Although there are many similarities found between low-resource countries, there are contextual differences. What was found in rural sub-district hospitals of Bangladesh with midwives educated in the Bangladesh midwifery educational system may differ widely from other contexts. Rural midwives may also perform differently than urban midwives, or midwives in the most remote settings.

The sample was relatively small—19 health facilities out of the 417 in the country can be indicative but not conclusive. The limited number of hospitals within each hospital type also likely interfered with finding statistical significance for the more advanced regression tests. Further, a significant portion of the data that was gathered was too homogeneous to perform significance tests. As a result, both the facility readiness tool and the survey were reported descriptively. Yet, while the homogenous data provided indications, they also validated concerns about people not being candid, as observations told a different story than what was reported.

There are three additional potential limitations to point out. First, though the survey tool was piloted, it was not scientifically validated after being adapted for this study. It could be beneficial

to do this in the future to enable its use in other maternity care settings. In addition, though all the hospitals were government standard rural sub-district hospitals that have a uniform template in terms of location in relationship to urban centres, infrastructure, and human resources, there were inevitable differences between the institutions including how busy the hospitals were. These differences could have had some impact on the variables of interest. Finally, some aspects of the health systems building blocks that are needed to support enabling environments for midwives and quality maternity care were not looked at in depth. For instance, the higher levels of governance, as well as the importance of information systems for accountability among other things were not touched on, and further research could aid in their understanding.

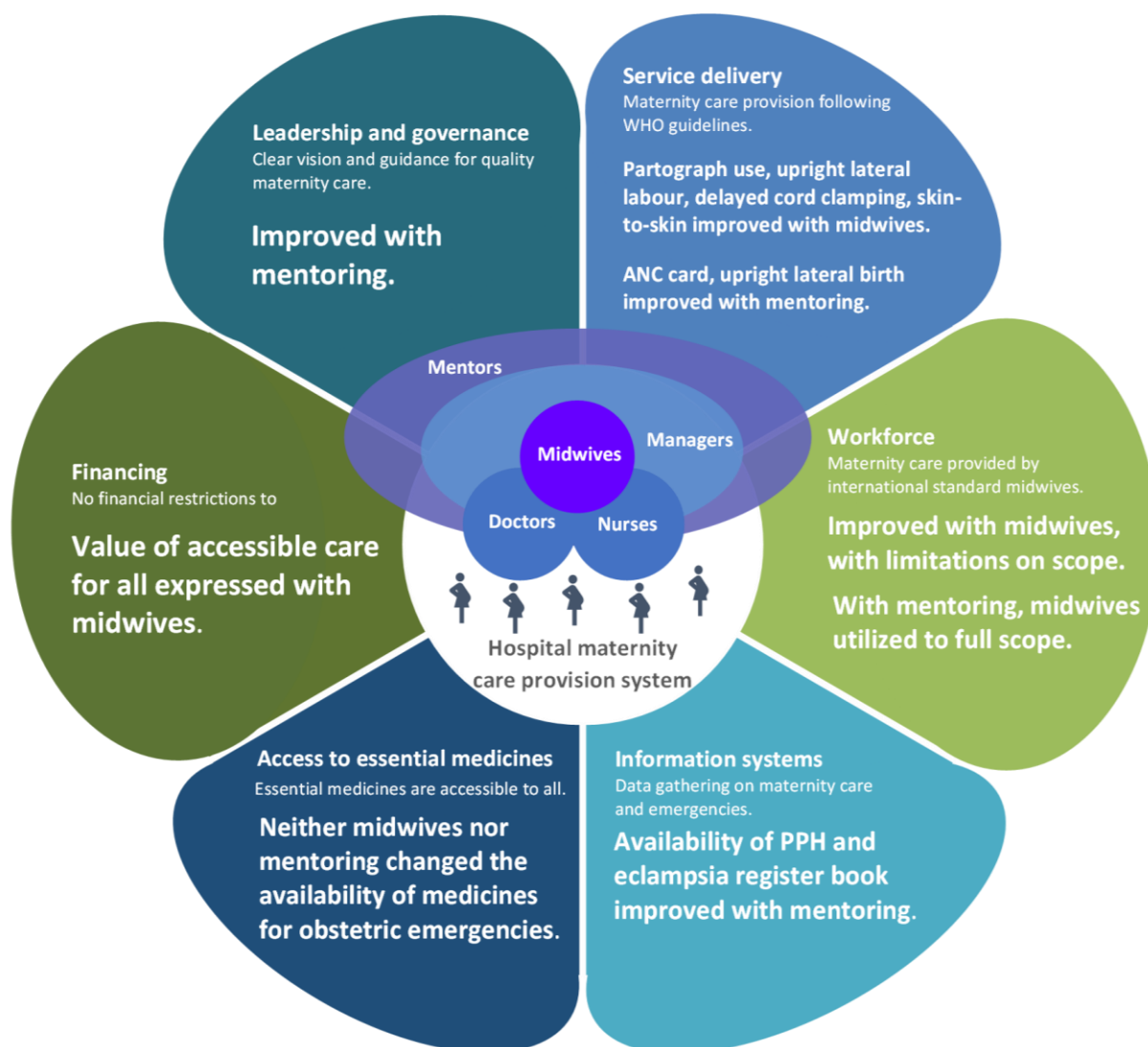
6.8 A new approach

Despite its exclusive focus on Bangladesh, that this study was conducted in a real-world context (as opposed to being an experiment or a pilot) increases its applicability in other LMIC settings. Given this, the research intends to guide countries toward the goal of prioritization of women's lives, health and well-being, and affirm their value. It endeavours to shed light onto one more way that societies can move toward humanism, and away from insidious systemic habits that lead to internalized oppression of individuals related to class and gender. It strengthens the existing literature's findings that LMICs will benefit from the introduction of professional midwives. It also validates midwives' expertise in quality maternity care, and passion for the rights of women (Nove et al., 2020).

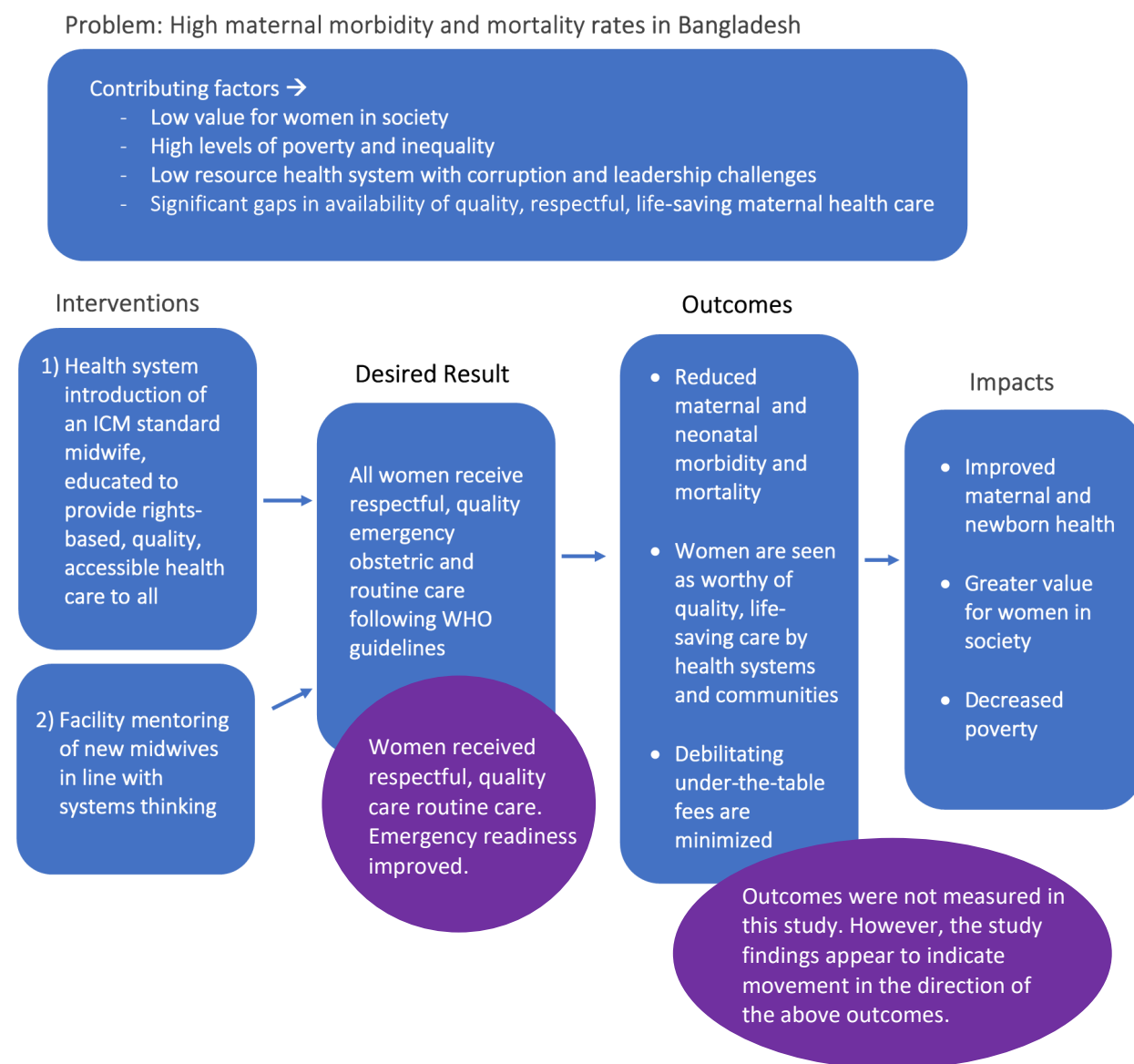
In addition, as depicted in Figure 10, this study has enhanced understanding of the alignment of variables related to midwifery-led maternity care and the health systems building blocks.

Specifically, the results support that nearly all of the health system building blocks were strengthened by the presence of professional midwives and some further, with mentors. Thus, the creation of enabling environments for a professional cadre of midwives may contribute to health system strengthening. Mentorship helped to align hospital managers' endorsement of care practices with those backed by evidence, thus strengthening the leadership and governance of maternity care at the hospital level. The quality of care provided in settings where midwives were employed was higher compared to facilities in which professional midwives were not employed, as indicated by increased partograph use, upright lateral labour, delayed cord clamping and skin-to-skin contact. Facilities that had midwives and mentors were found to have higher use of ANC cards and upright lateral births. In terms of workforce, midwifery-led care was stronger in facilities with midwives without mentors, though there were limitations in midwives' being able to work according to the full scope of midwifery. Settings with mentors were found to have midwives utilized to their full scope. Greater availability of PPH and eclampsia register books in settings with midwives and mentors supports a strengthened information system to track obstetric emergencies. Finally, facilities with midwives had more respondents expressing the value of accessible care for all, an indication of the role that international standard midwives may play in making maternity care more equitable.

Figure 11 Alignment of study findings with key health system components



The findings were also looked at against the study's programme theory and the programme theory was adapted accordingly (Figure 12).

Figure 12 Programme theory with adaptations based on study findings

The programme theory was found to have been relevant. A statistically significant association between the introduction of midwives and mentoring and the desired result of improved quality routine maternity care was found. In regard to the second desired result of improved quality of

emergency obstetric care, apart from facility readiness, this was not quantitatively measured. However, midwives' and other maternity staffs' statements about improved emergency care align with the programme theory's assumption that midwives and mentorship would lead to improved emergency care. While also not quantitatively measured, the assumptions that underlie the programme theory's outcome of minimized under-the-table fees align with the qualitative findings. The other two outcomes were not evaluated in this study. However, the association between improved care quality and improved morbidity and mortality rates is based on extensive research and is widely accepted. Although the midwives clearly described pride in providing quality maternity care to the poor, this only points to a potential for having a broader effect on women's self-worth, and how they are viewed by their families, communities and the broader society.

Given that this study contributes unique and relevant data to the field of maternity care in LMICs, its findings can be applied toward informing future policy and global action, including in education and research. For instance, there are a number of platforms, fora and global guidance frameworks including those led and created by WHO, UNFPA, UNICEF and the ICM that could specifically benefit from what this research found (Koblinsky et al., 2016). These opportunities are elaborated on in further detail in the subsequent sections.

6.8.1 Policy

Global policy and action plans make calls to improve maternal and newborn health. The five priority actions called on to achieve the Sustainable Development Goal 3 focus on maternal health care are:

1. Quality maternal health services that respond to local specificities of need and meet emerging challenges.
2. Prioritize quality maternal health services that respond to local specificities of need and meet emerging challenges.
3. Increase resilience and strength of health systems by optimising the health workforce and improving facility capability.
4. Guarantee sustainable financing for maternal–perinatal health.
5. Accelerate progress through evidence, advocacy, and accountability.

This study's findings support that ICM standard midwives can be a catalyst for these changes. Currently, quality is more critical to saving mothers and newborns than availability as poor quality contributes to over half of all maternal and neonatal deaths (Kruk & Pate, 2020). This study is one of the first to clearly find an association between midwives and quality in the maternity ward in an LMIC setting.

6.8.2 Education

The common assumption that quality education leads to quality implementation was upheld in this study, although with qualifiers (*Strengthening quality midwifery education for Universal Health Coverage 2030: framework for action*, 2019). Enabling environments after midwives' deployment were crucial. With weaker enabling environments (i.e., without mentors) midwives improved quality, but greater quality improvement occurred with mentorship. In addition, managing critical patients improved with mentorship, but substantial gaps remained. Thus, the fundamental premise that education alone can improve quality was found to only partially be true. Programs supporting midwifery education also need to include an emphasis on the context of deployment for greater impact.

6.8.3 Further research

This research makes it clear that midwives can be introduced into complex systems driven by hidden and unanticipated motivators, and precipitate positive adaptation. However, enabling environments and recognition of midwives' roles facilitates midwives to perform to their full potential. Although there was controversy regarding using doctors for mentors rather than midwives, as the midwifery profession was not yet established and all midwives were young new graduates, doctors carried the needed authority to engage with and obtain support from hospital managers, doctors and nurses. In addition, as mentorship focused on all stakeholders, rather than midwives alone, it could be argued that using mentors who are peers with the managers may have improved the outcomes. More research is needed to confirm this though.

While the frequency of mentoring visits varied in the broader literature, in this project, mentors visited the health facilities on average two times monthly. This frequency made an impact, but perhaps more visits would have improved effectiveness. Twice monthly visits fall in the middle of what was seen in the literature regarding frequency—some hospitals had more frequent (or one-to-one) mentorship, and others were as infrequent as bi-annually. The ideal frequency of mentorship visits would benefit from further research.

Several other research needs were made visible during this study. There is a need for more research on sensitive topics (e.g., refusal to provide emergency obstetric care) that can arguably be unseen drivers holding back progress. There is a likelihood that because of the sensitivity of exposing care refusal, constraints to treating emergencies could be more widespread than what is currently reflected in the literature. Rural health facilities in LMICs may not have everything

needed for managers to feel confident that the care provided will meet quality standards. As treating obstetric emergencies involves treating critically ill patients, more research is needed on this sensitive topic. From a systems thinking lens, more observational research is needed regarding whether the terms non-linear and non-intuitive may be euphemisms or misnomers for topics too sensitive to expose in political climates where governments are only willing to show success.

There were no direct questions addressing caring for the poor in the interviews and focus groups, and yet the topic emerged as an important theme. The conflicting statements regarding the desires of the community—one being that members of the communities surrounding the hospitals would reject non-doctor providers and refuse care, and the other being that poor people resist referral to higher facilities—begs deeper exploration. Research is also needed to better understand when surveys and questionnaires are effective for gathering accurate data, and when participants will give responses skewed toward desired responses.

For this research, midwives were not deployed as part of a project, rather as a government initiative, thus maximizing sustainability. Mentoring, however, was project-based and will not be sustained unless the Government or development partners choose to adopt it. In addition, although midwives were educated and deployed by the Government, there was project support for their pre-service education. Hospitals and midwives with project support performed better, yet even in the project sites gaps remained. More research is needed to refine the best, most cost-effective, sustainable methods for supporting the introduction of midwives and improved maternity care quality (Michel-Schuldt et al., 2020).

6.7 Conclusion

Bangladesh now has the experience of introducing professional midwives. Their successes and challenges can serve as examples to help guide countries as they move toward improved rights of women through improved maternity care. The midwifery profession in Bangladesh is a female profession, and those deployed by the government are caring for a sub-section of the world's poorest girls and women. Before the introduction of midwives, healthcare provision by women, particularly over the time of childbirth, was stigmatized as degrading and unclean. This research found that through introducing a midwifery profession, not only did quality and availability of care improve, giving care to women during childbirth transitioned from degrading, and for personal gain (i.e., tipping), to altruistic and an act of pride. This has the potential to improve the economy of the poorest. In addition, this positive adaptation in the healthcare system can lead to a greater valuing of women by individuals and communities. Health systems and communities who do not provide/have access to respectful maternal health care send a message that women do not have worth. Whereas provision of respectful quality care is an affirmation of women's inherent value in society. The ramifications of this affirmation could be far reaching. As health systems, communities, and women themselves internalize this clear message of their value, there is hope for the realization of women's rights and their ensuing empowerment. A fully functioning midwifery profession is an affirmation of women's worth and thus is an essential component of a prosperous nation.

7. Appendix

7.1 Literature search terms and Gough Tool

7.1.1 Key Concepts Shaping the Literature Review and Associated Search Terms

Key Concepts	Search Terms
Midwives/midwifery	Delivery, Obstetric; maternal health services; midwife* or midwiv*; maternal; skilled birth attendan*
Supervision/mentoring	Mentoring; mentors; mentor; supervis*
Care quality/care improvement	Quality of health care; quality improvement; care quality; outcome; quality improvement; healthcare

7.1.2 Gough tool for this review

Dimension	Description of review
A. Coherence and integrity	A generic non-review-specific judgment of the coherence and relevance on its own terms, using the generally accepted criteria for this type of evidence
B. Appropriateness for answering the question	A review-specific judgment about the fitness for purpose of the evidence for answering the question
C. Relevance and focus	A review-specific judgment about the relevance of the focus of the evidence for the question. This could include issues of propriety in how the research was conducted, which could impact on its inclusion and interpretation.
D. Overall assessment	The three above judgments are then combined to give an overall assessment.

Source: Gough (2007, p223)

7.2 Literature review table

Gough Score: high (H), medium (M), low (L) for coherence, appropriateness and relevance, and overall assessment.						
First Author Country Year Quality rank	Study Aim	Study methods & participants	Themes from Table 3	ICM-standard midwife	Mentoring	Key Findings
1. S. Tasnim Bangladesh 2011 HHH (H)	To evaluate the impact of the introduction of midwives on community uptake of facility-based services	Quasi-experimental community trial 10 health facilities assigned randomly to either intervention (midwives deployed) or controls using only doctors and nurses. Data was collected from the community members on healthcare uptake	Quality Health seeking Experiences	Yes		Description of midwifery education, and community mobilization. Deploying midwives to health facilities increased utilization of ANC, SBAs, and facility delivery
2. K. Jayanna Karnataka, India 2016 HHH (H)	To compare quality in government rural hospitals that have received mentoring and those that have not	Partial cluster randomized trial design with two arms, all receiving training and case sheets and one arm receiving mentoring. Pre- and post-intervention surveys, facility audits, case sheet reviews, and provider interviews.	Quality Policies Experiences	No: Maternity staff unspecified	X	Nurse mentor visits 1-2 days per month. Facilities that received mentoring were more likely to have appropriate drugs and supplies. The providers had better knowledge of how to respond to pregnancy and newborn-related complications, providers were more compliant with labour protocols, the cost of the intervention was just under 6 USD per delivery.

Gough Score: high (H), medium (M), low (L) for coherence, appropriateness and relevance, and overall assessment.						
First Author Country Year Quality rank	Study Aim	Study methods & participants	Themes from Table 3	ICM-standard midwife	Mentoring	Key Findings
3. W. Van Lerberghe Burkina Faso, Cambodia, Morocco, Indonesia 2014 MMM (M)	To evaluate the impact of deploying midwives/nurse midwives in selected low-resource countries that scaled up midwifery pre-service education and deployment as a core component of addressing maternal mortality	Literature review, MOH sources, and key informant interviews	Outcomes Policy Care quality Health seeking	No: Inclusion of all nurses and unspecified midwives		Deploying midwives as defined is central to the health system strengthening. Increases in SBA and facility birth in all socioeconomic quintiles. Improved maternal and neonatal mortality rates.
4. Singh Africa, Asia and Latin America/ Caribbean 2013 MHM (M)	To explore the impact of deploying skilled birth attendants on national neonatal mortality rates.	Recent demographic and health survey data was used to pull data from 9 countries in 3 regions and perform logistical regression analysis. Logistical regression controlled for data such as socio-economic status, age, parity, education, and region.	Outcomes	No: Inclusive of all SBAs as defined by WHO		There were mixed results. SBAs did protect in Latin America and the Caribbean. In Asia, they were not protective for the first day of life but were for the first week. In Africa, they were not protective.
5. Viera	This systematic review reviews literature on the impact of SBAs. The research includes deploying skilled birth	A systematic review	Policy Outcomes	No: But 4 studies are specific to midwives		Six studies were found to be relevant and of adequate quality. Of those, two were from Bangladesh, three from Indonesia, and one from Peru. Four of the studies looked at the

Gough Score: high (H), medium (M), low (L) for coherence, appropriateness and relevance, and overall assessment.						
First Author Country Year Quality rank	Study Aim	Study methods & participants	Themes from Table 3	ICM- standard midwife	Mentoring	Key Findings
Bangladesh, Indonesia, Peru 2012 HMM (M)	attendants, as well as other interventions such as financial incentives, in contexts where traditional birth attendants were the most common provider		Health seeking Quality	(not defined as ICM standard)		introduction of midwives. They found that putting midwives closer to the community did increase the use of SBAs, as well as increase caesarean section rates. In addition, there was an association between deploying skilled midwives and decreased maternal mortality in one study.
6. E. Speakman Afghanistan 2014 LHL (M)	This case study research describes the education and impact of deployment of community midwives in Afghanistan.	A review of the policies was triangulated with 8 in-depth interviews with stakeholders involved with maternal health and the introduction of midwives. In addition, national MMR and SBA rates were reported.	Policy Outcomes Quality Health seeking Experiences	No: 18-month training, midwives not ICM standard		Significant improvement in SBA and in maternal mortality since the introduction of the community midwives
7. Z. Mumtaz Pakistan 2014	This research is an evaluation of a programme that developed policy for deployment, and	Implementation research using an ethnographic approach. A review of policy and programs was conducted. Focus groups and interviews were	Policy Experiences Health seeking	No: Midwives not ICM standard		Gaps between national programme theory and realities on the ground. The importance of verifying assumptions made in programme theory to improve implementation.

Gough Score: high (H), medium (M), low (L) for coherence, appropriateness and relevance, and overall assessment.						
First Author Country Year Quality rank	Study Aim	Study methods & participants	Themes from Table 3	ICM-standard midwife	Mentoring	Key Findings
HHM (H)	deployed community midwives in Pakistan.	conducted with 20 policy makers and programme developers to gain understanding of the programme theory and with 38 Community Midwives (CMWs), 45 healthcare providers and 136 community members to gain an understanding of implementation.				Midwives were not motivated to perform their function, and the community was not receptive. No significant impact on skilled birth attendance or MMR.
8. S. Webster Indonesia 2013 LHL (L)	Report on the state of midwifery and maternal mortality and their relationship in Indonesia	A situational overview. Data is all population based.	Outcomes Policy Experiences Health seeking	Yes:		Midwives when deployed into public facilities were initially associated with declines in MMR, however, there was a problem with midwives leaving posts for private facilities which served more affluent population and thus more pay. The loss of the midwives led to increasing MMR. The ensuing rapid upscale of midwifery education had weak quality and MMR ceased to decline
9. G. Namazzi Uganda 2015 LLM (M)	To describe and evaluate a multi-intervention programme that included mentoring of maternity staff, the majority of whom were midwives.	This study describes changes to 20 health facilities after a mentoring intervention. Data were gathered by mentors and from	Quality Experiences	No: Midwives unspecified	X	National health worker mentors comprised of paediatrician, obstetrician, and a midwife carried out 4 visits per year. Increased facility delivery at mentored facilities

Gough Score: high (H), medium (M), low (L) for coherence, appropriateness and relevance, and overall assessment.						
First Author Country Year Quality rank	Study Aim	Study methods & participants	Themes from Table 3	ICM-standard midwife	Mentoring	Key Findings
		government health information systems.				Knowledge significantly improved in testing. Mentors reported that certain skills had improved in midwives. Healthcare providers including midwives reported increased confidence
10. Fischer A. Karnataka, India 2015 MLM (M)	Describes implementation and evaluates impact and challenges of a mentoring programme that was focused on improving maternity care in rural health facilities in India.	53 Full- time mentors, 385 rural health centres. 1 visit every 2 months. Data gathered through a qualitative inquiry on impact and experience through observations, focus groups and interviews with involved stakeholders. Stratified random pre and post assessments in selected districts with and without mentoring.	Quality Experiences	No: Maternity staff unspecified	X	National nurse mentor visits 1-2 days per month There were improved systems of care delivery put in place and healthcare providers reported better confidence and adherence to guidelines. Improvements in specific clinical care including: Active management of 3 rd stage Decreased inappropriate use of oxytocin. Improved immediate newborn care. Improved supply chain Better repair of equipment (These were not reported in a quantified manner in the article)
11. J. Bradley Karnataka, India 2017	To describe and evaluate the impact of mentoring programme implemented where nurses have been designated to expand	Randomized trial looking at knowledge and skills of 295 maternity nurses working in 108 rural health centres. The study compared knowledge and	Quality	No: Nurses	X	In-depth description of the steps of the mentoring. 11 nurse mentors trained for 5 weeks and assigned to 5-6 PHC each. Mentoring visits 2-3 days within 2 months.

Gough Score: high (H), medium (M), low (L) for coherence, appropriateness and relevance, and overall assessment.						
First Author Country Year Quality rank	Study Aim	Study methods & participants	Themes from Table 3	ICM-standard midwife	Mentoring	Key Findings
HMM (M)	maternity services but do not have adequate expertise. This study explored the use of a case sheet with and without mentoring, on quality of maternity care services.	skills at baseline and before and after the interventions. Knowledge was tested with a field survey and simulation of skills.				The study found that use of case sheets alone had no impact. Case sheets with mentoring found significant improvement in both knowledge and skill on common labour room skills including newborn resuscitation, post-partum haemorrhage (PPH) prevention, and knowledge about signs of obstetric emergencies.
12. R. S. Potty Karnataka, India 2019 HML (M)	To evaluate the impact of a joint community and facility mentoring programme that was designed to increase quality and demand.	Data comparing the intervention districts to the controls were collected by identifying all the pregnant women in predetermined intervention and non-intervention areas and calling them through a series of phone calls. Demographic data, as well as reported health seeking behaviour such as facility delivery and length of stay, were analysed.	Quality Health seeking	No: Maternity staff unspecified	X	Nurse mentor visits 1-2 days per month. The study found increases in number of ANC, facility delivery, length of stay post-partum, and early breastfeeding in the intervention group.
13. P. Schwerdtle	To evaluate the impact of mentoring programs for health personnel in	Systematic review of mentoring programs in LMICs.		No:	X	Only 5 studies were found to meet the criteria; of those only one was

Gough Score: high (H), medium (M), low (L) for coherence, appropriateness and relevance, and overall assessment.						
First Author Country Year Quality rank	Study Aim	Study methods & participants	Themes from Table 3	ICM-standard midwife	Mentoring	Key Findings
Low- and middle-income countries 2017 HMM (M) Rwanda Afghanistan Jordan Botswana	low- and middle-income countries			Maternity staff unspecified		focused on maternity nurses. That one is also featured in this review. All found a positive impact for mentoring with regard to care quality.
14. Bhamare P. India 2018 MHM (M)	To evaluate the impact of skills training, followed by mentoring on lifesaving maternal health interventions.	Conference abstract 28 health facilities were assessed using a standardized observation checklist called a standards-based management and recognition tool (SBMR). Evaluations were conducted before, immediately following, and one year after the intervention. They are reported descriptively	Quality	No: Maternity staff unspecified	X	No description of the mentorship program. All clinical skills improved, and improvements were maintained. The best improvement was in eclampsia management and the teaching of danger signs. The least effect was in post-partum care and newborn resuscitation.

Gough Score: high (H), medium (M), low (L) for coherence, appropriateness and relevance, and overall assessment.						
First Author Country Year Quality rank	Study Aim	Study methods & participants	Themes from Table 3	ICM-standard midwife	Mentoring	Key Findings
		and significance was not reported.				
15. A. Manzi Rwanda 2018 HMH (H)	To assess the impact of mentorship, over and above supervision, on ANC delivery with a focus on danger signs assessment in rural health centres in Rwanda.	The evaluation was conducted through a baseline and end line assessment at 21 rural health facilities in Rwanda. There was a total of 330 observations. The study used an observation checklist to gather information on healthcare providers' implementation of a danger signs assessment before and after a mentorship program. A mixed effect linear regression was used to measure the difference which controlled for confounders and cluster effects.	Quality	No: Nurses	X	Nurse mentor visits every 4-6 weeks. Danger signs assessments as well as 23 other markers for ANC were significantly improved (2.1% to 84%) with the mentoring intervention.
16. A. Manzi Rwanda 2013	To describe implementation and evaluate the impact and challenges of a mentoring intervention for nurses working in	Before and after study looking at changes in nurses' practices before and after mentoring	Quality	No: Nurses	X	Nurse mentor visits every 4-6-weeks to health centres. Identification of gaps in care followed by changing systems to respond to gaps such as targeted trainings.

Gough Score: high (H), medium (M), low (L) for coherence, appropriateness and relevance, and overall assessment.						
First Author Country Year Quality rank	Study Aim	Study methods & participants	Themes from Table 3	ICM-standard midwife	Mentoring	Key Findings
LMM (M)	rural health facilities including maternities					Improvement in STI management as per observation.
17. G. Tadele Tiruneh Ethiopia 2018 HML (M)	To evaluate a package focused on improving the provision of obstetric emergency care that included mentorship. This intervention was done after midwives had been deployed to improve EmONC, but the deployment of the midwives is not the focus of the research.	Before and after data from 134 health facilities covering 91 districts of rural Ethiopia was collected. Data were gathered through observation of care, record review, and interviews with providers as well as service statistics and patient records. Regression methods were used to measure the dose response. A BEmONC implementation strength score was developed. Descriptive statistics were used to measure the input and process of service delivery. A paired t test was used to assess difference in baseline and end line. An internal comparison group for dose response relationships. Logistical	Quality Health seeking	Yes: Included	X	Increase in the number of facility births and a higher met need for BEmONC. Use of newborn resuscitation and manual removal of placenta did not improve.

Gough Score: high (H), medium (M), low (L) for coherence, appropriateness and relevance, and overall assessment.						
First Author Country Year Quality rank	Study Aim	Study methods & participants	Themes from Table 3	ICM-standard midwife	Mentoring	Key Findings
		regression was used to determine the effects of different variables.				
18. C. Horwood South Africa 2019 MML (M)	The evaluation of a four-part intervention directed at improving care to sick and small newborns that included mentoring, training, skills development, and hospital accreditation.	Cross sectional surveys in 39 district hospitals. Data gathered through an observation checklist. Health worker knowledge was assessed midpoint and at endpoint.	Quality	No: Maternity staff unspecified	X	Four national mentoring visits over 2 years linked to accreditation. Improved health worker knowledge Overall improvements in availability of the needed supplies and equipment. Increases in evidence-based care
19. Helen Nita Catton Laos 2017 MLH (M)	Description of the steps for setting up a mentorship programme for inexperienced midwives in Laos.	Community case study describing the implementation of the mentorship program.	Quality	No: Midwives not ICM	X	A description of the steps of developing the mentorship is provided. National mentors are deployed full time to one healthcare facility. Initial positive reception. Barriers included few experts in the field who could become mentors. Assessment framework not well developed but initial results seem promising.
20. S. Rajbhandari Nepal 2018 MMM (M)	Evaluation of a mentorship programme for SBAs	Conference abstract	Quality	No: Maternity staff unspecified	X	Mentorship for clinicians and managers in 7 districts and 61 health facilities; improvements in ability to use partograph and conduct normal delivery

Gough Score: high (H), medium (M), low (L) for coherence, appropriateness and relevance, and overall assessment.						
First Author Country Year Quality rank	Study Aim	Study methods & participants	Themes from Table 3	ICM- standard midwife	Mentoring	Key Findings
21. World Bank Multiple LMIC 2013 MLL (L)	To determine what interventions, have an impact on maternal, neonatal, and under 5 mortality, inclusive of the impact of SBAs	Systematic review of impact evaluations: 68 impact evaluations, 33 specific to SBAs	Quality	No: Inclusive of all SBAs		The introduction of an SBA alone was not found to reduce maternal or neonatal mortality. It was found in some studies to impact increase under 5 mortality, breastfeeding, and immunization rates in combination with other things like improving both mothers and SBA knowledge and improving the quality of care provided.
22. R. Haththotuwa Sri Lanka 2012 MLL (L)	To delineate the models of care that reduced maternal mortality in Sri Lanka	A description of the systems put in place that influence the decline in maternal mortality in Sri Lanka, inclusive of the introduction of midwives	Outcomes	No: Not ICM standard, 18-month training		Deploying community midwives was chronologically related to improved MMR. This intervention was combined with other interventions

7.3 WHO Standards and Quality Statements

Selected WHO standards and quality statements

Standard	Quality Statements
<p>Standard 1</p> <p>Every woman and newborn receives routine, evidence-based care and management of complications during labour, childbirth and the early postnatal period, according to WHO guidelines.</p>	<p>Quality statement 1.1a: Women are assessed routinely on admission and during labour and childbirth and are given timely, appropriate care.</p> <p>Quality statement 1.1b: Newborns receive routine care immediately after birth.</p> <p>Quality statement 1.1c: Mothers and newborns receive routine postnatal care.</p> <p>Quality statement 1.2: Women with pre-eclampsia or eclampsia promptly receive appropriate interventions, according to WHO guidelines.</p> <p>Quality statement 1.3: Women with postpartum haemorrhage promptly receive appropriate interventions, according to WHO guidelines.</p> <p>Quality statement 1.4: Women with delay in labour or whose labour is obstructed receive appropriate interventions, according to WHO guidelines.</p> <p>Quality statement 1.5: Newborns who are not breathing spontaneously receive appropriate stimulation and</p>

	<p>resuscitation with a bag-and-mask within 1 min of birth, according to WHO guidelines.</p> <p>Quality statement 1.6a: Women in preterm labour receive appropriate interventions for both themselves and their babies, according to WHO guidelines.</p> <p>Quality statement 1.6b: Preterm and small babies receive appropriate care, according to WHO guidelines.</p> <p>Quality statement 1.7a: Women with or at risk for infection during labour, childbirth or the early postnatal period promptly receive appropriate interventions, according to WHO guidelines.</p> <p>Quality statement 1.7b: Newborns with suspected infection or risk factors for infection are promptly given antibiotic treatment, according to WHO guidelines.</p> <p>Quality statement 1.8: All women and newborns receive care according to standard precautions for preventing hospital-acquired infections.</p> <p>Quality statement 1.9: No woman or newborn is subjected to unnecessary or harmful practices during labour, childbirth and the early postnatal period.</p>
<p>Standard 6</p> <p>Every woman and her family are provided with emotional support that is sensitive to their</p>	<p>Quality statement 6.1: Every woman is offered the option to experience labour and childbirth with the companion of her choice.</p> <p>Quality statement 6.2: Every woman receives support to strengthen her capability during childbirth.</p>

<p>needs and strengthens the woman's capability.</p>	
<p>Standard 7</p> <p>For every woman and newborn, competent, motivated staff are consistently available to provide routine care and manage complications.</p>	<p>Quality statement 7.1: Every woman and child has access at all times to at least one skilled birth attendant and to support staff for routine care and management of complications.</p> <p>Quality statement 7.2: The skilled birth attendants and support staff have appropriate competence and skills mix to meet the requirements of labour, childbirth and the early postnatal period.</p> <p>Quality statement 7.3: Every health facility has managerial and clinical leadership that is collectively responsible for developing and implementing appropriate policies and fosters an environment that supports facility staff in continuous quality improvement.</p>
<p>Standard 8</p> <p>The health facility has an appropriate physical environment, with adequate water, sanitation and energy supplies, medicines, supplies and equipment for routine maternal and newborn care and management of complications.</p>	<p>Quality statement 8.1: Water, energy, sanitation, hand hygiene and waste disposal facilities are functioning, reliable, safe and sufficient to meet the needs of staff, women and their families.</p> <p>Quality statement 8.2: Areas for labour, childbirth and postnatal care are designed, organized and maintained so that every woman and newborn can be cared for according to their needs in private, to facilitate the continuity of care.</p>

Quality statement 8.3: Adequate stocks of medicines, supplies and equipment are available for routine care and management of complications.

7.4 Ethics approvals

7.4.1 Lancaster University



Applicant: Rondi Anderson
Supervisor: Amanda Bingley and Jon Read
Department: Health Research
FHMREC Reference: FHMREC16

23 August 2018

Dear Rondi

Re: Introducing professional midwives in government sub-district hospitals in Bangladesh: outcomes and experiences related to availability and quality of maternal and newborn health (MNH) services

Thank you for submitting your research ethics application for the above project for review by the **Faculty of Health and Medicine Research Ethics Committee (FHMREC)**. The application was recommended for approval by FHMREC, and on behalf of the Chair of the Committee, I can confirm that approval has been granted for this research project, subject to the following condition:

- **It is unclear on the participant information sheet whether participants can agree to be observed but opt out of the survey and interview. Please qualify in the participant information sheet, albeit briefly, so that it is clear to the potential participant what is optional and what is a requirement, if they do decide to participate.**

As principal investigator your responsibilities include:

- ensuring that (where applicable) all the necessary legal and regulatory requirements in order to conduct the research are met, and the necessary licenses and approvals have been obtained;
- reporting any ethics-related issues that occur during the course of the research or arising from the research to the Research Ethics Officer at the email address below (e.g. unforeseen ethical issues, complaints about the conduct of the research, adverse reactions such as extreme distress);
- submitting details of proposed substantive amendments to the protocol to the Research Ethics Officer for approval.

Please contact me if you have any queries or require further information.

Tel:- 01542 593987
Email:- fhmresearchsupport@lancaster.ac.uk

Yours sincerely,



R.E. Case

Becky Case
Research Ethics Officer, Secretary to FHMREC.

7.4.2 Ethics approval: Centre for Injury Prevention and Research

Memo: CIPRB/ERC/2018/18

Date: 25 October 2018

Ethical Review Committee

Md Abdul Halim
Director
Centre for Injury Prevention and
Research Bangladesh (CIPRB)
New DOHS, Mohakhali, Dhaka

Subject: Ethical Clearance

With reference to your application on the above subject, this is to inform you that your research proposal titled **“Introducing professional midwives in government sub-district hospitals in Bangladesh: impact on quality of maternal and newborn health services”** has been reviewed and approved by the Ethical Review Committee of Centre for Injury Prevention and Research Bangladesh (CIPRB).

You are requested to please note the following ethical guidelines as mentioned at page 2 (overleaf of this memo).

Professor Mahfuzur Rahman
Chairman
Ethical Review Committee

The ethical guidelines to be followed by the principal and co-investigators

- The rights and welfare of individual volunteers are adequately protected.
- The methods to secure informed consent are fully appropriate and adequately safeguard the right of the subjects (in the case of minors, consent is obtained from parents or guardians).
- The investigator(s) assume the responsibility of notifying the Ethical Review Committee if there is any change in the methodology of the protocol involving a risk to the individual volunteers.
- To immediately report Ethical Review Committee if any evidence of unexpected or adverse reaction is noted in the subject under study.
- This proposal is subject to the PI having read and accepted the CIPRB ethical principles and guidelines currently in operation.

7.5 Participant Information Sheets

7.5.1 Participant Information Sheet: Healthcare providers

Participant Information Sheet for healthcare providers for focus groups to be translated in Bengali and English: Introducing professional midwives in government sub-district hospitals in Bangladesh: impact on quality of maternal and newborn health services (for both verbal and written consent)

My name is Rondi Anderson and I am conducting this research as a student in the PhD Public Health programme at Lancaster University, Lancaster, United Kingdom.

What is the study about?

The purpose of this study is to try to understand the impact of deploying professional midwives and mentorship/supportive supervision on availability and quality of maternal and newborn health care, and how emergency and maternity staff feel about their role and experiences with the newly deployed midwives and with transitioning to more evidence-based care.

Why have I been approached?

You have been approached because the study requires information from those taking care of women on the maternity ward.

Do I have to take part?

No. It's completely up to you to decide whether or not you take part. Not participating will not affect your work standing.

What will I be asked to do if I take part?

If you decide you would like to take part, there are three possibilities of what you might do. I might observe you providing care to patients. I will ask you to take a 30-minute survey. And, I might possibly ask you to talk to me for about 30 minutes about how you feel about certain aspects of your work here. It is not necessary to take part in all parts of the study, if you are comfortable with only one part and do not want to participate in the others this is fine. There will be no pressure for you to participate in more than what you are comfortable with.

Will my data be identifiable?

The information you provide is confidential. The data collected for this study will be stored securely and only the researchers conducting this study will have access to this data:

- Audio recordings will be destroyed and/or deleted once the project has been submitted for publication/examined.
- Hard copies of surveys or observations will be kept in a locked cabinet.
- The files on the computer will be encrypted (that is, no one other than the researcher will be able to access them) and the computer itself will be password protected.
- At the end of the study, paper copies of surveys will be kept securely in a locked cabinet for ten years. At the end of this period, they will be destroyed.
- The typed version of your interview will be made anonymous by removing any identifying information including your name. Anonymised direct quotations from your interview may be used in the reports or publications from the study, but your name will not be attached to them.
- All your personal data will be confidential and will be kept separately from your focus group responses.

There are some limits to confidentiality: if what is said in the interview makes me think that you, or someone else, is at significant risk of harm, I will have to break confidentiality and speak to one of the managers of your facility about this. If possible, I will tell you if I find it necessary to do this.

What will happen to the results?

The results will be summarised and reported in a thesis and may be submitted for publication in an academic or professional journal. I may use the material to make presentations at conferences.

Are there any risks?

There are no risks anticipated with participating in this study. However, if you experience any distress following participation, you are encouraged to inform the researcher and contact the resources provided at the end of this sheet.

Are there any benefits to taking part?

Although you may find participating interesting, there are no direct benefits in taking part.

Who has reviewed the project?

This study has been reviewed by the Faculty of Health and Medicine Research Ethics Committee and approved by the University Research Ethics Committee at Lancaster University.

Where can I obtain further information about the study if I need it?

If you have any questions about the study, please contact the main researcher:

- Ms. Rondi Anderson
- Hospital manager

Complaints

If you wish to make a complaint or raise concerns about any aspect of this study and do not want to speak to the researcher, you can contact:

Abdul Halim MD OBGYN halim.ogsb@gmail.com Telephone 01712094176

Prof Roger Pickup, Associate Dean for Research, Faculty of Health and Medicine (Division of Biomedical and Life Sciences), Lancaster University, Lancaster LA1 4YD (email r.pickup@lancaster.ac.uk, Tel: (01524) 593746).

Thank you for taking the time to read this information sheet.

Resources in the event of distress

Should you feel distressed either as a result of taking part in this research, or in the future, the following resources may be of assistance.

- Local counselling service

For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection

7.5.2 Participant Information Sheet: Patients

Participant Information Sheet for patients to be translated in Bengali and English: Introducing professional midwives in government sub-district hospitals in Bangladesh: impact on quality of maternal and newborn health services (for both verbal and written consent)

My name is Rondi Anderson and I am conducting this research as a student in the PhD Public Health programme at Lancaster University, Lancaster, United Kingdom.

What is the study about?

The purpose of this study is to try to understand the impact of deploying professional midwives and mentorship/supportive supervision on availability and quality of maternal and newborn health care, and how emergency and maternity staff feel about their role and experiences transitioning to more evidence-based care.

Why have I been approached?

You have been approached because the study requires information from pregnant and post-partum women.

Do I have to take part?

No. It's completely up to you to decide whether or not you take part. Not participating will have no impact on the care that you receive.

What will I be asked to do if I take part?

If you decide you would like to take part, I will observe what you and your baby are doing and take notes.

Will my data be identifiable?

The observation data is confidential. The data collected for this study will be stored securely and only the researchers conducting this study will have access to this data:

- Hard copies of observations will be kept in a locked cabinet.
- The files on the computer will be encrypted (that is, no one other than the researcher will be able to access them) and the computer itself will be password protected.

What will happen to the results?

The results will be summarised and reported in a thesis and may be submitted for publication in an academic or professional journal. I may use the material to make presentations at conferences.

Are there any risks?

There are no risks anticipated with participating in this study. However, if you experience any distress following participation, you are encouraged to inform the researcher and contact the resources provided at the end of this sheet.

Are there any benefits to taking part?

Although you may find participating interesting, there are no direct benefits in taking part.

Who has reviewed the project?

This study has been reviewed by the Faculty of Health and Medicine Research Ethics Committee, and approved by the University Research Ethics Committee at Lancaster University.

Where can I obtain further information about the study if I need it?

If you have any questions about the study, please contact the main researcher:

- Ms. Rondi Anderson
- Dr. Head of Maternity

Complaints

If you wish to make a complaint or raise concerns about any aspect of this study and do not want to speak to the researcher, you can contact:

Abdul Halim MD OBGYN halim.ogsb@gmail.com Telephone 01712094176

Prof Roger Pickup, Associate Dean for Research, Faculty of Health and Medicine (Division of Biomedical and Life Sciences), Lancaster University, Lancaster LA1 4YD (email r.pickup@lancaster.ac.uk, Tel: (01524) 593746).

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Thank you for taking the time to read this information sheet.

Resources in the event of distress

Should you feel distressed either as a result of taking part in this research, or in the future, the following resources may be of assistance.

- Local counselling service

7.5.3 Participant Information Sheet: Managers

Participant Information Sheet for manager interviews to be translated in Bengali and English: Introducing professional midwives in government sub-district hospitals in Bangladesh: impact on quality of maternal and newborn health services (for both verbal and written consent)

My name is Rondi Anderson and I am conducting this research as a student in the PhD Public Health programme at Lancaster University, Lancaster, United Kingdom.

What is the study about?

The purpose of this study is to try to understand the impact of deploying professional midwives and mentorship/supportive supervision on availability and quality of maternal and newborn health care, and how managers and staff feel about the experience of having midwives and transitioning to more evidence-based care.

Why have I been approached?

You have been approached because the study requires information from managers of maternity wards.

Do I have to take part?

No. It's completely up to you to decide whether or not you take part. Not participating will not affect your work standing.

What will I be asked to do if I take part?

If you decide you would like to take part, I will be interviewing you about your experiences as a manager in a facility with a maternity ward with or without midwives and mentoring.

Will my data be identifiable?

The information you provide is confidential. The data collected for this study will be stored securely and only the researchers conducting this study will have access to this data:

- Audio recordings will be destroyed and/or deleted once the project has been submitted for publication/examined.
- Hard copies of surveys or observations will be kept in a locked cabinet.
- The files on the computer will be encrypted (that is, no one other than the researcher will be able to access them) and the computer itself will be password protected.

- At the end of the study, paper copies of surveys will be kept securely in a locked cabinet for ten years. At the end of this period, they will be destroyed.
- The typed version of your interview will be made anonymous by removing any identifying information including your name. Anonymised direct quotations from your interview may be used in the reports or publications from the study, but your name will not be attached to them.
- All your personal data will be confidential and will be kept separately from your interview responses.

There are some limits to confidentiality: if what is said in the interview makes me think that you, or someone else, is at significant risk of harm, I will have to break confidentiality and speak to one of the managers of your facility about this. If possible, I will tell you if I find it necessary to do this.

What will happen to the results?

The results will be summarised and reported in a thesis and may be submitted for publication in an academic or professional journal. I may use the material to make presentations at conferences.

Are there any risks?

There are no risks anticipated with participating in this study. However, if you experience any distress following participation, you are encouraged to inform the researcher and contact the resources provided at the end of this sheet.

Are there any benefits to taking part?

Although you may find participating interesting, there are no direct benefits in taking part.

Who has reviewed the project?

This study has been reviewed by the Faculty of Health and Medicine Research Ethics Committee and approved by the University Research Ethics Committee at Lancaster University.

Where can I obtain further information about the study if I need it?

If you have any questions about the study, please contact the main researcher:

- Ms. Rondi Anderson

- Hospital manager

Complaints

If you wish to make a complaint or raise concerns about any aspect of this study and do not want to speak to the researcher, you can contact:

Abdul Halim MD OBGYN halim.ogsb@gmail.com Telephone 01712094176

Prof Roger Pickup, Associate Dean for Research, Faculty of Health and Medicine (Division of Biomedical and Life Sciences), Lancaster University, Lancaster LA1 4YD (email r.pickup@lancaster.ac.uk, Tel: (01524) 593746).

Thank you for taking the time to read this information sheet.

Resources in the event of distress

Should you feel distressed either as a result of taking part in this research, or in the future, the following resources may be of assistance.

- Local counselling service

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7.6 Consent Form

Study Title: Introducing professional midwives in government sub-district hospitals in Bangladesh: impact on quality of maternal and newborn health services

As some participants may have low literacy, the below questions will be read to all post-partum mothers. Maternity staff and managers are all literate. A recorded yes, thumb print, or signature will be considered a yes.

We are asking if you would like to take part in a research project called **Introducing professional midwives in government sub-district hospitals in Bangladesh: impact on quality of maternal and newborn health services**

**Please
initial**

1. I confirm that I have read the information sheet and fully understand what is expected of me within this study

2. I confirm that I have had the opportunity to ask any questions and to have them answered.

3. I understand that our focus group and interview audio will be recorded and then made into an anonymised written transcript.

4. I understand that audio recordings will be kept until the research project has been examined.

5. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected.

6. I understand that once my data have been anonymised and incorporated into themes it might not be possible for it to be withdrawn, though every attempt will be made to extract my data, up to the point of publication.
7. I understand that the information from my interview will be pooled with other participants' responses anonymised and may be published.
8. I consent to information and quotations from my interview being used in reports, conferences and training events.
9. I understand that any information I give will remain strictly confidential and anonymous unless it is thought that there is a risk of harm to myself or others, in which case the principal investigator will/may need to share this information with his/her research supervisor.
10. I consent to Lancaster University keeping written transcriptions of the interview for 10 years after the study has finished.
11. I consent to take part in the above study.

Before you consent to participating in the study, we ask that you read the participant information sheet and mark each box with your initials if you agree. Please note that all data collected will be shared and discussed with my research supervisors. If you have any questions or queries before signing the consent form, please speak to the principal investigator, Rondi Anderson.

Name of Participant _____ **Signature** _____ **Date** _____

Name of Researcher _____ **Signature** _____ **Date** _____

7.7 Data collection tools

7.7.1 Form 1 - Facility Observation Tool

 Observation ID	FORM - 1	Facility Observation Tool	
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Please fill up only one Form for every facility.

No.1	Address and identification information			
1.1	Name of the Facility			
1.2	Upazila	1.3	Zila	
1.4	Data collector's Name			
1.5	Date of Visit	_ _ _ _ : _ _ _ _ : _ _ _ _ _		(dd/mm/yyyy)

Please circle correctly, which is observed.

No.	Variable	Yes	No
1	Oxytocin available in the emergency room	Y	N
2	Oxytocin available in the delivery room	Y	N
3	MgSO4 available in the emergency room	Y	N
4	MgSo4 available in the delivery room	Y	N
5	Newborn resuscitation Area with ambu bag in the delivery room	Y	N
6	Separate ANC corner	Y	N
7	Diploma midwife staffing the ANC corner	Y	N
8	Midwives staffing the maternity area	Y	N
9	Register book with midwife identification being used for deliveries	Y	N
10	Register book for PPH and eclampsia	Y	N
No.	Please collect the information from register book.		
11	Number of deliveries performed by midwives in the last six months		
12	Number of PPH cases in the last six months		
13	Number of eclampsia cases in the last six months		
Before leaving the observational place, carefully check whether all answers of the questions have properly recorded.			

(Signature of Data collector's)

Date: / /

(Signature of Supervisor's)

Date: / /

7.7.2 Form 2 - Clinical Observation Tool

 Observation ID	FORM - 2	Clinical Observation Tool	
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Please fill up one sheet for one women.



No.1	Address and identification information			
1.1	Name of the Facility			
1.2	Upazila	1.3	Zila	
1.4	Data collector's Name			
1.5	Date of Visit	_ _ _ _ : _ _ _ _ : _ _ _ _ _		(dd/mm/yyyy)

Operational Defnition:

2.5 > Partograph:

Partograph must be started within one hour or at 4cm. Fetal heart must be listen every 30 minutes & recorded. Dilatation must be filled correctly.

2.6 > Upright position:

At least 90% non supine position.

2.7 > Companion:

At least 90% of time companion present must be in delivery room.

2.9 > Skin to skin:

On baby management before one hour.

Please circle correctly, which is observed.

No.2	Variable	Yes	No	Not observed (NO)
2.1	ANC card being used	Y	N	NO
2.2	Management of PPH observed	Y	N	NO
2.3	Management of Eclampsia observed	Y	N	NO
2.4	Management of Newborn asphyxia observed	Y	N	NO
2.5	Partograph is used during labour	Y	N	NO
2.6	Upright or lateral positions for labour/delivery	Y	N	NO
2.7	Companion present during labour/delivery	Y	N	NO
2.8	Delayed cord clamping until no pulse	Y	N	NO
2.9	Baby placed skin-to-skin immediately after birth and mother and baby were covered together in the first hour after delivery	Y	N	NO
2.10	Active management of 3 rd stage of labour	Y	N	NO

(Signature of Data collector's)

Date: _ / _ / _

(Signature of Supervisor's)

Date: _ / _ / _

5.7.3 Form 3 - Survey Tool

Survey's ID	FORM - 3	Survey Tool (Emergency, ANC Maternity & Manager)	Lancaster University 
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**Introducing professional midwives in government sub-district hospitals in Bangladesh:
impact on quality of maternal and newborn health services**

No.1 Address and identification information				
1.1	Name of the Facility			
1.2	Upazila	1.3	Zila	
1.4	Data collector's Name			
1.5	Date of Visit	_ _ _ _ : _ _ _ _ : _ _ _ _ _ _ _		(dd/mm/yyyy)

No.2	Variable	Emergency Staff	ANC, or <u>maternity</u> Staff	Managers Staff
2.1	Provider Name			
2.2	Provider Type			
2.3	Years of experience			

Please circle correctly, which is mentioned.

No.3	Variable	Yes	No
3.1	Does your facility have Diploma midwives?	Y	N
3.2	Did your facility participate in a mentorship program (Save the Children <u>midwifery led-care</u>)?	Y	N
3.3	Is there a separate ANC corner in your facility?	Y	N
3.4	Do you feel that a separate ANC corner is important?	Y	N
3.5	Do you feel capable of using a partograph when a woman is in labor?	Y	N
3.6	Do you use a partograph when a woman is in labor?	Y	N
3.7	Do you feel capable of using skin-to-skin contact after delivery for one hour?	Y	N
3.8	Do you practice skin-to-skin contact after delivery for one hour?	Y	N
3.9	Do you feel capable to provide intial care for patients with PPH?	Y	N
3.10	Do you personally provide intial care to patients with PPH?	Y	N
3.11	Do you feel capable to provide intial care for patients with eclampsia?	Y	N
	Do you personally provide intial care to patients with eclampsia?	Y	N

No.4	Variable (Likert scale, 1-5)	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
4.1	The partograph is helpful?	1	2	3	4	5
4.2	Mothers having a companion present for labor and delivery is a good idea?	1	2	3	4	5
4.3	Delayed cord clamping is a good idea?	1	2	3	4	5
4.4	Non supine position is important for pregnant and labouring women?	1	2	3	4	5
4.5	Skin-to-skin contact for one hour after delivery is the best care for mother and baby?	1	2	3	4	5
4.6	Having Diploma midwives in the ANC and maternity area is the best care for mother and baby?	1	2	3	4	5
4.7	If your facility participated in the Save the children (SCI) mentorship, was it helpful?	1	2	3	4	5

 Survey's ID	FORM - 3	Survey Tool (Emergency, ANC Maternity & Manager)	 Lancaster University
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4.8	Recent introduction of Diploma midwives is helpful?	1	2	3	4	5
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In the below table, please mark any recent changes and then tell us if the change was related to mentoring and or the introduction of Diploma midwives. If the change has not happened, please leave it blank.

No.5	Please tell us if this statement is true or false	True or False?	Changed with mentors	Changed with recently deployed midwives	Comment
5.1	Before we did not receive women with PPH and eclampsia, now we do.				
5.2	Before we did not have a separate ANC corner, now we do.				
5.3	Before we did not use an ANC card, now we do.				
5.4	Before we did not use a partograph, now we do.				
5.5	Before all women were supine, now they are upright or lateral.				
5.6	Before we did not allow companions in the delivery room, now we do.				
5.7	Before we did not encourage oral hydration, now we do.				
5.8	Before we did routine episiotomy on all primips, now we only do for fetal distress.				
5.9	Before we cut the cord immediately, now we do <u>delayed</u> cord clamping.				
5.10	Before we only put the baby skin-to-skin for one minute, now we do for one hour.				

Before leaving the interview place, carefully check whether all answers of the questions have properly recorded.

(Signature of Data collector's)

Date: / /

(Signature of Supervisor's)

Date: / /

7.7.4 IDI Guideline

Interview guideline for manager/ staff/ nurse



[The researcher will ask the participant for the following introductory details:

1. Confirm relevant personal contact details
2. Ask for the following basic demographic information:
gender; age; doctor, nurse, midwife
3. Highest level of education
4. Number of years spent working as a manager
6. Does the facility have professional midwives?
7. Did the facility receive mentorship?

Researcher will ask the manager the following questions:

For all:

8. Has your hospital made any changes to improve maternal health care recently?
9. If so, can you describe what?
10. If so, what motivated these changes?
11. What helps you implement changes?
12. What is your opinion about Diploma midwives?
13. How do you feel about having Diploma midwives working at your facility?
14. Do you have Diploma midwives working at your facility?
15. Does your facility provide ANC if so who provides it?
16. Does your facility provide evidence based routine maternity care? If so who provides it?
17. How does this facility respond when a woman comes to the ER/Maternity with PPH/ eclampsia?
18. If this facility treats the women what type of professional manages a woman with an emergency?

These question will be asked If there are midwives posted at the facility:

19. Have there been any changes since midwives were deployed to your facility? If so what?
20. What are the challenges of having midwives deployed to your facility ?
21. What are the benefits of having midwives deployed to your facility?
22. Do you feel like midwives are able to practice as midwives in your facility? If they are not can you describe how and in what way they are limited?
23. How do you feel about Diploma midwives providing independent ANC?
24. Do midwives provide independent ANC at your facility?
25. How do you feel about Diploma midwives providing maternity care including emergency care?
26. Has anything changed in ANC or maternity care provision including response to OB emergencies since midwives were posted?
27. Please describe any changes to me?
28. Did your facility have a mentorship program?

These questions will be asked If there was mentorship at the facility:

29. How do you feel about the mentorship program?
30. What were the challenges for the mentorship program?
31. Did anything change as a result of the mentorship program?
32. If yes can you describe those changes?

7.7.5 FGD Guideline for Maternity Staff

Interview guideline for FGD groups - For Maternity Staff



Key Topic Areas: For Maternity Staff

The researcher will ask the participant for the following introductory details:

1. Confirm relevant personal contact details
2. Ask for the following basic demographic information: gender; age; doctor, nurse, manager, community member
3. Highest level of education
4. Number of years spent working as an emergency room, maternity staff member/manager
5. Does the facility have professional midwives?
6. Did the facility receive mentorship?

Researcher will ask the staff to talk about their activities as an emergency/maternity staff:

7. Has your hospital made any changes to improve maternal health care recently?
8. If so, can you describe what?
9. If so, what motivated these changes?
10. What helps you implement changes?
11. What helps you to learn a new clinical practice?
12. What is your opinion about Diploma midwives?
13. What changed when Diploma midwives came?
14. How do you feel about having Diploma midwives working at your facility?
15. How do you feel about Diploma midwives providing ANC
16. How do you feel about Diploma midwives providing maternity care
17. Did your facility have a mentorship program?
18. How do you feel about the mentorship program?
19. What changed with mentorship?
20. What do you do if a girl or woman comes to the Emergency Room/Maternity with PPH/ eclampsia?
21. Do you know how to provide initial stabilization of PPH and eclampsia?
22. Which type of professional manages a woman with an emergency first?
23. Describe how you monitor labour progress and foetal wellbeing?
24. Do you know how to use a partograph?
25. How do you feel about women in labor having a companion with them?
26. How do you feel if a woman in labor or during delivery is not in supine or lithotomy position?
27. When do you cut the cord?
28. How do you feel about delayed cord clamping?
29. What do you think about immediate skin-to-skin contact for one hour?
30. Do they feel you have the skills and information you need to use skin-to-skin contact?
 - a. If not, what more would you need in order to feel capable?
31. Do you use skin-to-skin contact?
 - a. What are the reasons for not using it?
 - b. What is your experience of using it?

7.7.6 FGD Guideline for Midwives

Interview guideline for FGD groups - For Midwives



Key Topic Areas: For Midwives

The researcher will ask the participant for the following introductory details:

1. Confirm relevant personal contact details
2. Highest level of education
3. Number of years spent working as a midwife
4. Did the facility receive mentorship?

Researcher will ask the staff to talk about their activities as an emergency/maternity staff:

5. Has your hospital made any changes to improve maternal health care recently?
6. If so, can you describe what?
7. If so, what motivated these changes?
8. What helps you implement changes?
9. What helps you to learn a new clinical practice?
10. How do you feel about being a Diploma midwives
11. What changed since you came to this facility?
12. How do you feel about providing ANC
13. How do you feel about providing maternity care
14. Did your facility have a Save the Children midwifery led-care (SCI) mentorship program?
15. How do you feel about the Save the Children midwifery led-care (SCI) mentorship program?
16. What changed with Save the Children midwifery led-care (SCI) mentorship?
17. What do you do if a girl or woman comes to the Emergency Room/ Maternity with PPH/ eclampsia?
18. Do you know how to provide initial stabilization of PPH and eclampsia?
19. Which type of professional manages a woman with an obstetrical emergency first?
20. Describe how you monitor labour progress and foetal wellbeing?
21. Do you know how to use a partograph?
22. How do you feel about women in labor having a companion with them?
23. How do you feel if a woman in labor or during delivery is not in supine or lithotomy position?
24. When do you cut the cord?
25. How do you feel about delayed cord clamping?
26. What do you think about immediate skin-to-skin contact for one hour?
27. Do they feel you have the skills and information you need to use skin-to-skin contact?
 - a. If not, what more would you need in order to feel capable?
28. Do you use skin-to-skin contact?
 - a. What are the reasons for not using it?
 - b. What is your experience of using it?

7.8.4 Facility readiness by hospital type

Observation variables	No Midwives	Midwives <u>without</u> mentors	Midwives <u>with</u> mentoring
Midwives providing ANC care	NA	2/6	6/6
Delivery register book designates if a midwife performed the delivery	NA	6/6	6/6
Midwives are designated to the maternity areas	NA	5/6	6/6
Newborn resuscitation area with equipment including Ambu bag	4/7	2/6	4/6
Magnesium sulphate in the delivery room	5/7	1/6	5/6
Magnesium sulphate in the emergency room	4/7	1/6	2/6
Oxytocin in the delivery room	5/7	5/6	5/6
Oxytocin in the emergency room	4/7	1/6	2/6
A separate space for ANC is important	2/7	2/6	6/6

7.8.5 Clinical observations of use of evidence-based practices by hospital type

Variable		No midwives	Midwives <u>without</u> mentoring	Midwives with mentoring
ANC card	Yes	64 (52%)	63 (45%)	174 (84%)
	No	59 (48%)	78 (55%)	34 (16%)
Partograph	Yes	8 (14%)	28 (56%)	58 (97%)
	No	48 (86%)	22 (44%)	2 (3%)
Companion for labour and delivery	Yes	55 (98%)	50 (98%)	62 (100%)
	No	1 (2%)	1 (2%)	0 (0%)
Upright position for labour	Yes	35 (63%)	48 (94%)	58 (95%)
	No	21 (37%)	3 (6%)	3 (5%)
Upright position for birth	Yes	13 (26%)	22(42%)	51 (86%)
	No	37 (74%)	29(58%)	8 (14%)
Delayed umbilical cord clamping	Yes	6 (11%)	43 (88%)	56 (98%)
	No	47 (89%)	6 (12%)	1 (2%)
Skin-to-skin contact	Yes	7 (13%)	47(94%)	54 (93%)
	No	46 (87%)	3 (6%)	4 (7%)
Active management of third stage	Yes	50 (94%)	59 (98%)	61 (100%)
	No	3 (6%)	1 (2%)	0

7.8.6 Detailed capabilities and actions, by hospital and provider type

		I am <u>capable</u> of using/conducting...									I use/conduct...								
		No midwives			Midwives <u>without</u> mentors			Midwives with mentors			No midwives			Midwives <u>without</u> mentors			Midwives with mentors		
		Nurses	Midwives	Doctors	Nurses	Midwives	Doctors	Nurses	Midwives	Doctors	Nurses	Midwives	Doctors	Nurses	Midwives	Doctors	Nurses	Midwives	Doctors
Partograph	Y	66 (85%)	-	6 (33%)	33 (83%)	16 (100%)	4 (100%)	32 (71%)	28 (100%)	4 (40%)	49 (63%)	-	0 (0%)	33 (83%)	15 (94%)	4 (100%)	29 (64%)	28 (100%)	2 (20%)
	N	12 (15%)	-	12 (67%)	7 (18%)	0 (0%)	0 (0%)	13 (29%)	0 (0%)	6 (60%)	29 (37%)	-	16 (100%)	7 (18%)	1 (6%)	0 (0%)	16 (36%)	0 (0%)	8 (80%)
		78	0	18	40	16	4	45	28	10	78	0	16	40	16	4	45	28	10
Skin-to-skin	Y	74 (95%)	-	16 (89%)	40 (100%)	16 (100%)	4 (100%)	43 (100%)	28 (100%)	10 (100%)	62 (79%)	-	6 (33%)	32 (80%)	16 (100%)	4 (100%)	40 (89%)	28 (100%)	8 (80%)
	N	4 (5%)	-	2 (11%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	16 (21%)	-	12 (67%)	8 (20%)	0 (0%)	0 (0%)	5 (11%)	0 (0%)	2 (20%)
		78	0	18	40	16	4	43	28	10	78	0	18	40	16	4	45	28	10
Initial stabilization for PPH	Y	75 (96%)	-	16 (89%)	39 (100%)	16 (100%)	4 (100%)	44 (98%)	28 (100%)	10 (100%)	64 (82%)	-	15 (83%)	38 (95%)	16 (100%)	4 (100%)	42 (93%)	28 (100%)	10 (100%)
	N	3 (4%)	-	2 (11%)	0 (0%)	0 (0%)	0 (0%)	1 (2%)	0 (0%)	0 (0%)	14 (18%)	-	3 (17%)	2 (5%)	0 (0%)	0 (0%)	3 (7%)	0 (0%)	0 (0%)
		78	0	18	39	16	4	45	28	10	78	0	18	40	16	4	45	28	10
Initial stabilization for eclampsia	Y	66 (86%)	-	17 (94%)	30 (75%)	15 (94%)	4 (100%)	44 (98%)	27 (100%)	10 (100%)	48 (62%)	-	14 (78%)	18 (45%)	9 (56%)	4 (100%)	39 (87%)	21 (78%)	10 (100%)
	N	11 (14%)	-	1 (6%)	10 (25%)	1 (6%)	0 (0%)	1 (2%)	0 (0%)	0 (0%)	29 (38%)	-	4 (22%)	22 (55%)	7 (44%)	0 (0%)	6 (13%)	6 (22%)	0 (0%)
		77	0	18	40	16	4	45	27	10	77	0	18	40	16	4	45	27	10

7.8.7 Detail on provider agreement on use of evidence-based practices

Partograph is helpful	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
No midwives	92 (89%)	9 (9%)	2 (2%)	0 (0%)	0 (0%)
Midwives <u>without</u> mentorship	64 (93%)	5 (7%)	0 (0%)	0 (0%)	0 (0%)
Midwives <u>with</u> mentorship	80 (89%)	9 (10%)	0 (0%)	0 (0%)	1 (1%)

A companion during labor and delivery is a good idea	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
No midwives	87 (84%)	14 (13%)	0 (0%)	2 (2%)	1 (1%)
Midwives <u>without</u> mentorship	64 (91%)	6 (9%)	0 (0%)	0 (0%)	0 (0%)
Midwives <u>with</u> mentorship	75 (84%)	12 (13%)	1 (1%)	0 (0%)	1 (1%)

Delayed cord clamping is a good idea	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
No midwives	35 (34%)	32 (31%)	3 (3%)	6 (6%)	28 (27%)
Midwives <u>without</u> mentorship	30 (43%)	15 (21%)	5 (7%)	4 (6%)	16 (23%)
Midwives <u>with</u> mentorship	69 (78%)	11 (12%)	1 (1%)	5 (6%)	3 (3%)

Non supine position is important for pregnant and labouring women	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
No midwives	29 (29%)	39 (39%)	2 (2%)	7 (7%)	24 (24%)
Midwives <u>without</u> mentorship	29 (42%)	19 (28%)	6 (9%)	4 (6%)	11 (16%)
Midwives <u>with</u> mentorship	66 (75%)	14 (16%)	3 (3%)	4 (5%)	1 (1%)

Skin-to-skin contact for one hour after delivery is the best care for mother and baby	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
No midwives	85 (82%)	16 (15%)	0 (0%)	0 (0%)	3 (3%)
Midwives <u>without</u> mentorship	65 (93%)	5 (7%)	0 (0%)	0 (0%)	0 (0%)
Midwives <u>with</u> mentorship	77 (86%)	11 (12%)	0 (0%)	1 (1%)	1 (1%)

Having Diploma midwives in the ANC and maternity area is the best care for mother and baby	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
No midwives	58 (74%)	15 (19%)	2 (3%)	2 (3%)	1 (1%)
Midwives <u>without</u> mentorship	63 (90%)	7 (10%)	0 (0%)	0 (0%)	0 (0%)
Midwives <u>with</u> mentorship	78 (52%)	71 (47%)	1 (1%)	0 (0%)	0 (0%)

If your facility participated in the Save the children (SCI) mentorship, was it helpful	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
No midwives	5 (12%)	6 (14%)	1 (2%)	1 (2%)	29 (69%)
Midwives <u>without</u> mentorship	23 (68%)	1 (3%)	4 (12%)	2 (6%)	4 (12%)
Midwives <u>with</u> mentorship	69 (80%)	16 (19%)	1 (1%)	0 (0%)	0 (0%)

Recent introduction of Diploma midwives is helpful	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
No midwives	12 (26%)	6 (13%)	1 (2%)	0 (0%)	28 (60%)
Midwives <u>without</u> mentorship	56 (80%)	14 (20%)	0 (0%)	0 (0%)	0 (0%)
Midwives <u>with</u> mentorship	75 (99%)	1 (1%)	0 (0%)	0 (0%)	0 (0%)

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