Activating Social Learning Networks and Technology to Improve Maternal Health Outcomes in Hashimpur, Bangladesh
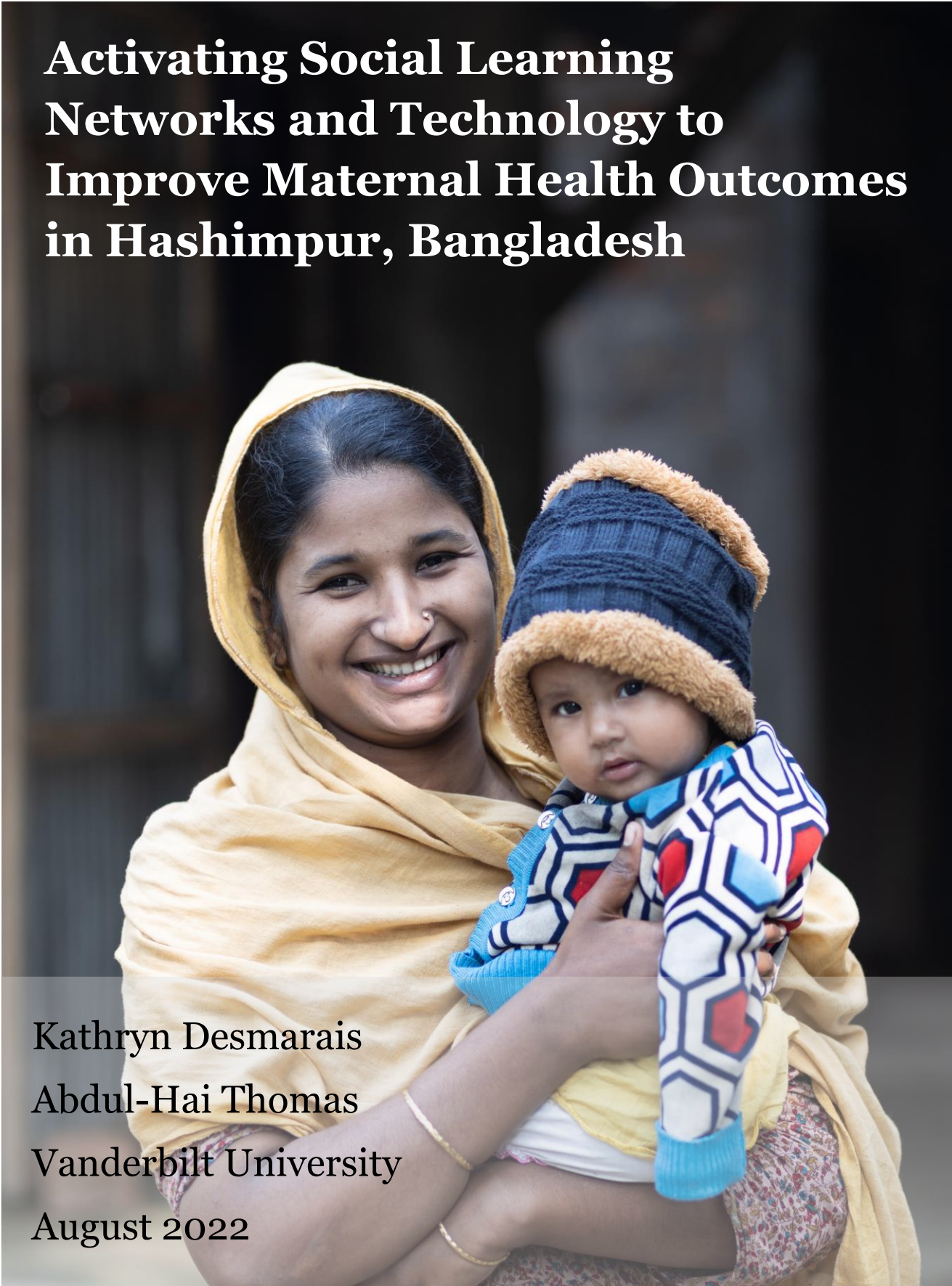
Kathryn Desmarais

Abdul-Hai Thomas

Vanderbilt University

August 2022

ACTIVATING SOCIAL LEARNING NETWORKS AND TECHNOLOGY TO IMPROVE MATERNAL HEALTH OUTCOMES IN HASHIMPUR, BANGLADESH

Kathryn Desmarais and Abdul-Hai Thomas

August 2022

ACKNOWLEDGEMENTS

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

EXECUTIVE SUMMARY

(Desmarais, 1998)

This Capstone project explores factors that affect maternal health outcomes in Hashimpur, a village located 200 km northeast of Dhaka, Bangladesh. Bangladesh is a focal nation for international agencies and nongovernmental organizations (NGOs) working in the public health space. Many of these public health efforts focus on reducing poverty, and fortunately, progress is evident. In 2021, The UN General Assembly passed a resolution confirming that Bangladesh qualified to graduate from the category of Least Developed Country (LDC). Due to the economic impact of the COVID-19 pandemic, the UN General

Bangladesh has been on the UN's list of least developed countries since 1975

Assembly granted Bangladesh an extended preparatory period of 5 years to complete the transition from LDC to the category of Developing Country. The UN General Assembly expects this transition to be complete in 2026. Despite its progress, much work remains, especially regarding Bangladesh's maternal morbidity and mortality outcomes. This project will provide our partner organization, rtl@hashimpur, with short and long-range improvement strategies and tactics that, when implemented, could improve maternal health outcomes for the benefit of all Hashimpur villagers.

We approached this project through a lens of social learning theory with a particular focus on gender theory. While our field research and recommendations are rooted in social

Social learning theory suggests that we learn by observing and modeling the behavior of others (Bandura, 1977). Gender theory examines how gender creates social constructs that impose expectations and limitations on behavior, thereby constructing and defining identity (Butler, 2003).

learning theory, gender dynamics undeniably shape maternal health outcomes in Hashimpur. Tangential and quite relevant to the gender theory lens is the notion of power based on gender (King, 2004), which we explore in depth as related to both driving factors and potential solutions. Our proposed recommendations leverage Lave and Wenger's work in Communities of Practice, which posits that learning is a social process within a framework of cultural context (Lave & Wenger, 1991).

Our project explores the following questions:

1. *What factors contribute to the use or the avoidance of birth health centers (BHCs) for first-line antenatal care and delivery?*
2. *Working within the context of the local culture, what roles can be established and/or enhanced to develop communities of practice that increase the first-line use of BHCs for antenatal care and delivery?*
3. *Considering the economic context in which our project is situated, how might technology strengthen social networks and communities of practice to increase the use of BHCs for first-line antenatal care and delivery?*

Birth health centers (BHCs) are medical facilities staffed by licensed medical professionals. While they may seem like an obvious choice for giving birth, many women in rural Bangladesh instead opt to labor and deliver at home assisted by nonmedical caregivers. The driving goal of this project is to help our partner organization develop and execute strategies and tactics that influence the greater use of BHCs. Together with our partner organization, we believe care provided in a medical facility and by health care providers will improve maternal health outcomes.

Our data indicate that a range of factors affects the first-line use of BHCs for antenatal care and delivery, including culture, religion, access, education, and economics. Despite these challenges, we found that a robust community of practice already exists in Hashimpur among the traditional birth assistants (TBAs) that serve the village and surrounding areas. TBAs play a critical role in both caring for the women of the village and deciding to refer a woman for medical care at a BHC. Unfortunately, our data find that, as central as the TBA role is, significant training and education are needed for these nonmedical caregivers. Knowledge of

fundamental nutrition, hygiene, and safe birthing practices is lacking. Unfounded treatment methodologies abound and are only perpetuated by the strength, connection, longevity, and dependence on the existing community of practice.

Fortunately, both the villagers and the TBAs have an appetite to explore technology for education —an encouraging finding given the mission of the Digital Village Project. Our first recommendation is to strengthen the outcomes of the communities of practice that exist in the village via connection circles. When implemented, these connection circles would integrate the TBAs with medical staff from area BHCs to establish trust, community, communication, and eventually knowledge and practice sharing. The goal is for TBAs to learn from the medical professionals of the BHCs to increase first-line treatment usage by expectant mothers. In cases where this is not achievable, the TBAs' inclusion in the connection circle would at the very least introduce them to safer pregnancy and birthing practices and help them to recognize complications earlier, before they develop into life-threatening emergencies to both mother and baby.

Our second recommendation is to apply for the Laerdal Foundation Saving Lives at Birth in Low-Resource Settings grant. This grant is awarded to projects focused on improving health outcomes in Tanzania, Ethiopia, Malawi, Bangladesh, India, and Nepal. Ranging in value from $30,000 to $50,000, this grant could supply the one existing clinic space in Hashimpur with equipment and instruments needed to treat expectant mothers. This grant could also fund the technology needed to sustain telemedicine with BHCs; a visiting doctor program; hardware; software; content development for app-based learning; and nutrition, education, and transportation programs for expectant mothers.

Our third recommendation focuses on an app developed per Millennium Development Goal 5 (MDG 5) for use in Nigeria. The m4Change's application helps health care workers (HCWs) adhere to clinical protocols, improve patient care, and standardize health education.

The app provides health counseling recordings on topics such as nutrition during pregnancy, use of iron and folic acid, maintaining hygienic practices, birth planning, number and timing of antenatal care visits, malaria prevention, information about immunizations, recognizing danger signs during pregnancy, postpartum contraception, HIV prevention, and newborn care. Given the strong foundation laid by the Digital Village Project, much of the technical infrastructure to enable this app already exists in the village.

These three recommendations coupled with the great work of the Digital Village Project paint a promising future for increasing safe pregnancy and birthing practices and improving the health outcomes for the mothers and infants of Hashimpur.

INTRODUCTION

A mother and her two children stand outside their home in Hashimpur

Our Capstone project sponsor is rtl@hashimpur, a Bangladeshi technology research firm specializing in the research and development of Artificial Intelligence (AI), Machine Learning (ML), Big Data, and Internet of Things (IoT) solutions adapted for first-generation technology users. While rtl@hashimpur is the overarching sponsor, our project will work under the aegis of its Digital Village Project.

rtl@hashimpur originates from Rational Technologies Ltd (Rational), a company founded in 2012 by Saquib Chowdhury and two other partners. As a technology entrepreneur and social activist, Saquib was unhappy that Bangladeshi users paid premium prices for low-quality software products and services. Rational set forth a mission to create commercially viable, quality technology solutions for Bangladesh and similar markets.

In 2019, following the successful spin-off and sale of Rational's flagship product, Saquib bought out his partners and relocated his operations to his ancestral village of Hashimpur, located 200 km northeast of Dhaka. There, he founded and registered rtl@hashimpur as a public

Female villagers carry harvested vegetation along a train track in Hashimpur

commitment to his vision to serve the 62% of Bangladeshis living in rural areas (Karim, 2010).

Saquib founded the Digital Village Project to build economic resilience to the effects of climate change. As members of the village, Saquib and his team became firsthand witnesses to the life-altering disruptions caused by the ever-increasing severity of storms, heat waves, and an increasingly dangerous (and extended) flood season. Bangladesh's hard-earned economic and

social gains over the past 50 years were at risk of being erased by a single cataclysmic event. The Digital Village Project's core activity thus became the introduction of new and existing technologies to protect and enhance the quality of life for the villagers of Hashimpur and adjoining villages making up the Hajipur Union.

Thus far, the efforts of the Digital Village Project have focused on technology-related improvements. However, Saquib and the Digital Village Project recognize the need for improvement projects in public health. Given the cultural norms and beliefs that situate maternal health, this area has been out of reach for the Digital Village Project. They recognize that their involvement in improving maternal health-related outcomes must be at arm's length to gain traction.

A grandmother tends to her newborn grandson in the family home

Maternal health is the most basic of human needs. Inadequate health care during pregnancy may lead to lifelong health consequences for both mother and child, including maternal death. The definition of maternal death is the death of a mother during pregnancy or 42 days postdelivery (CDC, 2021). The CDC defines the global standard for maternal mortality rates as the number of maternal deaths per 100,000 live births. While Bangladesh's maternal mortality rate has declined continuously over the past several years (CIA, 2021), the country still suffers from a relatively high rate. Landing between Indonesia and Yemen, Bangladesh ranks 131 out of 184 nations (CIA, 2021) in maternal mortality.

Women in Bangladesh are already economically and socially vulnerable. Adding the risks associated with pregnancy and delivery further exacerbates their disadvantaged position, lack of power, and overarching vulnerability. Tending to the most basic health care needs and improving maternal health outcomes will have far-reaching consequences for mothers, children, families, and the broader village community.

Mothers and wives are central to family life, assuming most household and domestic duties. Ignoring the problem of high maternal mortality affects the entire village society. In addition to grief and loss, there is no member of the family left untouched by the premature death of a family's

> ***Bangladesh's maternal mortality rate ranks in the top third of all nations***

mother. Further, a chain reaction ensues, impacting other community members as extended family and friends need to step in to support and care for the family while the head of household continues to work.

This project aims to understand the primary drivers of maternal health decisions in Hashimpur. Only through identifying and understanding such factors can we make effective recommendations for improvement. From our findings, we put forward actionable, sustainable, and scalable recommendations to link education and technology and create meaningful communities of practice to improve maternal health outcomes.

ORGANIZATIONAL CONTEXT

In 2009, the Bangladeshi national government launched an initiative called Digital Bangladesh to accelerate economic and social development through information technology and digital connection. With 62% of its population living in rural areas and 38% working in the agricultural sector, citizens of remote villages stand to benefit the most from this initiative's investments (Karim, 2010).

A decade on, investment in infrastructure and services has primarily benefitted urban dwellers, mostly in the capital Dhaka. The government adamantly pointed to the availability of public and private services through online portals and grassroots Union Digital Centers (UDCs) as proof that no digital divide existed among the citizens of Bangladesh. Yet Saquib's experience at Rational pointed to a different reality. He observed a "Digital Dhaka" where educated and economically well-off residents reaped the full benefits of the digital revolution. Meanwhile, other citizens were aware of the great potential of information technology but received little to no help finding and accessing tools and services to use it. In this context, Saquib launched the Digital Village Project in 2019 to link the citizens of Hashimpur to technology that could alleviate poverty; improve health care and education outcomes; and create economic diversification, resilience, and opportunities.

The Digital Village Project is an arm of rtl@hashimpur, which is a for-profit company. The Digital Village Project enjoys equal status to the two other branches at rtl, namely *4IR* and *Digital Society*. Therefore, the Digital Village Project is not a traditional development project, nor is it sponsored by an NGO, although it does partner with other organizations, some of which are NGOs. Further, rtl@hashimpur would like to serve as an exemplar for other IT companies, encouraging the establishment of company headquarters situated in more rural locations of Bangladesh. While Bangladesh is a hot spot for NGO and development initiatives, rtl@hashimpur seeks to build a case for selfish development based on commercial self-interest, not altruism. This model plants and cultivates technology companies in rural regions of the country to benefit companies and citizens alike.

Before the COVID-19 shutdowns in 2020, both the national government and the national technology industry began to take notice of rtl@hashimpur's model, watching closely to see if it could serve as a model for further expansion and scaling. After the pandemic began, multiple government agencies recognized Saquib as an expert in rural digital connectivity and empowerment. He currently advises the government of Bangladesh on policy and implementation strategies and serves a similar role in organizations such as the UN Development Program and the International Telecommunications Union. He is recognized as a leader in the Bangladeshi technology industry, and the leading universities in Bangladesh look to his work in Hashimpur as a case study. This exposure allows Saquib to connect with decision makers, scale the Digital Village Project, and share the lessons of Bangladesh with the international community.

Since its inception, the Digital Village Project has worked on several initiatives in Hashimpur. However, its first order of business was to secure the buy-in of the local community. Saquib spent 2019 meeting with village elders, elected representatives, police, military and local administration officials, farmers, business owners, madrasah, and school officials, as well as neighbors and curious visitors. The experience of Digital Bangladesh indicated that it was not enough to simply create products and services and expect people to start using them. People asked to change their entire way of

The village chief and imam stand together outside the Chowdhury home

living must understand the benefits of technology and genuinely desire it for themselves.

During this time, Saquib pitched his idea of the Digital Village Project to his network. By January 2020, over a dozen institutional partners committed to supporting, investing in, and executing different components of the initiative. These included primary activities such as bringing broadband internet to the village and creating mobile financial wallets and e-mail accounts for each villager. Other activities planned for the subsequent 24 months included the creation of a wireless infrastructure to connect homes, businesses, farms, and common spaces for an eventual integrated smart community.

The Digital Village Project completed a project to create a digital map of the village of Hashimpur, including every household and location of commerce, as well as marking infrastructure.

ডিজিটাল হাশিমপুর
Digital Hashimpur

(Chowdury, 2022)

On the human side, partners prepared activities to onboard women and farmers onto e-commerce platforms, match autorickshaw drivers with passengers via taxi-hailing apps and introduce a platform to link tradespeople such as masons and carpenters to people in need of their services. In addition to offering technology training, the organization also partnered with others to provide first aid training, training for women and girls on menstruation and reproductive health, self-defense for women and girls through karate classes, training on how to

recognize sexual harassment, women's rights in cases of sexual harassment, and the resources available to help victims.

The onset of the coronavirus pandemic and Bangladesh's first lockdown came 2 days before the formal launch of the Digital Village Project. Like the rest of the world, rtl@hashimpur found itself in a situation for which it was unprepared. In the absence of testing, personal protective equipment, or even access to basic medical facilities, rtl could not continue its work in Hashimpur. It was months before the digital mapping of the community —including homes, infrastructure, and basic demographic data —could occur.

Ensuing lockdowns and COVID-19 breakouts forced rtl to pivot to a more agile and limited operating model. Instead of large community projects, events became limited to small groups working in bubbles. Among these, telemedicine was established as a gateway technology to keep villagers engaged in the Digital Village Project.

In late 2020, we began discussions with Saquib about partnering with us on this Capstone project. We discussed several initiatives the Digital Village Project sought to undertake. Initially, we proposed a quality improvement project on women's empowerment. However, Saquib advised that we needed to stay clear of overtly describing our project as one centered on women's empowerment. As an elder in the village and a leader and business owner in the community, Saquib needed to respect the local patriarchal culture and protect both rtl@hashimpur and the Digital Village Project's image and status so that they could continue to do good work benefiting the entire community. Describing our project as one focused on empowering women would enable groups with vested interests to create controversy. It would endear the villagers to neither Saquib and his organizations nor us.

We identified an underserved area unaddressed by the Digital Village Project —maternal health. Hence the topic of our Capstone project was born: *Activating social learning networks*

and technology to improve maternal health outcomes in Hashimpur. Maternal health is at the center of human life, and poor outcomes have a ripple effect across the entire family and community. While the Digital Village Project is the primary stakeholder for purposes of both the project and carrying out recommendations resulting from our findings, nearly every Hashimpur villager stands to benefit. Further, with the planned scaling of Digital Village Project initiatives across other rural areas, this project has the potential to impact thousands of lives throughout the nation positively.

Our project does not purport to bring about improvement by challenging or changing local cultural norms. Instead, we carefully examine cultural factors such as gender, religion, and beliefs about health care, seeking to understand how these factors shape what we define as the problem. Through this analysis, we make informed, culturally situated recommendations for tangible ways in which maternal health outcomes might be improved through the expanded use of communities of practice and technology. The resulting deliverable to our partner organization is a clear set of strategic recommendations and actionable tactics for implementation.

PROBLEM OF PRACTICE
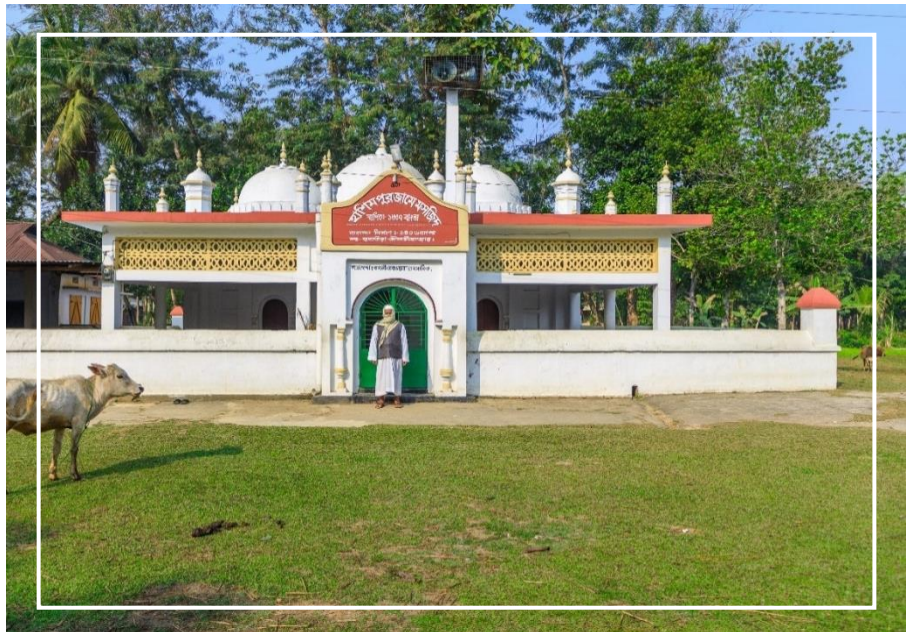
A cow stands outside the local mosque while the imam stands in the doorway

In 2000, leaders from 189 nations signed a declaration to eradicate poverty and improve the lives of the world's poorest people. From this declaration, eight Millennium Development Goals (MDG) were developed, with one (MDG 5), specifically focused on improving maternal health morbidity and mortality (El Arifeen et al., 2014).

rtl@Hashimpur's Digital Village Project was launched in 2019 to leverage Bangladesh's focused investments in information technology and digital connection and to accelerate the development of technology infrastructure, access, and adoption in the village of Hashimpur. The goal of the Digital Village Project is to improve the standard of living for Hashimpur villagers across a wide range of outcomes, including health care. To date, the Digital Village Project has not been able to enter the space of maternal health outcome improvement due to cultural norms and standards, including gender, religion, and class. Our partnership will enable this entrance.

We seek to understand how we might improve maternal health outcomes in the village of Hashimpur in the context of its local norms and culture.

Further, we aspire to understand how we might establish a scalable and sustainable solution that the Digital Village Project can support from afar without actively managing. While there has been significant progress since MDGs were launched, Bangladeshi women experience relatively high maternal mortality rates compared to women in both developed and developing nations (CIA, 2021). The Bengali maternal mortality rate has dropped significantly in the past 20 years from 434 maternal deaths per 100,000 live births in 2000 to 173 maternal deaths per 100,000 live births in 2017, the most recent year for which the

17

World Bank has data. In contrast, high-income countries have maintained a steady maternal mortality rate of 11 maternal deaths per 100,000 live births (World Bank, 2022).

Various factors contribute to Bangladesh's elevated rates:

- economic constraints

- domestic and social pressure and stigma

- hospital and health care skepticism

- how health care practitioners and medical professionals position mothers

- TBAs having minimal or improper training (Barnett et al., 2006).

Our initial literature review revealed a correlation between Bangladesh's maternal morbidity and mortality rates and the use of TBAs. The TBA role serves as a nonmedical provider and is a generalized category. According to Parkhurst and Rahman, TBAs could refer to myriad individuals (e.g., family members who assist in a few deliveries per year or nonrelatives who conduct deliveries as a profession) (Parkhurst & Rahman, 2007). A large proportion of rural Bangladeshi women attempt delivery at home. Many of these women develop complications and engage with alternative healers in a process that may or may not end in receiving professional medical care. Seeking traditional medical intervention is seen as a last resort due to cost and logistics and can be shrouded in shame and stigma. Usually, women and families seek traditional medical intervention only when complications are severe and advanced. Many women, at best, needlessly suffer and, at worst, lose their lives or the lives of their infants from avoidable complications that, if recognized and treated early, are recoverable.

Leveraging wider and more robust communities of practice and available technology to drive the use of bona fide health care services offered at BHCs for antenatal, delivery, and postnatal care is critical to changing this dynamic.

LITERATURE REVIEW

A villager stands with his bicycle by the riverbank in Hashimpur

We conducted our literature review to identify and understand the range of factors shaping and impacting our defined problem of practice. Maternal morbidity and mortality outcomes intersect with a multitude of dimensions. Sensitivity to the broad context encompassing our problem enables us to examine the dynamic from various areas of practice. As Bangladesh is an active space for health care-focused NGOs, available literature was abundant. Therefore, we consulted literature from multiple disciplines, including

- quantitative government data,
- religious texts,
- maternal health studies from other nations in the top quartile of maternal morbidity, and
- medical journals consisting of empirical and experimental studies on public health and medical outcomes.

Finally, we consulted the abundance of ethnographic research focused on macro- and micro-observations of culture.

Our literature review was structured much like a funnel, beginning with a wide range of topics in which we were interested, then narrowing to major themes. Additionally, we reviewed each article's reference list for related publications that might be relevant to further our understanding of our problem of practice. With the help of reference management software, we built a database of nearly 120 individual publications. As we reviewed each publication, we referenced our three project questions to create a tagging system, from which we emerged with 10 literature categories. Referring to our three project questions again, we mapped the initial 10 categories to three high-level themes (see figure 1).
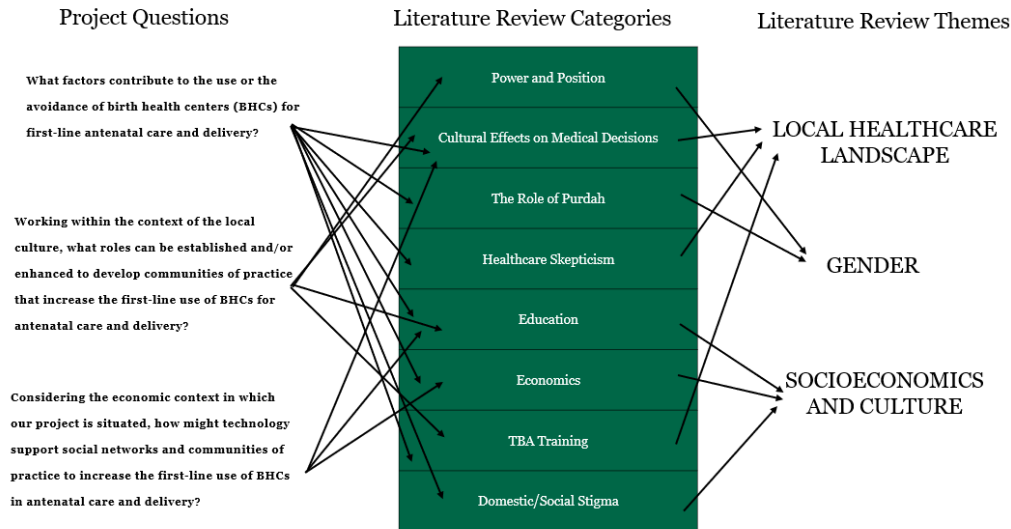
Figure 1

GENDER

NGOs and government agencies working together toward the MDG 5 goal of reducing maternal mortality have focused on one key factor to reduce maternal morbidity and mortality: antenatal and delivery care from a medical professional and delivered in a clinical setting.

Gender is perhaps the most defining and undergirding construct in maternal health, as only females can conceive, gestate, and deliver a baby. Despite their sole ability to perform these fundamental and critical human processes, women in many societies find themselves lacking power and agency in their own health care decisions due to their gender. Bangladesh is no exception, and pregnant Bangladeshi women find themselves in a particularly powerless and vulnerable position to make decisions that affect their health care.

> *"We are Muslim. If male people in the society see women it would be a great sin, so we do not allow women to go outside for treatment"* (42-year-old, male imam) (Sarker et al., 2016, p. 13).

Demographic data indicate that 81% of Bangladeshi women of childbearing age have not completed secondary education, and 78% do not work outside the home. These numbers are

even higher when broken down between urban and rural women. The same demographic study further probed the decision-making authority of women of childbearing age and found that only 12% of respondents make independent decisions about their health care (Ghose et al., 2017). Many rural Bangladeshi women find themselves powerless to exert significant influence over health-related outcomes given their lack of access to education, independent financial resources, and the decision-making authority to influence their own health care choices.

Power over one's health care decisions is a critical factor in a women's reproductive care-seeking behavior, with one study finding that women with a relatively medium level of autonomy were 1.4 times more likely to seek antenatal care from a medical provider (Haque et al., 2012). If a woman does not have agency in her own health care decisions, who does? Numerous ethnographic studies cite the husband's role, the woman's mother-in-law, elders in the village, and religious authorities as having the most significant influence on the care received during pregnancy and delivery (Sarker et al., 2016).

Eighty-eight percent of Bangladeshis practice Islam, making Bangladesh the third-largest Muslim country globally (*2019 State Department Report on Religious Freedom*, 2019). Our literature review revealed that the Bangladeshi interpretation of the Islamic tenet of *purdah* shapes many health care practices and decisions for pregnant women. Purdah is an Islamic practice rooted in modesty and purity, which guides men to cast down their eyes when interacting with women, guides women to cover their outer physical appearance with modest clothing, and encourages the segregation of the sexes outside of the home. Purdah has broad implications for women, especially pregnant women, and as a result, is a factor in the avoidance of BHCs in antenatal care and delivery.

The Bangladeshi interpretation of purdah is culturally situated, as not all Islamic countries nor all Muslims interpret and practice purdah in the same manner. Thus, Bangladeshi women's autonomy and agency, particularly in rural settings, are restricted, which limits access

to education, employment, and mobility outside the home. Rural Bangladeshi women express a preference for home births attended by TBAs instead of births attended in a health care setting by a medical professional (Goodburn et al., 1995). Among many contributing factors, our literature review cited purdah as a defining factor in the preference for home births. Treatment by a male practitioner, especially for obstetrics, is seen as lifting the symbolic veil of purity.

For this reason, many women labor and deliver at home, only seeking medical care when complications arise, often resulting in emergency care when time is short, options are limited, and stakes are high (Parkhurst & Rahman, 2007).

SOCIOECONOMICS AND CULTURE

Our literature review identified education as inseparably linked to maternal health outcomes. Central to this theme is the education level of the parents. Multiple sources cited the likelihood of seeking care from a medical provider as significantly associated with education, with one study finding that the father's education level was a determining factor (Ahmed et al., 2001). Literacy rates are recognized obstacles to receiving care in a clinical setting (Sarker et al., 2016). To overcome the challenges presented by illiteracy, several studies examined the use of pictorial cards to demonstrate visually what obstetrics complications may look like, such as edema, infection, prolapse, eclampsia, convulsions, or hemorrhage (Khanum et al., 2000). Khanum et al. found that awareness of antenatal and postnatal complications was greater in a study group that received the pictorial cards versus the group that did not. In addition to education, economics plays an important role in the decision to seek medical treatment during pregnancy and delivery. Bangladesh has been on the UN's list of "least developed countries" since 1975, and while it is on the path to graduate shortly, one third to one quarter of Bangladesh's population still lives in extreme poverty (Choudhury & Ahmed, 2011). Due to

limited financial resources, it is common for women to delay calling a TBA during active delivery, as the longer the TBA stays, the greater the expense incurred.

Economic factors also limit access to high-nutrient foods during pregnancy and generally limit care-seeking behavior. Multiple studies examined the costs of planning and preparing for pregnancy and delivery expenses, with one study citing the example of a man who was only able to secure 2/3 kg of rice by begging door to door (Choudhury & Ahmed, 2011).

Economic factors may also constrain safe delivery practices and the use of Clean Delivery Kits, which consist of a pair of gloves and a sterilized blade. The kits cost approximately .37 cents each and are empirically proven to decrease postdelivery infection rates (Andrews & Dalal, 2011). Finally, economics also plays a factor in securing transportation should emergency complications arise, with one study referencing a farmer who mortgaged a portion of his land to secure the funds needed to obtain transport to a health care facility for his wife (Choudhury & Ahmed, 2011).

Children sit at a local religious school

Domestic and social stigma often play a role in whether a family will seek care from a trained health care professional in a clinical setting. Particularly in rural locations, women consider pregnancy and delivery as naturally occurring events that do not require medical intervention. Several studies included respondents who cited the increased likelihood of a cesarean section should they seek treatment at a BHC and noted that c-sections are considered unnatural or a failure. Respondents in other studies cited the feeling of shyness and the stigma of shame associated with seeking medical care. Yet others expressed a fear of communicating

their complications to their husbands for fear their husbands would not want to be bothered by the time and expense and would leave them.

A 2004 study by Ballou examined the role of cultural backgrounds and belief systems in determining the type of medical care individuals and communities provide and receive (Ballou, 2004). Such issues are exacerbated when cultural dynamics and interactions differ with medical communities of different cultures (Ballou, 2004). Ballou found that individuals and communities generally prefer to receive care from those with whom they are the most comfortable (Ballou, 2004). Hashimpur's villagers are no different.

LOCAL HEALTH CARE LANDSCAPE

Lastly, the body of literature highlights the role the local health care landscape plays in maternal mortality outcomes. Maternal health outcomes are consistently affected by the level of training and education of birth attendants.

> OB-GYNs in the US – a country that ranks #61 in the world, and last on the list of developed nations for maternal outcomes - complete four years of undergraduate studies, followed by four years of medical school. Next, they complete three years of residency, and in the case of sub-specialties in OB-GYN, another three years of fellowship. This totals between 11 and 14 years of formal higher education.
>
> (Colleges, 2022)

Most TBAs lack formal medical training and education yet are present in the laboring woman's home for most births in rural Bangladesh (Paul & Rumsey, 2002). Unlike skilled birth attendants, midwives, or doctors, TBAs undergo no formal training or education programs. TBA selection often depends more on social and family connections than abilities or skills. The lack of TBA education has consequences, however. A study on umbilical cord cutting practices cited the use of unsanitary procedures, such as the lack of

25

handwashing and gloves, the use of unclean blades to cut the umbilical cord, and in some cases, the use of tools such as bamboo slats, broken glass, stones, string, or other devices used to sever the cord (Andrews, 2011).

Further, a TBA's lack of training in recognizing pregnancy complications may lead to delayed treatment. Several NGOs have sought to provide in-field training for TBAs, and Bangladesh once had a program that lasted more than 20 years and trained over 52,000 TBAs. Nonetheless, a retroactive analysis halted the program because it revealed that it was ineffective owing to poor selection of TBAs as well as inadequate training and education content (Murakami et al., 2003). Other NGO programs have sought to measure the impact women's groups in rural Bangladesh have on maternal health outcomes, finding that well-structured groups led by facilitators (TBA or otherwise) trained in maternal and neonatal health, and which consider participant culture and context, have the greatest impact on improving both infant and maternal mortality outcomes (Azad, 2010).

Despite the lack of formal medical training, TBAs are continually cited throughout the literature as the first choice for labor and delivery, with many examples of women rejecting the idea of Western medical care altogether.

> "People think that TBAs are trained and have been conducting deliveries for a long time. TBAs can handle delivery cases very well. Giving birth at home gives mental peace. Only a woman can understand another woman's problems very well, a woman cannot talk about all their problems with a man, she feels shame and does not feel fear while giving birth at home with the help of TBA; this is her mental peace." – 34-year-old female (Sarker et al., 2016).

Often, those outside or peripheral to a cultural or belief system consider traditional local care practices archaic or ineffective. Hashimpur villagers must navigate similar external

pressures. A multitude of NGOs operating in Bangladesh pushes pregnancy, labor, and delivery practices that are incongruent with long-held local practices. This incongruence is not unique to Bangladesh, however. Ballou (2004) investigates a similar dynamic in her research on the Amish community, noting that "a power struggle over medical hegemony has ensued between the Amish and the outside biomedical community" (Ballou, 2004, p.174).

Antonio Gramsci defines "hegemony" as a state in which the ruling material force of society is also the ruling intellectual force (Scott 1985, as cited in Ballou, 2004). Ballou (2004) presents medical hegemony as dominant classes successfully presenting their definition of reality and its view of the world in such a way that other classes accept it as common sense. Therefore, medical hegemony presents the consensus that the dominant class's worldview is the only sensible one.

Communities' and groups' alternative views are often marginalized because of medical hegemony. Additionally, such communities and groups must navigate internal pressure. Ballou's research of the Amish community finds that "if the group in question also happens to be a minority, individuals may feel pressured by their community to keep their traditional ways while being urged by the dominant community to conform to its views and methods" (Ballou, 2004, p. 174). Hashimpur's traditional medical philosophy practiced by TBAs is often at odds with the Western medical philosophy practiced in BHCs. Unfortunately, this dynamic means that those who need medical attention do not receive it or often receive insufficient care.

Just as the liberal Amish of Indiana find themselves between the Old Order Amish and the non-Amish, Hashimpur villagers also find themselves among traditional villagers, more urban dwellers, and the influence of NGOs. As a result, making medical choices while determining which medical philosophy to incorporate can be a source of mental and emotional stress.

Our literature review found that the Amish and the villagers of Hashimpur are not alone in their struggles with medical hegemony dissonance. Ugwu and de Kok (2015) researched Nigerian women's attitudes and beliefs towards c-sections. Ugwu and de Kok define medical systems as cultural systems like kinship and religious systems —they are intertwined with meanings, values, and behavioral norms. For instance, Nigerian women endure the mental and emotional stress of being seen as a failed woman and wife if they require a c-section. Such mental and emotional stress can lead to and exacerbate health consequences.

 In their 2015 study, Ugwu & de Kok discovered an approximately 14% c-section rate among women in a missionary health institution in the North Central region of Nigeria. "Emergency [c-sections] accounted for more than 90% of all c-sections, which suggests that delays occurred in one or several phases of the care-seeking process. More so, 22% of medically indicated c-sections were refused by the women" (Ugwu & de Kok, 2015, p.10).

Socioeconomic status also exacerbates the effects of cultural background and belief systems on medical decisions. Ugwu & de Kok write,

> "Our qualitative findings also indicate that costs contribute to women's aversion for c-sections in part because when a woman or her husband cannot easily pay for her c-section, chances are that her marriage may also be threatened...This echoes findings from a previous study conducted in Burkina Faso, which found that obstetric emergencies can lead to marriage breakdown, in part due to costs incurred" (Ugwu and de Kok, 2015, p. 10).

Hashimpur's village is predominantly Muslim. Therefore, cultural background and belief systems significantly impact women's prenatal and antenatal medical decisions. Although divorce is permissible in Islam, Hashimpur villagers tend to refrain. In a study in a remote village in Bangladesh, Alam, Saha, Razzaque, and Van Ginneken (2001) "hypothesized that

infants born after divorce . . . experience higher mortality than infants of mothers whose marriages were intact" (p. 273). The study confirmed the hypothesis, finding that "mother's divorce status is related to higher mortality of infants born after a divorce than infants born to nondivorced mothers" (p. 274). Such research illustrates the potential mental and emotional stress resulting from medical hegemony's externalities. For a myriad of reasons, antenatal and labor and delivery care provided by a TBA may be seen as a less risky option.

Medical hegemony is a comprehensive phenomenon —creating external and internal pressures on various communities worldwide. Medical hegemony conflicts with cultural backgrounds and belief systems when groups or communities with alternative views experience marginalization. Ballou (2004) discusses the importance of finding a balance between hegemonic sound medical practices and the natural remedies and treatments influenced by cultural and religious beliefs. By listening to and understanding cultural and religious expressions, medical practitioners can work within cultural constructs to gain trust and influence positive maternal and infant outcomes.

In total, our review of over 120 studies yielded three primary areas impacting maternal health care-seeking behavior in rural areas of Bangladesh: Gender, Socioeconomic Factors, and the Local Health Care Landscape. Our questions for field research in the village of Hashimpur stem directly from the three factors we found to impact maternal outcomes in other rural Bangladeshi communities.

Conceptual Framework and Project Questions

Children play in Hashimpur

SOCIAL NETWORK ANALYSIS

Our primary conceptual framework is social network analysis (SNA). Drawing on the broader study of organizational network analysis that Tichy defines as "a method of conceptualizing organizations that captures the intersection of both static and dynamic aspects of organizations by focusing on the linkages between social objects over time" (Tichy et al., 1979), we look more specifically at social network analysis.

Tichy examines three primary social network relationships by asking first what is exchanged among members of the network, then asking about the nature and the strength of the relationships among the members of the network, and finally, he asks about the structure of the network itself. In the context of our project, the villagers and TBAs in Hashimpur form a social network to exchange information about maternal health care.

Tichy's Social Network Concepts:

1) Transactional Content: what is exchanged by the social objects
   a) Exchange of affect
   b) Exchange of influence or power
   c) Exchange of information
   d) Exchange of goods or services
2) Nature of the Links: this property refers to the strength and qualitative nature of the relation between two social objects
   a) Intensity
   b) Reciprocity
   c) Clarity of expectations
   d) Multiplexity
3) Structural Characteristics: the overall pattern of relationships between the system's actors
   a) External network
   b) Total internal network
   c) Cluster within network
   d) Individuals as special nodes within network

(Tichy et al., 1979)

Our literature review revealed the three overarching categories of Gender, Socioeconomics, and Culture and Local Health Landscape as factors influencing decisions on maternal health care. These categories and the themes contained therein are defined and situated in the various social networks of Hashimpur's villagers. Examining them through SNA offers insight into how they prompt or hinder women and families to leverage different types of antenatal and delivery care.

SNA provides us the framework to map and measure the relationships and flows among gender, socioeconomics, culture, and the local health care landscape, helping us to explore our

first project question: What factors contribute to the use or avoidance of BHCs for first-line antenatal care and delivery?

COMMUNITIES OF PRACTICE AND LEGITIMATE PERIPHERAL PARTICIPATION

Our second framework centers on communities of practice and legitimate peripheral participation and undergirds our second project question: Working within the context of the local culture, what roles can be established and/or enhanced to develop communities of practice that increase the first-line use of BHCs for antenatal care and delivery?

The body of literature informs us of the identified roles and communities of practice involved in improving maternal health outcomes, some of which are already active in Bangladesh because of the Millennium Development Goal initiative (MDG), which was proposed in 1990 by the World Health Organization (WHO) and the UN to improve maternal health globally.

Examining these roles and communities of practice through Lave and Wenger's legitimate peripheral participation framework enables us to recommend sociocultural approaches to learning and development within existing and emerging communities of practice (Lave & Wenger, 1991).

Lave and Wenger propose that learners inevitably participate in communities of practitioners that possess domain knowledge; therefore, the mastery of knowledge and skill requires newcomers

(novices) to move toward full participation in the sociocultural practices of a community. Lave

and Wenger advocate that legitimate peripheral participation provides a way to speak about the relations between newcomers (novices) and old-timers (experts), and about activities, identities, artifacts, and communities of knowledge and practice.

The community of practice framework enables us to provide recommendations that bring Hashimpur's TBAs from the periphery to full participation in the BHCs' communities of practice. From an extensive literature review, we identified the roles of medical practitioners as well as NGOs and other groups that may influence the use or avoidance of BHCs in antenatal care and delivery in Hashimpur. All of these roles form the broader community of practice.

OPTIMIZING SOCIAL NETWORKS AND COMMUNITIES OF PRACTICE VIA TECHNOLOGY

Our third project question explores the intersection of SNA and communities of practice situated in the context of Hashimpur's burgeoning digital landscape and asks the following: Considering the economic context in which our project is situated, how might technology support social networks and communities of practice to increase the use of BHCs for first-line antenatal care and delivery?"

Ho (Ho et al., 2010) asserts that "[i]nformation technologies provide opportunities for communities of practice to facilitate communication among members from different geographic locations and time zones, increasing the diversity of the learning network" (p. 140), and highlight that communities of practice are beneficial to sharing and co-creating knowledge. We anticipate that technology could expand and strengthen Hashimpur's social networks and communities of practice.

The literature also highlights the use of a mobile health app in other rural settings. Vélez et al. (2014) studied a rural community in Ghana and observed that "[m]obile technology presents an opportunity to transform the clinical practice of midwives in developing countries and to better engage them within the health care ecosystem" (Vélez et al., 2014, p.7).

Additionally, Ho et al. (2010) write that such technology "[c]an increase the speed of data collection for use in monitoring and evaluation while providing resources for feedback, clinical decision making, and other information needs" (p. 140). We hypothesize that the following technology may influence the use or avoidance of BHCs in antenatal care and delivery:

- Mobile device type and accessibility

- Internet availability

- E-mail addresses

- Apps and SMS programs

Merging our conceptual frameworks with our project questions and themes from our literature review, we created an overarching framework for our project that illustrates the connections and relationships among the multitude of factors that affect care choices that, in turn, impact maternal health care outcomes in Hashimpur (see figure 2).
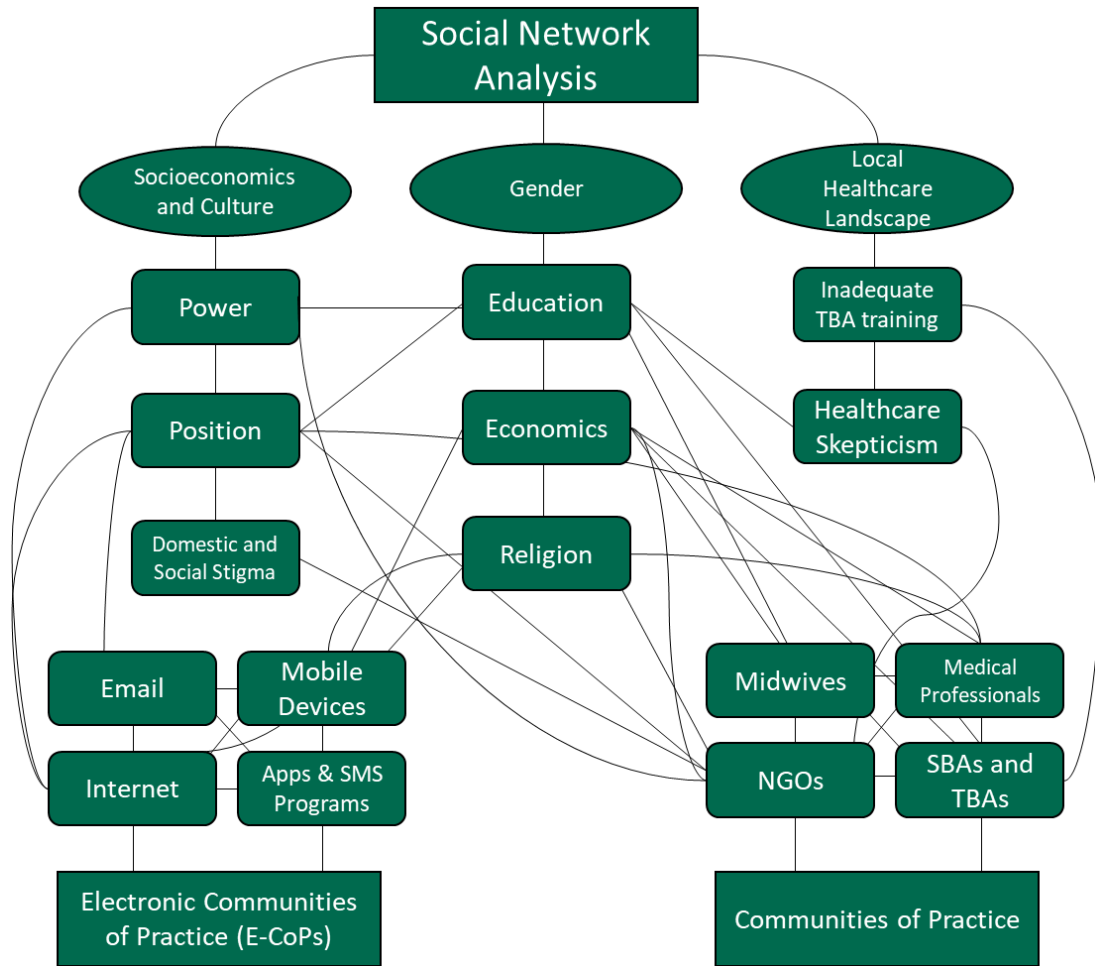
Figure 2

METHODS

Children gather for a picture

Our research employed a multimethod approach, examining both quantitative demographic data and ethnographic data gathered during field research. To situate our project, we began our data gathering by interviewing our partner organization. The goal of this interview was twofold: first, to continue to scope the problem as defined in their terms, and second, to clarify and further probe themes gleaned from the literature. With an agreed-upon scope and input on methods, we began to develop the

Sun sets on the village of Hashimpur

instruments and tools for field data collection.

We examined existing demographic data as available as well as primary data gathered in the field through verbally administered surveys, interviews, observations, and focus groups. We identified four groups with whom to engage for interview sessions:

- Women of childbearing age or older women who have had children but may no longer be of childbearing age
- Women who work as traditional birth assistants
- Husbands of women of childbearing age or husbands of women who have had children but may no longer be of childbearing age
- Village leadership —the village chief and the local imam

As our project takes place in a rural village in Bangladesh, there were complexities inherent in our field research. First, we needed to translate our data gathering instruments from English to Bengali. In October 2021, we contracted with a research assistant who is fluent in English, Bengali, and Sylheti. She translated the questions for each respondent group of interest from written English to written Bengali. In the field, the Bengali versions were referenced when simultaneously interpreting to Sylheti, the local language spoken in Hashimpur.

We initially planned to bring our research assistant to the village to serve as the simultaneous interpreter during all data gathering. Unfortunately, she fell ill with COVID-19 several days before the first interviews occurred. Our partner organization quickly worked to find a suitable replacement, searching for a student or recent graduate in the social sciences who was fluent in both English and Sylheti. Sylheti is a regional dialect, and thus candidates for the research assistant role who had the desired level of fluency were likely to have been raised in the region or have familial ties to the area. We contracted with our second research assistant, Tamana, only a few days before the commencement of field research. Once onboard, we provided Tamana with a rapid yet thorough briefing on the project, the design, the methods for gathering data, the schedule of groups by day, and finally each question set.

Before our arrival, our partner organization contracted two local women in the village to assist with recruitment. We selected both women based on their social ties and influence with other women and families. We provided the women with instructions on the target profile of interviewee subjects (e.g., childbearing age, have had children in the past, traditional birth assistants). Our recruiters did not use written materials for recruitment and instead conducted all recruitment via word of mouth, SMS, and social networking.

To help establish initial rapport and a sense of familiarity before the first day of data collection, we held a large dinner the evening before the first interviews. The dinner occurred on the property of our partner organization. Organizers constructed a tent out of colorful fabrics to create a fun and inviting atmosphere. A nearby village slaughtered a cow earlier in the day, and

we purchased meat from the slaughter. Beef is relatively expensive and is a meal for special occasions such as weddings. Even during times of celebration, scarce resources mean portions are limited. Part of our rapport-building was to not limit portions and to encourage the women to eat as much as they liked.

The only seated guests at the dinner were the women to be interviewed. Any men present remained outside the tent except for the village chief and Saquib, who both left immediately

Tamana interprets Kathryn's opening remarks during a dinner with the female interviewees

after they made their welcoming remarks. Before waiters served the dinner, the village chief endorsed our Capstone project and the work of the Digital Village Project. He mentioned some of the other improvements brought about by Saquib's work. Next, Saquib said a few words about the mission and goals of the Digital Village Project and how our presence was part of building on these initiatives. Once the village chief and Saquib left the tent, we introduced ourselves via the simultaneous interpreter, again explaining the project's intent, and sharing a personal story of motherhood. This rapport-building, while quick, was vital given the sensitive topics to be discussed in the following days. Given the sensitivity around the concept of purdah and modesty, we expected hesitancy in speaking about reproductive health and therefore went to extra lengths to establish trust and comfort among our respondents. The primary researcher is an American, Caucasian woman, and secondly, the research assistant, while Bangladeshi and female, was a stranger not from the village. As outsiders to the community, we wanted to do all that we could to establish a sense of ease and comfort.

We arranged to interview four groups of five women of childbearing age, three groups of one to two midwives, two groups of two husbands of women of childbearing age, and one last group containing the imam and village chief. Upon the arrival of each group, our methods protocol was to again explain the project, then obtain informed consent. Most of our respondents do not read or write. Therefore, to obtain informed consent we verbally explained the informed consent document, then obtained either a signature or a thumb print from an inkpad we brought to the field (see appendix A).
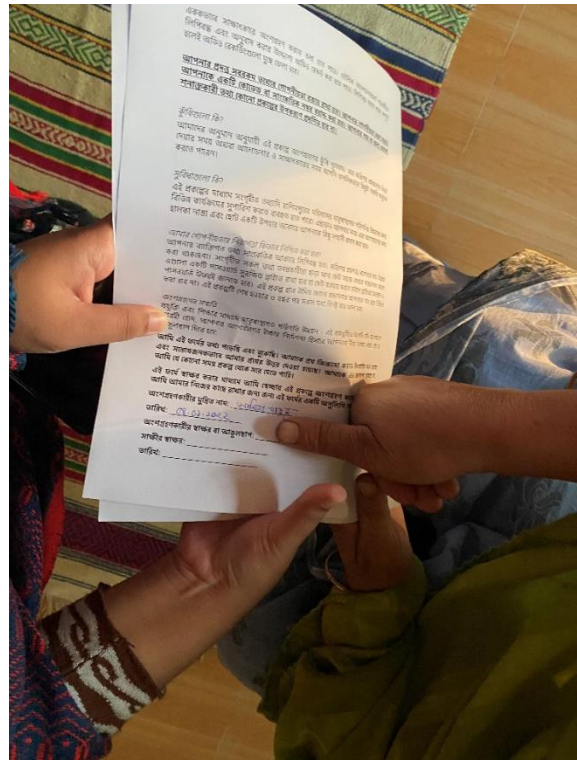
An interviewee provides a thumbprint in lieu of signature on the informed consent form

Our interview sessions were guided by a carefully curated question set based on the type of information we wanted to gather from each respondent group:

Mothers	Husbands	TBAs	Village Leadership
•Personal •Education & Occupation •Assets & Technology •Prenatal, Delivery, and Postnatal Care and Experience •Anticipatory Questions	•Personal •Education & Occupation •Assets & Technology •Prenatal, Delivery, and Postnatal Care and Experience •Anticipatory Questions	•Education, Occupation, Training, and Experience •Anticipatory Questions	•Leadership •Technology •Attitudes towards healthcare

The interview questions were informed by our conceptual frameworks and literature review, and our partner organization vetted each respondent group's question set for cultural sensitivity (see appendices B-E).

The initial set of interviews took place in the living room of the Chowdhury residence, with the interviewees seated in a row of chairs while the primary researcher and research assistant sat directly across. With participant consent, audio recordings were made so that the files could be sent to a research assistant for transcription and translation. Many of our opening questions could have been answered via a

Five women are seated in chairs for an interview session

survey. Given the low literacy rates, we knew in advance we would need to verbally ask the demographic questions.

Due to the time-consuming nature of simultaneous interpretation, the interviews were approximately 90 minutes in length. Each respondent was asked demographic questions individually. This allowed the respondent to provide their name and allowed our transcriptionist to hear their voice on the recording so that they could be linked to future responses for follow-up if needed.

Once we completed the demographic information gathering, we turned to other categories of questions that tied directly to our conceptual framework and project questions. The women answered these questions more conversationally, with most women responding to each question. At times the women spoke over each other. Knowing that this would make transcription a challenge, we occasionally stopped to repeat a question or remind the respondents to speak one at a time so that we could collect their valuable insights.

At the end of the session, we thanked the women for their time and for sharing their stories with us. As a token of our appreciation, each woman was gifted a sari; some adult-sized fabric masks; some child-sized disposable masks with animal cartoon figures; and a small sachet of hand lotion, lip balm, and nail polish. Once the first group of women left the session and returned to the main part of the village, word of the gifts from the United States began to spread, resulting in further interest in our project.

Two women look at their gifts

Our first day of research yielded 10 interviews with women of childbearing age and two interviews with TBAs. After the completion of each session, we immediately sent the audio files for transcription and translation. As we prepared for our second day of field research, a key member of our team tested positive for COVID-19. Given the low vaccination rates in the village, as well as concern for our team members, we immediately decided to break down the operation and leave the village so as not to risk further exposure to the rest of the team or villagers. We still had multiple interviews to conduct across all our demographic groups of interest. However, we were in a region with limited medical care and a village population with low COVID-19 vaccination rates and virtually no social distancing. For this reason, we had no choice but to suspend data collection.

Several weeks after returning home to the United States, we worked with Saquib and our research assistants to schedule additional follow-up sessions for virtual data collection. These sessions were again conducted in the Chowdhury residence, with simultaneous interpreters on site to facilitate. We connected virtually and were on camera via a laptop positioned in front of the respondents.

During the virtual data collection phase, we completed our planned interviews with the TBAs (an additional three respondents) and women of childbearing age (an additional nine respondents). We also conducted sessions with the village chief, the imam, and four husbands of women of childbearing age. Each virtual session's audio was recorded and sent to a research assistant for translation and transcription.

POSITION AND POWER IN THE CONTEXT OF OUR DATA COLLECTION

We would be remiss if we did not mention the role power and position played in our data collection. Hashimpur has three leaders in positions of power and authority. The first and most powerful is Saquib's father, Mr. Chowdhury. His family has owned large amounts of land in the area for decades. His family was recognized as Zamindars (landlords that are descended from nobility) and rented land for others to use for farming. His positional power is the ultimate authority in the village. When asked about the power dynamics in the village, Saquib explained that his father does not engage in the day-to-day politics of the village or issue diktats, preferring to indicate his opinion to village elders rather than engage in any specific situation. As we were guests in the Chowdhury home and all interviews were conducted in the home, this positioned our project very favorably.

The second position of power is the village chief. The chief's position was bestowed by Mr. Chowdhury and is more symbolic power than legitimate power. Nonetheless, his blessing was important to advance our project forward. When we gathered with the women for a dinner on the first night of our data collection, the village chief endorsed our project, giving credence to our presence. His comments linked our work to the tremendous efforts that began years earlier when the Digital Village Project was established. The chief's endorsement was a critical step in positioning our presence and project in a positive light.

Lastly, there is a significant amount of power that lies with the imam at the mosque located on the Chowdhury property. Concerning hierarchy among imams, this imam ranks rather low, given that his mosque is a small congregation. Nonetheless, he is conservative and oppositional to technology expansion efforts in the village. The mosque depends on the devotion of its members. Technology that makes lives better in the here and now existentially threatens the power of the imam. Our partner organization explained this simply: "the more likely people are desperate and deprived, the more likely they are to follow the edicts of religious leaders" (Chowdury, 2022). There is an important distinction here: religious edicts versus the edicts of religious leaders motivated by political power. The Digital Village Project will need to find a way to navigate the tension of this local power dynamic as it launches more digital solutions in Hashimpur, including our recommendations for improving maternal health outcomes. As a result of our interview with the imam, Saquib also gained information about the imam's attitudes toward technology that will help him shape his approach for future rtl@hashimpur projects.

As part of our data gathering techniques, we were careful to treat the chief and the imam with equal reverence. We interviewed both together and began our interview by acknowledging their position of leadership in the village. Additionally, we staggered questions so that the imam would be asked first for one question, then the chief would be asked first for another question.

The layers of politics in the village are very complex, and as outsiders to the language, culture, and village, we were sure to tread lightly, seeking advice and counsel from Saquib before the chief and imam interviews. Saquib vetted our questions to ensure that they were phrased appropriately to generate open and thoughtful responses aimed at uncovering attitudes and beliefs.

While our problem of practice is about maternal health, the support of the chief and the imam will be crucial as we bring solutions forward.

THE IMPACT OF LANGUAGE ON OUR METHODS

We faced a unique linguistic challenge in our data gathering. The language of Bangladesh is Bengali; however, the language of the villagers is Sylheti, a regional dialect. One of the first milestones of our data collection process was to secure local simultaneous translation support. Not only did this person need to be fluent in English, but they also needed to be fluent in Sylheti. With the dogged help of Saquib, we were able to secure two simultaneous interpreters and one translator.

Aside from the informed consent, we did not provide our subjects with any other written materials. All recruitment and interviews were conducted verbally. Even data collection that might normally be conducted via a written survey (age, occupation, etc.) was obtained verbally. This is in part due to the low literacy rates among the women we interviewed, but it is primarily because Sylheti is not considered a written language. While there are publicly funded efforts in the United Kingdom to revive written Sylheti, the language is currently not written, nor does it have a dictionary (Comanaru & D'Ardenne, 2018). The last generation to learn written Sylheti in school was born in the 1950s.

Given these complexities, our interviews were transcribed and translated from recordings of the simultaneously interpreted interviews in one step.

DATA ANALYSIS

The 10 interview sessions we conducted yielded a data set representing 32 individual respondents (see figure 3). Additionally, we conducted two interviews with our Capstone sponsor.
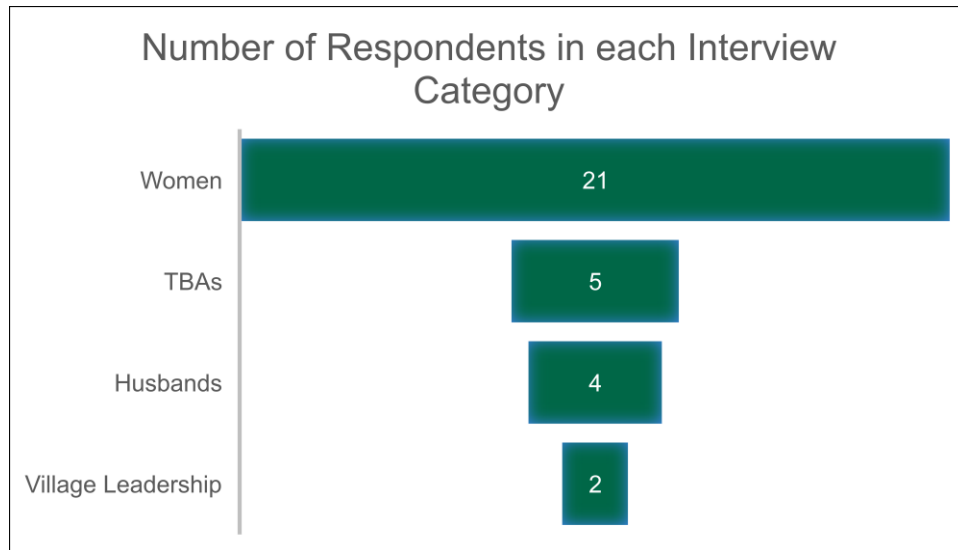
Figure 3

We collected demographic information such as age, years of formal education, age at marriage, and pregnancy histories to get a better sense of the hyper-local socioeconomic landscape in the village. We averaged the responses by each respondent group to better understand the demographic make-up and socioeconomic context of our respondents. We tabulated our data in Excel, as a high-level statistical analysis was not required given the simplistic nature of the data.

Due to the complexities of transcription and translation, plus the conversational nature of the data gathering process, our qualitative data do not match one-to-one on question and answer. During the interview sessions, we posed a question and then followed the conversation naturally as the respondents spoke, sometimes following up with questions that were not part of the initial data collection tool for the sake of clarity or to probe more deeply. Therefore, we

employed a broader selection of data analysis qualitative categories for coding purposes (see figure 4).

| Project Questions | What factors contribute to the use or the avoidance of Birth Health Centers (BHCs) for antenatal care and delivery? | Working within the context of the local culture, what roles can be established and/or enhanced to develop communities of practice that increase the first-line use of BHCs for antenatal care and delivery? | Considering the economic context in which our project is situated, how might technology support social networks and communities of practice to increase the use of BHCs for first-line antenatal care and delivery? |

Conceptual Frameworks: Social Learning Theory | Gender Theory

Literature Review Themes:

Gender	Socioeconomics and culture	Local healthcare landscape
Power & Position	Education	Healthcare skepticism
Religion	Economics	TBA Training
	Domestic/social stigma	

Data Analysis Qualitative Codes:

Economics	Access and equity	Antenatal care	Communities of Practice (CoP)	Cultural factors affecting medical decisions	Culture, beliefs, and norms	Healthcare professionals (HCP): medical doctors and formal healthcare	Religion/Purdah
Social Network Analysis (SNA)	Societies and governance	Millennium Development Goals (MDGs)	International bodies (UN, WHO)	American College of Obstetricians and Gynecologists (ACOG)	Traditional Birth Assistants (TBAs)	Skilled Birth Assistants (SBAs)	Technology

Figure 4

Much like our literature review, our coding methodology began as a funnel and narrowed into more specific themes. For example, socioeconomic themes were separated into education, economics, and social stigma. Economics was then examined based on both keyword searches and reading for context. The words "money", "work", "job", "fees", and "financial" were coded as relating to economics. We also reviewed for context even without the presence of keywords. For example, the section of the transcript in which a woman explained that she took iron supplements sporadically instead of daily to make them last longer was coded under economics.

Field-based, ethnographic, and qualitative data collection is often inherently fraught with complexities. This project is no exception. Our respondents speak an unwritten language, and we relied heavily on simultaneous interpretation and translation. Even with the most experienced linguists, this work can be very subjective. Throughout our data collection and translation process, we used three separate linguists with varying degrees of experience.

Therefore, while we are confident that the data was accurately captured on a thematic level, we cannot be fully confident that a word or phrase was not mistranslated at some point.

FINDINGS

A young woman poses for a picture

Project Question 1: What factors contribute to the use or avoidance of BHCs for first-line antenatal care and delivery?

> *Finding #1: Culture, beliefs, norms, and religious practices (i.e., purdah) impact the use or avoidance of BHCs for first-line antenatal care and delivery. These factors have less impact on seeking BHC care in emergency*

Various factors contribute to the use or avoidance of BHCs for first-line antenatal care and delivery. From the literature review, we anticipated that culture, beliefs, norms, and religious practices (i.e., purdah) would be the most significant factors. While the data analysis confirmed that these factors impact villagers' decisions to use or avoid BHCs for first-line antenatal care and delivery, our data indicate they do not affect villagers' use or avoidance in the case of emergencies.

Interview data illustrated that women do not feel comfortable receiving medical care from male doctors, nor do husbands or the women's mothers-in-law feel comfortable with women receiving medical care from male doctors. Nevertheless, the consensus is that in an emergency neither husbands nor mothers-in-law would deny antenatal, labor, or delivery medical treatment. During one interview session, several women expressed a reluctance to see a male doctor as they would not be able to share all their health concerns, especially regarding gynecological problems. They expressed that they would hide certain health problems as they are hesitant to discuss such issues openly with a male. One respondent explained, "I would be comfortable being treated by a male doctor, but only if he were accompanied by a female who conducted any part of the exam that required physical contact." Nearly all respondents across our interview groups expressed a willingness to seek care from a female medical doctor, although none had ever been treated by a female MD. Nonetheless, in the case of an emergency,

respondents indicated that they are willing to seek care from a male doctor to avoid the consequences of remaining untreated.

We anticipated that culture, norms, beliefs, and the tenet of purdah would greatly influence religious views on maternal health care decisions. The local imam expressed two contradicting beliefs. First, he expressed dissatisfaction with the village's existing antenatal care and delivery services and stated that he encourages villagers to seek professional medical care. We asked him if he provides advice to men during their wives' pregnancies and what that advice entails. He responded, "My advice is to stay safe during pregnancy so that a healthy baby is born. I ask [villagers] to disregard the current birthing practices of the village and seek hospitalization. The current system in the village should be removed and brought under a hospital." However, when questioned further as to his attitudes and beliefs around male doctors treating expectant mothers, the imam stated that "it is uncomfortable. No one wants another male to look at their wife. It is not satisfactory even if a family member is present with the wife." Given the low prevalence of female doctors, especially in rural areas, seeking hospitalization almost always means being treated by a male doctor, something the imam expressed is undesirable.

When we asked the village chief if he provides advice to men during their wives' pregnancies, the village chief replied that he is typically not asked, but when he is, he speaks not with the expectant mother, but rather with her guardian (her husband or another male family member).

Our data illustrate that education, access, and economics play a significant role in the use or avoidance of BHCs for antenatal care and delivery. Although the women in our respondent group averaged more years of formal education than their husbands (see figure 5), their societal
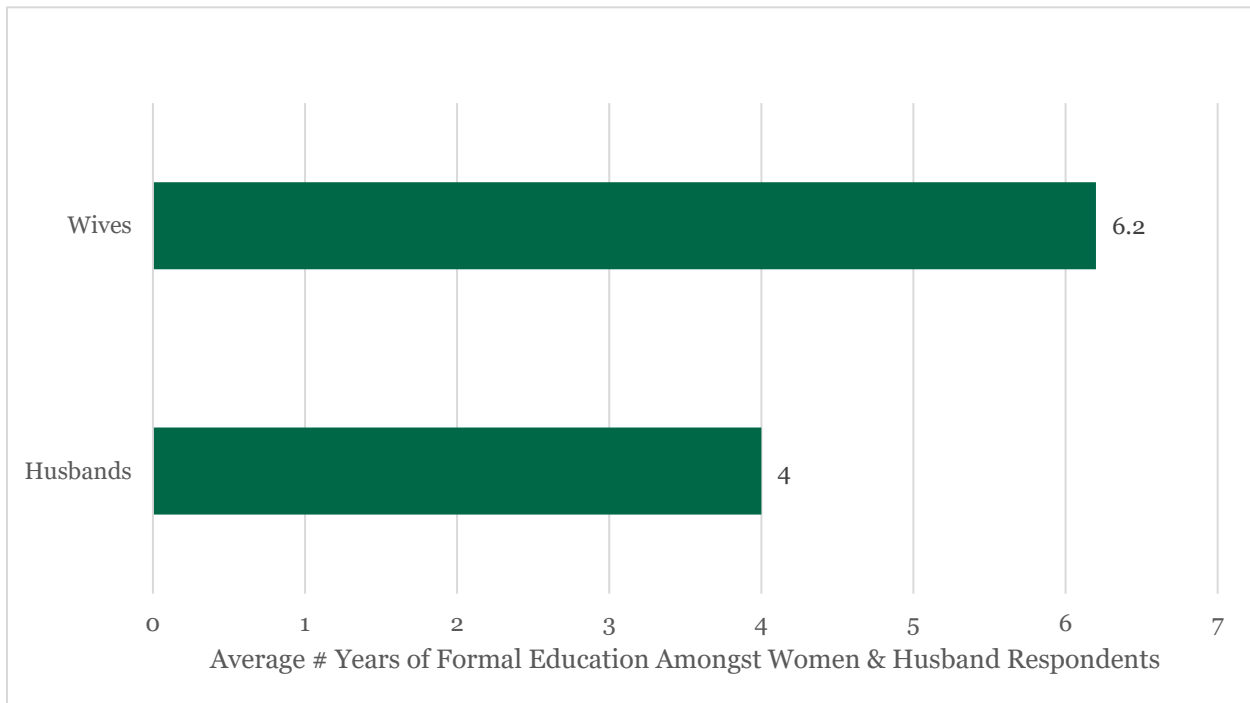
Figure 5

position and access to resources such as medical care are generally tied to their husbands' education level and economic status. Our data indicate that the husband respondent group averaged 4 years of formal education with an average monthly income equivalent to $131. The husbands in our respondent group typically work low-skill jobs like day labor, construction work, or driving. In one interview group, we learned that one woman's husband had completed 2 years of education. The other women's husbands lacked any formal education and only knew how to sign their names.

These constraints limit accessibility to BHCs, prompting families to seek more affordable care from the existing community of practice comprised of TBAs and other women in the village (i.e., mothers, mothers-in-law, and other women who have experienced pregnancy and childbirth).

Access not only pertains to education and economics but includes geographic location and transportation. For example, most male participants do not own vehicles and depend on CNGs and rickshaws for transportation. Therefore, it is difficult to travel to BHCs due to the significant distances. Some respondents indicated that traveling to the hospital takes approximately 1.5 hours from the village and costs between 600 and 1,000 taka ($7-$12 approximately) using public transport like buses or CNG auto-rickshaws.

A CNG vehicle sits in the village

Alternative travel options include renting private cars or passenger vans (such as LiteAce), which are even more expensive.

Additionally, village weather complicates geographic location and transportation factors. For example, male participants emphasized that traveling during dawn or dusk can be both difficult to arrange and dangerous due to dense fog.

Literature suggests that medical hegemony traditionally originates from external entities. In the case of Hashimpur, influence on local and hyperlocal preferences for hospital-centered treatment and care comes from the local leadership.

As mentioned in Finding 1, the local imam recommends, and the village chief agrees, that the village's current antenatal and birthing system should be under hospital auspices. When asked whether the [current] birthing practices in the village are safe, the local imam said, "The current systems used in the village are not safe, and that is because, at present, there are no wise and experienced women like those in the past." This belief is in direct contrast to the long-held beliefs of the women, who expressed great trust and confidence in the TBAs' abilities to care for them during pregnancy, labor, and delivery.

Women respondents expressed dependence on the TBAs during labor and delivery, stating that when they could not find a doctor and were suffering from incredible pain, it was the TBA who attended to their at-home delivery. Further, it was the husbands who sought the care of TBAs when their wives went into labor.

One respondent relayed a story of experiencing sudden bouts of pain during the night, causing sleep disruption. She called the TBA who gave her a belly massage with oil. This helped to gradually reduce the pain so that she was able to resume her regular household duties. Two other respondents recounted complications delivering their placentas after birth. A TBA attended to both. One of the women was unable to urinate or defecate due to complications with the retained placenta. It was the TBA who extracted the placenta from her womb.

Respondents from another interview group also expressed their experiences with TBAs. One woman shared with us that she was one month past her due date and still had not gone into

54

labor. She was scared and did not have the financial resources to seek medical care. A TBA from a distant village was visiting her neighbor and came to check on her after hearing of her condition. The TBA prescribed the woman some medicine and told her that she would go into labor within a few hours. This proved to be true, and the woman had a normal, albeit painful delivery.

While the imam's attitudes and beliefs demonstrate a preference for hospital-based care, the stories recounted by our respondent groups expressed a feeling of comfort, trust, and reliance on the local TBAs.

Project Question 2: Working within the context of the local culture, what roles can be established and/or enhanced to develop communities of practice that increase the first-line use of BHCs for antenatal care and delivery?

Finding #1: TBAs are open to working with medical providers, although the current relationship is informal and TBAs reach out not for routine care, but for emergency situations.

Our data highlight that TBAs are women and families' preference for antenatal care and delivery. TBAs are therefore in the position to refer women to BHCs before and during pregnancy as well as during the postpartum period. As TBAs undergo little to no formal training, they are not chosen for their medical knowledge, but rather for their social and family connections.

Collectively, the TBAs we interviewed have an average of 15 years of experience with minimal training from health care professionals. Nevertheless, TBAs are centrally positioned by villagers in antenatal care and delivery due to proximity and experience —highlighting that even with limited formal training, TBAs have rapport and relationships with the villagers. For

example, one husband, Billal, takes his wife to the doctor for checkups but seeks care from a TBA during delivery. Given this trust and preference for TBA care, there is an opportunity to enhance the knowledge and skill of this provider group to increase safe pregnancy and birthing practices.

Some TBAs we interviewed conveyed a willingness to refer women for BHC care earlier than others. One respondent with over 20 years of TBA experience told us that if she suspects any complications resulting from the position of the fetus, she refers the mother to a BHC. Another TBA who had previously received a brief period of formal training indicated that if a mother is in labor for more than 12 hours or starts to bleed, she refers the patient to seek care from a BHC, as it is unsafe to deliver at home under these circumstances.

Another TBA shared that when a woman is not contracting enough, it becomes harder to assist the delivery. She indicated that some women also have a narrow vaginal passage, and if the baby is large, delivery cannot be done without the assistance of care from a BHC. Trying to force the delivery could lead to severe

"I even assisted in delivering fetuses that died in the womb by using saline and injections. I always make sure to not harm the mother or the baby in any way. I once helped deliver a baby after three days' labor and the baby survived." – Afsun, TBA

"I want to help people in their troubled times, especially those who can't go to the doctor. Women may be harmed before being able to reach the doctor, so I want to be there for them to assist when they need care. This would make Allah happy." – Taslima, TBA

"My mother was a TBA. When women in the village needed help my mother was called often. From the time of my puberty, I would accompany my mother to the houses of women in labor and my mother meticulously showed me the process of delivering babies" – Bahuran, TBA

problems. Another TBA told us of the dangers of trying to deliver a large infant. She recounted a time when she was unable to deliver an infant and finally referred the mother to a hospital. A doctor conducted an episiotomy to try to deliver the infant, but it died, and the infant's father ultimately blamed the TBA for its death.

> *Finding #2: Established antenatal care and delivery communities of practice already exist within Hashimpur.*

The communities of practice that emerged during our interviews are comprised of dedicated TBAs. Collectively, the TBAs consider it a religious and moral duty and obligation to help women throughout pregnancy, delivery, and postnatal care. One TBA, when pregnant, could not find a birth assistant to help her with labor and delivery. Thus, from her own traumatic experience, she related to the other women and felt obligated to help. Therefore, she decided to learn how to be a birth assistant.

Another TBA told us of a time when a laboring woman was in crisis and screaming for help. She became anxious as there wasn't anyone who could assist with the birth, so she went to sajdah (prostration) and prayed to Allah for help, then went to the woman. As the woman labored, she held the crown of the baby's head and asked the woman to push. The baby was successfully delivered, but the mother experienced further postpartum complications. She brought some Amaranth seeds to the mother and asked her to chew them, then gave her four teaspoons of Terpin. She then prayed to Allah to give the woman the courage to have more children. This was the first time she assisted with a birth.

> **Finding #3: The current antenatal care and delivery practices provided by the village's TBAs are not based in evidence-based obstetric protocols but are strengthened and reinforced as they're shared within the existing community of practice.**

Each TBA we interviewed told us of the women and infants she helped, the complications she navigated with mother and baby, and stories of sadness and loss. Each of these stories is a building block in their experience and a connection to the community of other TBAs.

Established antenatal care and delivery communities of practice exist within Hashimpur. However, formal medical training of members is extremely limited. For example, three of the five TBAs interviewed received no formal medical training —with one receiving 3 years of medical training from a doctor who taught her about gestation, the process of severing umbilical cords, and various other obstetric procedures. The other four TBAs received training from family members and friends or were self-taught.

> *"My problems started when I got dysentery and [it was suggested] chewing some tree leaves instead of medical treatment. I had premature labor at seven months. During delivery, the placenta didn't come out and the TBA didn't know what to do about it. She made an incision and took it out with the assistance of another TBA. My baby did not survive."*

TBAs highlighted that they do not have the medical equipment or supplies doctors use during labor and delivery. When we asked what they do have on hand, one TBA described in detail how she uses clothes, rags, towels, napkins, blades, and threads for cleaning the mother and baby and for cutting and tying the umbilical cord during and after delivery. Due to their lack of formal medical training and inability to access standard medical supplies, TBAs often make medical decisions dictated by their local environment, and unsubstantiated practices become standards of care. For example, practices such as tearing the umbilical cord by hand or boiling

instruments along with rice (when the rice is boiled the instruments are considered disinfected) become norms shared among the community of practice, passed on from old-timers to newcomers. Although TBAs attempt to conduct such practices as safely as possible with what is available to them, empirical evidence proves that many of these practices are not only less efficacious but can introduce additional risks in the form of infection, excessive blood loss, and other complications.

One mother told us of a time when she sought the care of a TBA who examined the position of her fetus several times before referring her to a doctor. The mother went to an NGO-run facility where she was informed by a medical doctor that she would need a c-section as the fetus was growing too large to be delivered safely and the mother's amniotic fluid levels were low. The mother then consulted a second TBA who told her that neither care from a doctor nor a c-section would be necessary. The mother suffered through long and stressful labor before a doctor was finally called from the neighboring area. Unfortunately, her baby was stillborn, a tragedy that perhaps could have been avoided had the second TBA not provided an opinion counter to the medical advice the mother received at the NGO-run facility.

Project Question 3: Considering the economic context in which our project is situated, how might technology support social networks and communities of practice to increase the use of BHCs for first-line antenatal care and delivery?

Finding #1: Local leadership is averse to using technology to increase the use of BHCs for antenatal care and delivery.

Although the local leadership's understanding and application of culture, norms, beliefs, and purdah do not significantly impact the use or avoidance of BHCs for first-line antenatal care and delivery, their beliefs and attitudes differ on the use of technology for educational purposes. The village chief and local imam are adamantly against using technology, particularly

smartphones and cell phones, to improve the knowledge and skill level of the village's antenatal and delivery communities of practice.

When asked if they would encourage the use of phones to receive health services and education, the local imam abruptly responded, "Not interested." When responding to the follow-up question "Would [local leadership and villagers] be interested in [receiving] health services training on mobile phones," the local imam responded, "[This] will be harmful. Firstly, [villagers] may not understand what is being said. Considering all the problems mobile phone usage is causing these days, there will be 10 harms being done while trying to bring one benefit." The village chief agreed. The local imam and village chief's attitudes and beliefs on the application of technology to improve health care outcomes may present a barrier not only to our recommendations but to the broader work of the Digital Village Project.

Finding #2: TBAs and villagers are not averse to using technology to receive education on safe pregnancy and delivery practices

In addition to facing medical hegemony from local leadership, Hashimpur villagers must also contend with the local leadership's hegemony regarding technology. All participants conveyed an interest in receiving training via smartphones and cellphones. TBAs also expressed a desire to communicate with expectant mothers via SMS or apps to remind them of proper nutrition, rest, and taking prenatal vitamins. One TBA said simply, "If you teach me how to use the app, I will use it." While this is encouraging, the village's local leadership's attitudes and beliefs regarding technology remain at odds with those of the villagers.

Although the interview participants are generally uneducated and lack access to other resources needed for safe pregnancy and delivery practices, the community of practice wishes to improve its antenatal care and delivery practices via its strong digital connectivity and access to technology. The village's local leadership also desires to improve its antenatal care and delivery

practices, though without, or with limited and/or controlled, use of technology. Given the work already underway by the Digital Village Project, this discordance on the use and benefit of technology will need to be resolved.

RECOMMENDED INTERVENTIONS

Children play in Hashimpur

Recommendation 1: Introduce connection circles to enhance and strengthen the efficacy of the village's antenatal care and delivery communities of practice.

We recommend that the Digital Village Project implement a model known as connection circles to expand and improve the village's broader antenatal care and delivery community of practice. connection circles draw on traditions and storytelling to foster collaborative decision-making, an environment of inclusivity, shared learning, and finally, a dynamic of mutual understanding (Pranis, 2005). Ultimately, the connection circle process develops and strengthens relationships while sharing knowledge and information. The result is a collectively stronger community of practice.

Interview data revealed that the TBAs serving the Hashimpur area strive to provide the best care they can to expectant mothers and that they are an integral part of the village's social networks. However, lack of formal medical training and minimal access to evidence-based obstetrics protocols and resources compromises the standard of care and efficacy the TBAs provide. This introduces unnecessary risk for expectant mothers and their children.

Our interview data indicates that TBAs serving Hashimpur desire community and connection, and our literature review indicates that well-designed groups that embrace the cultural context of their participants are effective in improving maternal health outcomes (Azad, 2010). Connection circles comprised of NGO partners, area BHCs, medical doctors, and the TBA community would create a space to develop a shared understanding, as well as an exchange of knowledge, skills, and information. TBAs would receive valuable training on safe practices and protocols such as nutrition, hygiene, and recognizing complications. They would also receive access to field-based resources to aid in routine care. BHCs, NGOs, and medical doctors would hear of the TBAs' field experiences so that together, the full circle could understand the needs, preferences, and beliefs of the expectant mothers and work collaboratively to devise ways to provide better treatment and thereby reduce risks and improve maternal health outcomes.

After establishing the four relational elements of a connection circle,

- developing plans and a sense of unity;

- meeting, getting acquainted;

- addressing vision and issues; and

- building understanding and trust,

the village's community of practice could identify a Leadership Consortium (LC) to lead the connection circle. This LC would be comprised of multiple stakeholder groups ensuring equity in voice and access. Given our findings related to TBAs' openness to technology, coupled with the core work of the Digital Village Project, we would encourage this newly formed LC to leverage digital connectivity to strengthen and supplement "live" connection circles with a digital community of e-connection circles.

Recommendation 2: Pilot the m4Change antenatal care (ANC) application to scale to full launch.

The Digital Village Project's work has provided Hashimpur villagers with foundational and functional technology access and infrastructure, namely village-wide broadband access, and e-mail addresses for each adult villager. Building on this work, we recommend the introduction of the m4change antenatal care digital app or a locally developed equivalent.

The m4Change project was launched to support and accelerate Nigeria's efforts to reach Millennium Development Goal 5 (MDG 5). The Nigerian government's Saving One Million Lives (SOML) initiative promoted the use of mobile technology to implement maternal and child health programs (McNabb et al. 2015).

Pathfinder International piloted the m4Change project app in northern Nigeria from December 2012 to December 2013. The app supported Community Health Extension Workers (CHEWs) as they provided higher-quality antenatal care services in 10 primary health centers (PHCs) in Abuja and Nasarawa, Nigeria (McNabb et al., 2015). The app supports health care workers as they register and track pregnant women and establishes a digital communication line

to remind women of missed antenatal care checkup appointments, communicate regarding birth plans, and help advise on postpartum care concerns.

Partnering with Pathfinder International to pilot this app in Hashimpur would allow health care workers to partner with TBAs to register and track patients. Health care workers would also be able to access patient records digitally, displaying services received in previous visits and dynamically prompting TBAs to provide services based on decisions and services offered in previous visits.

Client records would include demographic data, medical history, diagnostic information (e.g., blood pressure, height, weight, immunization status), and laboratory test results. The app contains decision-support algorithms covering primary antenatal care services including screening for preeclampsia and management of obstetric danger signs.

In cases where providers input test results (e.g., blood pressure, hemoglobin levels, protein, and glucose levels in urine, etc.) out of normal range, the app would generate recommendations for treatment, referral, and recommendations for tailored follow-ups. The m4change app also includes audio-recorded health counseling messages that can be played by the expectant mother. Health counseling recordings include topics such as nutrition during pregnancy, use of iron and folic acid, maintaining hygienic practices, birth planning, number and timing of ANC visits, prevention against malaria, information about immunizations, education on danger signs during pregnancy, postpartum contraception, HIV, and newborn care. Given the literacy and education constraints revealed in our data analysis and our first finding that highlights the impact literacy and education have on accessing medical care, delivery of information via audio recording will enable greater access for villagers.

The collaborative nature of this app supports and strengthens the connection circles we propose. This app is a crucial tool in not only delivering information but also fostering communication among the network of providers in Hashimpur's broader maternal health community of practice.

Recommendation 3: Apply for the Laerdal Foundation Saving Lives at Birth in Low-Resource Settings Grant.

Our findings indicate that a lack of economic resources constrains villagers' access to antenatal and delivery care. Therefore, we recommend the Digital Village Project apply for the Laerdal Foundation Saving Lives at Birth in Low-Resource Settings grant. This grant seeks applications for projects that employ innovative approaches to providing education as well as launching and scaling projects aimed at improving maternal and infant mortality outcomes. The Laerdal Foundation specifically focuses on projects in Tanzania, Ethiopia, Malawi, Bangladesh, India, and Nepal —all countries with high infant and maternal mortality rates.

Grants range in value between $30,000 and $50,000. We recommend applying for this grant to

- sustain an antenatal care telemedicine program,

- fund nutrition and transportation programs,

- fund Clean Birth Kits,

- fund TBA education,

- support expenses associated with the launch and execution of connection circles,

- and fund the hardware, content development, and training needed to launch the m4change application in Hashimpur.

CONCLUSION

Villagers shop for food in the village bazaar

Our Capstone examines factors that impact maternal health outcomes in Hashimpur, Bangladesh. Based on our research, we provide recommendations to our partner organization that will deliver solutions to leverage technology and communities of practice to improve maternal health outcomes.

The initial literature review revealed factors that impacted the use or avoidance of BHCs for antenatal care and delivery, which spawned three project questions:

- **Project Question** 1: What factors contribute to the use or avoidance of BHCs for first-line antenatal care and delivery?

- **Project Question 2**: Working within the context of the local culture, what roles can be established and/or enhanced to develop communities of practice that increase first-line use of BHCs for antenatal care and delivery?

- **Project Question 3**: Considering the economic context in which our project is situated, how might technology support social networks and communities of practice to increase the use of BHCs for first-line antenatal and delivery care?

Field data revealed the existence of an informal yet established and valuable community of practice among TBAs and villagers. Additionally, despite village leadership's aversion to technology, the TBAs and villagers are ready and willing to use technology to develop and participate in live and virtual networks to improve antenatal care.

Our recommendations are designed to integrate technology with Hashimpur's existing, robust maternal health community to both mitigate unnecessary health risks and drive increased use of medically based BHCs. Further, the Digital Village Project's groundbreaking work favorably positions it to adopt our second recommendation —the proven technology of the m4Change antenatal care app. Our first two recommendations will be supported by our third — funding via an international grant focused specifically on improving maternal health outcomes in low-resource settings.

Hashimpur has both a robust village community and the benefit of the Digital Village Project's work. Synergizing these two dynamics with our proposed recommendations has the potential to dramatically impact maternal health outcomes for generations to come.

References

Maternal mortality ratio (modeled estimate, per 100,000 live births) - Bangladesh, High income | Data. (2022). https://data.worldbank.org/indicator/SH.STA.MMRT?end=2017&locations=BD-XD&start=2000&view=chart

Ahmed, S., Sobhan, F., & Islam, A. (2001). Neonatal morbidity and care-seeking behaviour in rural Bangladesh. *Journal of tropical pediatrics*, *47*(2), 98-105.

Alam, N., Saha, S. K., Razzaque, A., & van Ginneken, J. K. (2001). The effect of divorce on infant mortality in a remote area of Bangladesh. *Journal of Biosocial Science*, *33*(2), 271-278.

Andrews, J. Y., & Dalal, K. (2011). Umbilical cord-cutting practices and place of delivery in Bangladesh. *International Journal of Gynecology & Obstetrics*, *114*(1), 43-46.

Azad, K., Barnett, S., Banerjee, B., Shaha, S., Khan, K., Rego, A. R., Barua, S., Flatman, D., Pagel, C., & Prost, A. (2010). Effect of scaling up women's groups on birth outcomes in three rural districts in Bangladesh: a cluster-randomised controlled trial. *The Lancet*, *375*(9721), 1193-1202.

Ballou, L. (2004). Amish Medicinal Beliefs, Practices, and Practitioners: Medical Hegemony and Its Role in Amish Medical Decision-Making. *High Plains Applied Anthropologyst*, *2*, 174-184.

Bandura, A., & Walters, R. H. (1977). *Social learning theory* (Vol. 1). Englewood cliffs Prentice Hall.

Barnett, S., Azad, K., Barua, S., Mridha, M., Abrar, M., Rego, A., Khan, A., Flatman, D., & Costello, A. (2006). Maternal and newborn-care practices during pregnancy, childbirth, and the postnatal period: a comparison in three rural districts in Bangladesh. *Journal of health, population, and nutrition*, *24*(4), 394.

Butler, J. (2003). Gender trouble. *Continental feminism reader*, 29-56.

CDC. (2021). *Reproductive Health*. Retrieved 2021 from

      https://www.cdc.gov/reproductivehealth/maternal-mortality/index.html

Choudhury, N., & Ahmed, S. M. (2011). Maternal care practices among the ultra poor

      households in rural Bangladesh: a qualitative exploratory study. *BMC pregnancy and*

      childbirth, *11*(1), 1-8.

Chowdury, S. (2022, February). Position and Power in Hashimpur. (K. Desmarais, Interviewer)

CIA. (2021). *The World Factbook*. Retrieved 2021 from https://www.cia.gov/the-world-

      factbook/countries/bangladesh/

Colleges, B. A. (2022). *How to Become an OB/GYN: Education Requirements & Job*

      Description. Retrieved April 30 from

      https://bestaccreditedcolleges.org/articles/become-an-obgyn.html

Comanaru, R., & D'Ardenne, J. (2018). The development of a research programme to translate

      and test the personal well-being questions in Sylheti and Urdu. GESIS Symposium on"

      Surveying the Migrant Population: Consideration of Linguistic and Cultural Aspects",

Desmarais, N. (1998). Encyclopaedia Britannica CD 98. *Electronic Resources Review*.

El Arifeen, S., Hill, K., Ahsan, K. Z., Jamil, K., Nahar, Q., & Streatfield, P. K. (2014). Maternal

      mortality in Bangladesh: a Countdown to 2015 country case study. *The Lancet*,

      384(9951), 1366-1374.

Ghose, B., Feng, D., Tang, S., Yaya, S., He, Z., Udenigwe, O., Ghosh, S., & Feng, Z. (2017).

      Women's decision-making autonomy and utilisation of maternal healthcare services:

      results from the Bangladesh Demographic and Health Survey. *BMJ open*, *7*(9).

Goodburn, E. A., Gazi, R., & Chowdhury, M. (1995). Beliefs and practices regarding delivery and

      postpartum maternal morbidity in rural Bangladesh. *Studies in family planning*, 22-32.

Haque, S. E., Rahman, M., Mostofa, M. G., & Zahan, M. S. (2012). Reproductive health care

      utilization among young mothers in Bangladesh: does autonomy matter? *Women's*

      Health Issues, *22*(2), e171-e180.

Ho, K., Jarvis-Selinger, S., Norman, C. D., Li, L. C., Olatunbosun, T., Cressman, C., & Nguyen, A. (2010). Electronic communities of practice: guidelines from a project. *Journal of Continuing Education in the Health Professions*, *30*(2), 139-143.

Karim, M. A. (2010). *The Concept of Digital Bangladesh*.

Khanum, P. A., Quaiyum, M., Islam, A., & Ahmed, S. (2000). Complications of pregnancy and childbirth: knowledge and practices of women in rural Bangladesh. In: International Centre for Diarrhoeal Diseases Research, Bangladesh: Dacca.

King, A. (2004). The prisoner of gender: Foucault and the disciplining of the female body. *Journal of International Women's Studies*, *5*(2), 29-39.

Lave, J. (1991). Situating learning in communities of practice.

McNabb, M., Chukwu, E., Ojo, O., Shekhar, N., Gill, C. J., Salami, H., & Jega, F. (2015). Assessment of the quality of antenatal care services provided by health workers using a mobile phone decision support application in northern Nigeria: a pre/post-intervention study. *PLoS One*, *10*(5), e0123940.

Murakami, I., Egami, Y., Jimba, M., & Wakai, S. (2003). Training of skilled birth attendants in Bangladesh. *The Lancet*, *362*(9399), 1940.

Parkhurst, J. O., & Rahman, S. A. (2007). Non-professional health practitioners and referrals to facilities: lessons from maternal care in Bangladesh. *Health Policy and Planning*, *22*(3), 149-155.

Paul, B. K., & Rumsey, D. J. (2002). Utilization of health facilities and trained birth attendants for childbirth in rural Bangladesh: an empirical study. *Social science & medicine*, *54*(12), 1755-1765.

Pranis, K. (2015). *Little book of circle processes: A new/old approach to peacemaking*. Simon and Schuster.

Raihan, R. (2022) *Collection of Hashimpur Research Trip Stills January 2022*

Sarker, B. K., Rahman, M., Rahman, T., Hossain, J., Reichenbach, L., & Mitra, D. K. (2016).

Reasons for preference of home delivery with traditional birth attendants (TBAs) in rural

Bangladesh: a qualitative exploration. *PLoS One*, *11*(1), e0146161.

2019 State Department Report on Religious Freedom. (2019). Retrieved from

https://www.state.gov/reports/2019-report-on-international-religious-

freedom/bangladesh/

Tichy, N. M., Tushman, M. L., & Fombrun, C. (1979). Social network analysis for organizations.

Academy of management review, *4*(4), 507-519.

Ugwu, N. U., & de Kok, B. (2015). Socio-cultural factors, gender roles and religious ideologies

contributing to Caesarian-section refusal in Nigeria. *Reproductive health*, *12*(1), 1-13.

Vélez, O., Okyere, P. B., Kanter, A. S., & Bakken, S. (2014). A usability study of a mobile health

application for rural Ghanaian midwives. *Journal of midwifery & women's health*,

59(2), 184-191.

World Bank (2022). Retrieved from The World Bank:

https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=BD

Appendices

এককভাবে সাক্ষাৎকারে অংশগ্রহণ করতে বলা হতে পারে। মৌখিক আলোচনাগুলো পরবর্তীতে লিপিবদ্ধ এবং অনুবাদ করার উদ্দেশ্যে অডিও রেকর্ড করা হতে পারে। লিপিবদ্ধ করার কাজ সম্পূর্ণ হলেই অডিও রেকর্ডিংগুলো মুছে ফেলা হবে।

<u>আপনার প্রদত্ত সবরকম তথ্যের গোপনীয়তা বজায় রাখা হবে। আপনার গোপনীয়তা রক্ষা করতে আপনাকে একটি কোডেড বা সাংকেতিক নম্বর বরাদ্দ করা হবে। আপনার নাম বা অন্য কোনো শনাক্তকারী তথ্য কোনো প্রকল্পের উপকরণে প্রদর্শিত হবে না।</u>

ঝুঁকিগুলো কি?

আমাদের অনুমান অনুযায়ী এই প্রকল্পে অংশগ্রহণের ঝুঁকি ন্যূনতম। তবে জরিপের প্রশ্নগুলোর উত্তর দেয়ার সময় অথবা আলোচনার ও সাক্ষাৎকারের সময় আপনি মানসিকভাবে কিছুটা অস্বস্তি অনুভব করতে পারেন।

সুবিধাগুলো কি?

এই প্রকল্পের মাধ্যমে সংগৃহীত তথ্যাদি হাশিমপুরের মহিলাদের মাতৃস্বাস্থ্যগত পরিণতির উন্নয়নের জন্য বিভিন্ন কার্যক্রমের সুপারিশ করতে ব্যবহৃত হতে পারে। এছাড়াও আপনার সময় এবং অংশগ্রহণের জন্য হালকা নাস্তা এবং ছোট একটি উপহার আকারে আপনাকে কিছু সম্মানী প্রদান করা হবে।

আমার গোপনীয়তার নিরাপত্তা কিভাবে নিশ্চিত করা হবে?

আপনার ব্যাক্তিগত তথ্য সাংকেতিক আকারে লিপিবদ্ধ হবে। জরিপের প্রশ্নপত্রে আপনার নাম উল্লেখ করা থাকবেনা। সংগৃহীত সকল তথ্য তদন্তকারীরা ছাড়া অন্য কেউ সহজে দেখতে পারবেননা কারণ এগুলো একটি পাসওয়ার্ড সুরক্ষিত ড্রাইভে রাখা হবে যা কেউ ব্যবহার করতে চাইলে ড্রাইভের অবস্থান ও পাসওয়ার্ড উভয়ই জানতে হবে। এই প্রকল্প হতে উদিত কোনো প্রকাশনায় আপনাকে নাম দ্বারা চিহ্নিত করা হবে না। এই প্রকল্পটি শেষ হওয়ার ৩ বছর পর সকল তথ্য বিনষ্ট করে ফেলা হবে।

অংশগ্রহণের সম্মতি

প্রযুক্তি এবং শিক্ষার মাধ্যমে মাতৃস্বাস্থ্যগত পরিণতি উন্নয়ন - এই প্রকল্পটিতে আপনি যদি অংশগ্রহণে আগ্রহী হোন, আপনার অংশগ্রহণের ইচ্ছার নির্দেশনা হিসাবে আপনাকে নীচে স্বাক্ষর করতে হবে বা আঙুলছাপ দিতে হবে:

আমি এই ফর্মের তথ্য পড়েছি এবং বুঝেছি। আমাকে প্রশ্ন জিজ্ঞাসা করতে উৎসাহিত করা হয়েছে এবং সন্তোষজনকভাবে আমার প্রশ্নের উত্তর দেওয়া হয়েছে। আমাকে এও জানানো হয়েছে যে, আমি যে কোনো সময় প্রকল্প থেকে সরে যেতে পারি।

এই ফর্মে স্বাক্ষর করার মাধ্যমে আমি স্বেচ্ছায় এই প্রকল্পে অংশগ্রহণ করতে সম্মতি জানাচ্ছি। আমি আমার নিজের কাছে রাখার জন্য জনা এই ফর্মের একটি অনুলিপি পেয়েছি।

অংশগ্রহণকারীর মুদ্রিত নাম: ___আয়মুন বেগম___

তারিখ: ___08·01·2022___

অংশগ্রহণকারীর স্বাক্ষর বা আঙুলছাপ: _____

সাক্ষীর স্বাক্ষর: _____

তারিখ: ___08·01·2022___

Appendix B – Interview question guide for women of childbearing age

Target subject: A female of childbearing age who is married

Personal and Demographic

1.   What is your current age?

2.   How old were you when you got married?

3.   How many pregnancies have you had?

4.   How many live births have you had?

5.   What is your husband's current age?

Education and Occupation

1.   What is your highest degree of education?

2.   Do you work outside of the home? If so, what do you do?

3.   What is your husband's highest degree of education?

4.   What does your husband do for work?

Assets and Technology

1.   What is your approximate monthly household income from all sources?

2.   Do you own your home or any land?

3.   Is money a factor in seeking hospital care?

4.   What are your primary means of transportation?

5. Is transportation a factor in seeking hospital care?

6. How many cell phones are in the home?

7. Do you have a reliable internet connection?

Prenatal, Delivery, and Postnatal Care and Experience

1. When you were pregnant, did you take any prenatal vitamins?

2. When you were pregnant, did you receive care from anyone? If so, whom?

3. If you received care, how was that caregiver selected?

4. If you needed to seek urgent care, how did you contact the hospital?

5. If you needed to seek urgent care, how did you get to the hospital?

6. What type of care options for pregnancy, labor, and delivery are available here in the village?

7. Did you receive any information or education about potential complications during pregnancy?

8. Did you receive any information about what to expect during labor and delivery?

9. Where did you labor and deliver your pregnancies?

10. Who was present for the labor and delivery?

11. Where was your husband during the labor and delivery?

12. What role did family members play in your pregnancy care, labor, delivery, and the postpartum period?

13. Did you recognize any complications that arose during pregnancy?

14. Were you informed by a caregiver that you were experiencing complications? If yes, what were you told and what treatment was recommended?

15. Did you recognize any complications that arose during labor and delivery?

16. Were you informed by a caregiver that you were experiencing labor and delivery complications? If yes, what were you told and what treatment was recommended?

17. Did you recognize any complications that arose in the six weeks after delivery?

18. Were you informed by a caregiver that you were experiencing postpartum complications? If yes, what were you told and what treatment was recommended?

19. Do you feel that your husband or any members of your household would have been able to recognize any complications?

20. Who did/do you turn to for advice on matters of pregnancy, labor, and delivery?

21. Whose opinion did/do you trust on matters of pregnancy, labor, and delivery?

22. Who did/do you consider an expert on matters of labor, pregnancy, and delivery?

Anticipatory Questions

1. How would you feel about receiving routine care from a female-trained midwife during pregnancy? During labor? During delivery? During the postpartum period?

2. How would you feel about receiving routine care from a female doctor during pregnancy? During labor? During delivery? During the postpartum period?

3. How would you feel about receiving routine care from a male doctor during pregnancy? During labor? During delivery? During the postpartum period? Would this opinion change if the care required was for an urgent complication?

4. How do you think your husband, mother-in-law, or other family members would feel if you received routine care from a male doctor? Urgent care from a male doctor?

5. If you had the opportunity to learn more about safe pregnancy, labor, and delivery practices on your phone, would you be interested in learning more?

Appendix C – Interview question guide for traditional birth assistants

Target subject: A traditional birth assistant who provides care during the antepartum, labor, delivery, and postpartum periods.

Education, Occupation, Training, and Experience

1. What is your current age?

2. What is your highest degree of education?

3. For how long have you been a birth assistant?

4. What prompted you to get into this role?

5. What kind and how much training or education do you have for your role as a birth assistant? Who provided this training?

6. Do you feel that you have enough training, or would you be interested in more?

7. What types of supplies do you have on hand when attending a birth?

8. Do you feel that you have access to all the tools and supplies you need to do your job effectively?

9. Do you enjoy what you do?

10. What's hard about what you do?

11. How do families know to seek out your care? Who decides to seek care from you?

12. How many births have you attended?

13. What types of care, advice, or counsel do you provide during pregnancy, labor, delivery, and the postpartum period?

14. How much interaction do you have with the pregnant woman's husband? Mother-in-law? Mother? Other relatives?

15. How often do you see your patients while they are pregnant?

16. When you do a physical exam, what are you checking for?

17. What are the most frequent complications you see during pregnancy, labor, delivery, and the postpartum period? How do you treat them?

18. Based on your experience, how do you know when a complication needs further medical care?

Anticipatory Questions

1. If you had the opportunity to learn more about safe pregnancy, labor, and delivery practices on your phone, would you be interested in learning more?

2. If you had the opportunity to give the women in your care information about safe pregnancy, labor, and delivery practices on your phone, would you be interested in learning more?

Appendix D – Interview question guide for husbands of women of childbearing age

Personal and Domestic

1. What is your current age?

2. How old were you when you got married?

Education and Occupation

1. What is your highest degree of education?

2. What do you do for work?

Assets and Technology

1. What is your approximate monthly household income from all sources?

2. Do you own your home or any land?

3. Is money a factor in seeking hospital care?

4. What are your primary means of transportation?

5. Is transportation a factor in seeking hospital care?

6. How many cell phones are in your home?

7. Do you have a reliable internet connection?

Prenatal, Delivery, and Postnatal Care and Experience

1. When your wife was pregnant, what kind of care did she receive and from whom?

2. If she received care, how was that caregiver selected? Who selected the caregiver?

3. If she needed to seek urgent care, how did you contact the hospital?

4. If she needed to seek urgent care, how did you get to the hospital?

5. As a father, did you receive any information or education about potential complications your wife might experience during pregnancy?

6. As a father, did you receive any information about what to expect during labor and delivery?

7. Were you present during the labor and delivery?

8. What role did family members play in your wife's pregnancy care, labor, delivery, and the postpartum period?

9. What role did family members play in making care decisions for your wife during labor, pregnancy, and delivery? Who made what types of recommendations or decisions?

10. Did you recognize any complications that arose during pregnancy?

11. Were you informed by a caregiver that your wife was experiencing complications? If yes, what were you told and what treatment was recommended?

12. Did you recognize any complications that arose during your wife's labor and delivery?

13. Were you informed by a caregiver that your wife was experiencing labor and delivery complications? If yes, what were you told and what treatment was recommended?

14. Did you recognize any complications that arose in the six weeks after delivery?

15. Were you informed by a caregiver that your wife was experiencing postpartum complications? If yes, what were you told and what treatment was recommended?

Anticipatory Questions

1. How confident do you feel that you or any members of your household can recognize any complications?

2. How would you feel about your wife receiving routine care from a female-trained midwife during pregnancy? During labor? During delivery? During the postpartum period?

3. How would you feel about your wife receiving routine care from a female doctor during pregnancy? During labor? During delivery? During the postpartum period?

4. How would you feel about your wife receiving routine care from a male doctor during pregnancy? During labor? During delivery? During the postpartum period? Would this opinion change if the care required was for an urgent complication?

5. If you had the opportunity to learn more about safe pregnancy, labor, and delivery practices on your phone, would you be interested in learning more?

6. Would you use technology tools?

7. Who do you trust for information about technology services?

   a) Would you go to Saquib for technology help?

   b) Would/does Saquib help you now?

Appendix E – Interview question guide for the local imam and village chief

1. What happens when a child is going to be born?

2. What are the current prenatal and birthing practices in the village?

3. What do you think could be improved?

4. As the village chief: Do you provide advice to men during their wife's pregnancy? What advice?

5. As the Iman: Do you provide advice to men during their wife's pregnancy? What advice?

6. As the Imam: Do you provide advice to women during their pregnancy?

7. As the village chief: Do you provide advice to women during their pregnancy?

8. Should women receive medical care from a **<u>midwife</u>** during pregnancy and delivery?

9. As the Imam: Should you advise women to receive medical care from a **<u>female doctor</u>** during pregnancy and delivery?

10. As the village chief: Should you advise women to receive medical care from a **<u>female doctor</u>** during pregnancy and delivery?

11. In which situations would it be acceptable for a woman to seek care from a male doctor?

    a. Women seeing male doctors in the company of family members?

    b. Women seeing male doctors in the event of an emergency?

12. As leaders in the village, do villagers ever request resources from you to aid in pregnancy and delivery? (Funds for transportation, mobile phone usage, medicine, or payments for midwives or doctors?)

13. How does your religion influence medical decisions in the village?

14. Can villagers recognize any complications during pregnancy, labor, and delivery?

15. Do you know about health services over the phone?

16. Would you encourage the use of phones to receive health services?

17. Would you encourage their use for women/expecting mothers?

18. Who do you trust for information about technology services?

19. Would you go to Saquib for technology help?

20. Would/does Saquib help you now?

21. As the Imam: Do you have any ideas to improve childbirth?

22. As the Village Chief: Do you have any ideas to improve childbirth?

Appendix F – Transcript Coding Example

Color Codes:

$
Access & Equity
Antenatal Care
Communities of Practice (CoP)
Cultural factors affecting medical decisions
Cultures, beliefs, norms
HCP: MDs & Formal Healthcare
Medical
Purdah
SNA
Societies & Governance: **MDGs, WHO, UN, ACOG**
TBAs & Midwives
Technology

Timestamp 7:40 -

Participants' name, current age and age of marriage
1. Rumi Begum, aged around 41, married at 11 years of age
2. Mina, aged around 40, married at 14/15 years of age
3. Shafia Begum, aged 22, married at 16 years of age
4. Piyara, aged around 30, married at 16 years of age
5. Rukeya Begum, aged around 50, married at 16 years of age

Timestamp 11:00 -

Pregnancies
1. Rumi Begum: 8 pregnancies with 2 miscarriages, 6 live births
2. Mina: 3 pregnancies, all live births
3. Shafia Begum: 1 pregnancy, 1 live birth
4. Piyara: 4 pregnancies including one having twin girls, her first child was born home and it was a miscarriage, then there were 3 live births
5. Rukeya Begum: 5 pregnancies, all were live births but one son died later
   (for Rukeya, interpreter mentions that there were four successful pregnancies out of a total of 5.However from my understanding during the transcription, it seems the son was born live but died later)

KD talks about the importance of the research to her as a mother who was pregnant twice and has one daughter.
Interpreter explains to the participants that Kathryn is herself a mother with one child and is very interested to know how these women became mothers in a nice manner.

Timestamp 13:30 -

Highest degree of education and Occupation
1. Rumi Begum studied in Maktab (the local religious school run by the mosque) where she learned reading Arabic (*not necessarily understanding the language*)

2. Mina also studied in Maktab like Rumi
3. Shafia Begum studied till Grade 5 (has completed primary education)
4. Piyara studied till Grade 3
5. Rukeya Begum is uneducated

All the women are housewives and one of them work outside home

Timestamp 16:25 -
Husband's education & Occupation
Only Mina's husband studied till Grade 2. Husbands of the other 4 women did not receive any formal education and they only know how to give a signature.

1. Rumi Begum's husband works as a decorator (i.e. works to put up decorations on venues of weddings/events)
2. Mina's husband works as a day laborer working on whatever is available at any time
3. Shafia Begum's husband also works as a day laborer
4. Piyara's husband works as a laborer for a timber enterprise (i.e. cutting and trimming trees)
5. Rukeya Begum's husband has no work

Timestamp 19:38 -
Prenatal vitamins during pregnancy
Piyara had iron tablets which she was prescribed due to carrying twins (interpreter mentions vitamin tablets).
None of the other participants took any vitamins or other supplements during pregnancy.

Timestamp 21:25 -
Care during pregnancy
Everyone received care from family members,especially mother-in-laws.

Only Shafia Begum didn't receive it from her MIL. She was taken care of by a niece on her in-laws side (her husband's elder brother's daughter)

Timestamp 22:50 -
Contacting hospital for urgent care
They mention that they had to go through a lot of struggles and suffering to go the hospital. Their husbands took them.

Rumi Begum was hospitalized for washing her womb after miscarriages.
Piyara's twin baby was born in a reputed hospital in Kulaura (city area).
Mina, Shafia and Rukeya didn't need to go to hospital as they had home deliveries. One of them got saline injected at home.

Timestamp 26:00 -
Care options for pregnancy, labor and delivery available in the village
There are not many care options except for a doctor (MBBS qualified), who takes a visiting fee of 500-2000 taka (US $6 - $24) and helps with injections of medicine or saline.

Those who have money can seek care from suitable places by reaching there quickly, but the participants' families cannot afford external services, so they have to go through much suffering.
At home, midwives/TBAs provide care and call the doctor if necessary.

Timestamp 29:35 -
Information or education about potential complications during pregnancy
They have not received any such information except advice from mothers or mother-in-laws to eat timely and warnings about leg swelling, etc.
TBAs came for visiting but did not provide any specific education or information about complications. They only gave oil massages if there was pain and advised about eating and drinking well.

Timestamp 34:53 -
Who was present during labor and delivery if at home?
   1. Rumi Begum had two TBAs present, one of whom was Piyara's mother. Her mother and sister were also present and looked after her.
   2. Mina had one TBA and a sister present.
   3. Shafia Begum had an aunt-in-law who was a TBA and also her sister-in-law present.
   4. Piyara had her mother, who was the TBA, and mother-in-law present during her home birth which was a miscarriage. Rest of her deliveries were at the hospital.
   5. Rukeya Begum had her aunt and cousin present who were also TBAs.

Timestamp 39:35 -
Husband during labor and delivery
Husbands of Rumi Begum and Mina were at work. They came running with TBAs when they heard about the labor and stayed outside the room during delivery.

Shafia Begum's husband was out of town and couldn't be present during delivery. Her MIL called the aunt-in-law (who was a TBA) once the labor started.

Piyara's husband, mother, MIL and sister were with her at the hospital. Only the doctor and her sister were in the delivery room. Her husband waited outside.
During her home delivery in her very first pregnancy, her MIL was inside the room and husband waited outside.

Rukeya Begum's husband waited outside the room.

Timestamp 43:05 -
Recognizing complications during pregnancy, labor, delivery and the post-partum period (6 months postdelivery)
   1. Rumi Begum - for her two miscarriages, she had blood loss on third month of pregnancy. She doesn't know why it happened. Rest of her pregnancies were normal
   2. Mina - After her third (last) pregnancy, she had an ulcer and couldn't have any more children. Her previous pregnancies/delivery/postpartum were normal
   3. Shafia Begum had normal pregnancy, delivery and postpartum
   4. Piyara had an abnormally large belly at 4 months. Her husband couldn't take her to a doctor due to having a financial crisis. Then her sister was called, and she loaned money

and took her to a doctor in the nearby town area. The doctor did a scan on the computer and found out that she was carrying twins. The doctor then advised her to get regular monthly checkups. It was not financially possible for her to go every month, so she went every couple of months.

She had very swollen legs and a big belly from 4 months onwards, making it difficult to move or even get up from the bed. She needed assistance to get up from reclining position.

After delivery, she was very sick and had numbness in her limbs for around 10− 12 days.

1. Rukeya Begum had no labor pain. Doctor was called to give her saline.
   After delivery, she had a problem of hypertension.
   She also had a swollen body during pregnancy, making it difficult to move.

Timestamp 55:00 -

Trust as an expert in matters of pregnancy and delivery
They trust their husbands (Rumi and Mina), doctors, and other people with knowledge on the matter such as nurses and midwives.

Call drops for several minutes. The participants discuss among themselves in low voices.

Timestamp 1:06:15 -

Receiving medical care from female doctor during pregnancy
They all feel it would be of great benefit to everyone

Timestamp 1:07:16 -

Receiving medical care from male doctor during pregnancy
They would be uncomfortable to openly speak about their problems to a male doctor. All participants want to avail care from a female doctor.
Piyara is okay with a male doctor if no females are available.

Timestamp 1:10:05 -

Opportunity to learn more about safe pregnancy, labor, and delivery practices over phone
They are all interested to learn more through mobile phones

Timestamp 1:11:30 -

KD thanks everyone for their time and sharing their stories.
The participants express their gratitude to KD for trying to know about them.

Gifts are distributed.

Acknowledgments

Nilima Tariq: Despite challenges and obstacles, you stayed the course to help us get this important work done. Your attention to detail through the arduous task of transcribing and translating hours upon hours of audio files is impressive. You took our raw data and (literally) translated it into a workable form. We can't thank you enough for your commitment to this project.

Tamanna Jahan Tanni: We are forever indebted to you for your passion and dedication to our work. You took on a major initiative with little time to prepare, and you jumped in without hesitation. Your steadfast commitment to the integrity of our data collection is commendable and greatly appreciated. We thank you for your collaboration on this project and your friendship.

Retul Raihan: You have a remarkable talent and ability to capture emotion on film. From the arrivals hall in Dhaka to departure and every step in between, you captured and documented this amazing journey in Bangladesh. Thank you for your generosity and dedication to this work and thank you for your continued friendship.