Cesarean Wound Care
After Hospital Discharge: A Qualitative Study in Rural Haiti

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Cesarean Wound Care after Hospital Discharge: A Qualitative Study in Rural Haiti

Elizabeth M Campa, MSc

A Thesis Submitted to the Faculty of
The Harvard Medical School
in Partial Fulfillment of the Requirements
for the Degree of Master of Medical Sciences in Global Health Delivery
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Cesarean Wound Care after Hospital Discharge:
A Qualitative Study in Rural Haiti

Abstract

Part 1 discusses the current situation in Haiti and challenges women face in receiving healthcare while Part 2 details a research project completed on the topic of C-section wound care.

The number of cesarean section (C-section) deliveries has risen dramatically over the last few decades, with an estimated global number of 29.7 million C-sections in 2015 (Boerma, 2018). C-section delivery may be accompanied by many complications, surgical site infection (SSI) being the most prevalent. Post-cesarean SSI may increase maternal morbidity and mortality (Salim, 2012; Awad, 2012).

In 2018, Hôpital Universitaire de Mirebalais (HUM) in rural Haiti registered 5,007 births. Of these, 30% (1,502) were C-sections (Personal communication). This study assesses the information HUM clinicians share with women at discharge for C-section wound care and how women receive and can follow these recommendations.

Data collected through semi-structured interviews with clinicians resulted in a consensus-based C-section discharge checklist and interviews with clinicians and women who have recently had a C-section provided insight on the discharge process. Clinicians focused recommendations in five areas, including bandage change, bathing, changing clothes, restricting physical effort, and infection prevention. Most women interviewed for the study reported receiving no information at discharge or limited information before leaving the hospital. For women that received discharge instructions, many left the hospital confused by the information and unable to ask questions.

HUM should work towards formalizing the discharge process after a C-section by finalizing the checklist developed in this study and train clinicians. HUM should also review providing a set of written or illustrated instructions that a woman and her family could take home for review after discharge.

Additional research should take place to improve understanding on the discharge process in low and
middle-income countries by exploring what women understand in order to best equip women in avoiding complications after a C-section.
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Part 1: Background

Collette Joseph, whose name has been changed to protect her privacy, had long dreamt of becoming a mother. Growing up outside of Ouanaminthe in rural, northern Haiti had never been easy. Her education ended just after completing the 6th grade; her primary role growing up was to help her mother care for her younger brothers and sisters. Married at 20, Collette’s husband dedicated his time to her and the small plot of land they farmed together when he was not working in the factories of Ouanaminthe.

Collette had only realized she was pregnant when her mother mentioned she was gaining weight. After discussing her last menstruation, they determined she was at least five months along. Shortly after, Collette and her mother made the journey to the nearest hospital, more than 15 miles away. There, she weaved through the crowds of ailing women and children, the air thick with the smell of sweat and unwashed, tired bodies to register and then wait for hours in the blaring sun. When the nurse completed her exam, Collette learned that her blood pressure was of concern; the nurse counseled on how to help with this, including reduced salt intake, rest, and regular visits to the hospital for follow up. Collette mentioned to the nurse that she lived far away, but the nurse did not seem to care and stated that Collette needed to figure out how to return for her check-ups. Upon leaving the hospital that day, nearing her sixth month of pregnancy, she was unsure how she would be able to follow the nurse’s instructions and prayed she would get better.

Unfortunately, for Colette, the next few months of her pregnancy would prove difficult, she grew more and more uncomfortable when she could no longer distinguish if her bodily pains were labor-related or her escalating blood pressure, she decided to trek back to the main hospital in Cap Haitian, the second-largest city in Haiti, which has a population of 300,000. There, at approximately 37 weeks gestation, she was wheeled into the operating room for an emergency C-Section. Scared that her husband was not allowed to be with her, she quickly lost consciousness as the anesthesia set in.

Some hours later, Collette woke up, tired but alert, immediately asked for her baby. The pressure in her head was less so now than when she had arrived hours earlier. Her body ached, but as her baby boy was in her arms for the first time, the trauma of the day’s events seemed to wash away. Finally, she was a
mother. When the time came to for discharge several days later, a hospital worker—though she was unsure if it had been a nurse or an administrator—handed Collette discharge paperwork along with her medical bill. Collette and her husband only had $50 to their name when the baby arrived, as it was just a few weeks short of the harvesting and selling their crops. Thankfully, Collette's uncle in Miami agreed to pay the $450 cost of the C-Section.

They boarded the bus to return home to her community outside of Ouanaminthe, located along the Haiti and Dominican Republic border. It was there her husband began to read the slip of paper provided to them: keep the wound clean, replace bandage regularly, wash with soap and water each day, keep dry, eat well, rest. Collette wondered how she would be able to follow the recommendations, as she had never spent any time in a hospital. Her family's home was many miles away, and her mother, with the responsibilities of her children, was unable to assist Collette and her new baby. With her husband working at the nearby industrial park most days and in the fields tending crops most evenings, she was on her own to care for the baby—rest would not come easy. It all seemed too much to bear when all she wanted was to enjoy her new baby’s face as the bus bumped along the road home.

A few days after arriving back, Collette felt overly tired, and her head feverish. Overnight, her wound had become red and itchy. Alone and afraid, she called her husband to return home. As she changed from her housecoat into street clothes, the baby began to cry. Though Collette needed to focus on healing, the baby took up her full attention—the feedings, the bathing, changing, and washing cloth diapers; all the while, any movement would impart significant discomfort, further pain. She thought back at the paper provided at the hospital; to keep the wound clean, to wash it with soap and water; but time had passed so quickly in the first days after arriving home, and while she tried so hard, she had not thought of her wound until now.

A few hours later, Collette reached the clinic located at the Codevi industrial park, where her husband worked at a local factory when not working in the fields. The 20 miles and several buses that cost a day’s wages were almost too much to bear. Waiting alongside the hot, dusty road with her husband
and newborn, the wound at her belly oozed and stained her clothes. Every so often, she would catch the odor from her oozing wound, and she would feel nauseous. She knew she needed to see a doctor.

Once at the clinic, the doctor diagnosed Collette with a severe C-Section wound infection that required debridement. Pain medication was unavailable due to a stock out, so she bit down on the strap of her purse as the doctor cleared out the infected tissue. Once the procedure was complete, the doctor provided antibiotics to last her the week and instructed her to return to the clinic two days later and return the following week. Collette felt robbed of all the beauty surrounding her newborn son by the exhaustion, infection, and pain she experienced. Collette would recover but would not forget the experience of those first few days home with her baby.

Collette had made it to the main hospital in Cap Haitian. As Collette recounted her story, she is thankful to God for having arrived at a health facility where C-Section was available. What would have happened had she reached a health facility much closer to her home that did not offer C-section?

Collette can count herself lucky. She could travel quickly to a clinic not far from her community and received assistance. Because of her husband's position at the industrial park, he and his immediate family had access to essential health services. The clinician took care of the wound infection, and the visit and medications had been free. Unfortunately, in Haiti, thousands of women die in the first few weeks after giving birth each year. For these women, help often arrives too late, if at all.

**Understanding the discharge process**

The purpose of this paper was to learn how we can protect women like Collette from C-Section wound infections by ensuring we equip them with useful recommendations to take care of themselves once they leave the hospital. By equipping women with information on how to care for their C-section, we can prevent infections and other complications that may arise after a C-section. Before we can determine how to assist these women, we need to build a fundamental understanding of what happens in the hours and days after a woman has had a C-section, from the time she leaves the operating room through discharge from the hospital.
As part of the process of understanding what clinicians share with women at discharge after a C-section, we first interviewed clinicians. Through these interviews, we produced a checklist for discharge based on clinicians’ recommendations. Second, we interviewed women who had recently undergone a C-section to gain insight on information shared with them by clinicians and how women receive this information during discharge. By equipping women with information on how to care for their C-section wounds, we anticipate that they will be able to identify better when to seek care if complications develop.

**C-section and SSIs globally**

A C-section is often the only solution when vaginal delivery poses a risk to mother or baby, including prolonged labor or when the baby presents in an abnormal position. However, what is equally important to understand is that while a C-section can be lifesaving, the procedure can also lead to complications, including death, mainly where the lack of facilities to conduct safe surgeries or treat complications are limited (Betrán, 2016).

C-sections remain one of the most frequently performed surgeries worldwide. Data collected from 169 countries representing 98.4% of total births globally estimate that 29.7 million C-sections occurred in 2015 (Boerma, 2018). This increase can be due to more women give birth in health facilities as well as greater availability of C-sections at health facilities around the world.

C-sections also vary significantly from one region to another. At 44%, Latin America and Caribbean region has highest rate of C-sections (Boerma, 2018). Issues remain in parts of the world where facilities are inadequately prepared to conduct a C-section or cannot maintain sterile surgical spaces or have stock out on medications, including antibiotics.

There is a risk of complications with any surgical procedure. Surgical site infections (SSIs) are the most common form of complication after a C-section. While there is limited data globally on C-section related SSIs, particularly in lower- and middle-income countries (LMICs), the current estimate for SSI globally related to C-section is between 3-15% (Zuarez-Easton, 2017). The risk in developing SSI has declined over the last thirty years with the use of antibiotic prophylaxis and health facilities with sterile procedures in place, creating more hygienic environments. Today, due to the increase of C-sections...
globally, the rate of C-section SSI is likely to increase, which can also contribute to higher maternal mortality rates (Gibbs 1980; Krieger 2016).

**Haiti Challenges**

Several years after the 2010 earthquake, the government of Haiti developed a National Health Policy (MSPP, 2012). The plan described Haiti’s health challenges, including reducing morbidity and mortality. The goal of the plan was to lay the groundwork toward a universal health system. As part of the plan, one of the objectives was also to guarantee sufficient funding of the health system by steadily allocating funds into the health budget. Besides, following the trends of other countries, the plan included using performance-based results that lined up with the national priorities (MSPP 2012).

Corruption and poverty continue in Haiti (Verner, 2006) with little to no progress towards reaching the goals set in 2012 by the government of Haiti and the Ministry of Health. Since 2014, the Haitian government has seen growing disparities in leadership from failed parliamentary elections, a revolving door of ministerial representatives, presidents leading by decree (as of this writing, Jovenal Moise has no mandate to lead, but remains president), Haiti has also seen one of the worst cholera epidemics in modern history, and now the coronavirus pandemic. Since 2018, Haiti has seen levels of civil unrest unknown to the current generation of Haitians too young to remember the crisis of the 1990s. Lack of government, infrastructure, or a commitment to follow through of promises of a better tomorrow through the support of international partners and current inflation of 20%, weak education system, and roads continue to add to Haiti’s complexities with no specific or easy solutions in sight. There are no simple solutions to how meaningful change can take place.

Civil unrest since July 2018 has led to countrywide lockdowns and closing of schools for months at a time. With an untrained, ill-equipped, and underpaid police force with little presence on the streets, armed gangs were driving violent clashes on the streets and road closures affecting everyday life.

The maternal mortality rate in Haiti is 480 per 100,000 live births (World Bank, 2019; EMMUS 2017), resulting in Haiti having the highest maternal mortality rate in Latin American and the Caribbean (World Bank, 2019). While skilled birth attendants are present in Haiti, a skilled birth attendant
accompanies only 60% of deliveries in Haiti (Kivland, 2019). World gains in Haiti’s healthcare have all but stalled in the ten years after the Haitian earthquake with many hospitals and health care facilities destroyed, and whole cadres of health care professionals killed. Even a decade later, Haiti is still working itself out of this devastating event. Despite the infusion of almost $10 billion of foreign aid into Haiti (Ramachandran, 2015), and the multitude of outside interventions through the presence of thousands of non-governmental organizations (NGOs), gaps persist at all levels of healthcare in Haiti.

**C-sections in Haiti**

The lack of care women seek during pregnancy in Haiti may contribute to the increase in C-sections leading to a rise in complications. With C-section SSIs, we also see an increase in the number of emergency visits of women returning with severely infected C-section wounds; this could lead to higher percentages of women admitted to the hospital for prolonged stays. With prolonged stays, families face added stress to care for the newborn as well as further burdening the family when health facilities require payment for services (Salim, 2012).

Due to the lack of a national Electronic Medical Records (EMR) system or stability of available health facilities offering C-sections, it is difficult to estimate the total number of C-section births in Haiti. Of the approximately 905 defined health facilities in Haiti, 121 identify as hospitals. An additional 129 defined as health centers with beds, and 297 are health centers without beds. The remaining 358 facilities categorized as dispensaries (primary care facility run by private or charitable organizations), which total 43% percent of these defined health facilities. Only ten percent of these total facilities offer C-section services (IHE, 2014). Through a general review of facilities offering C-section in Haiti, the vast majority are either private hospitals with high fees or facilities providing services on a non-continual basis. Of these, we estimate that half or more currently is not in operation and lack staff and supplies to manage C-sections due to the ongoing crisis in Haiti, where hundreds of health facilities have shuttered their doors.
Hôpital Universitaire de Mirebalais and C-section

Changes in the Haitian healthcare system are taking place. This is true at HUM, a ZL supported Haitian Ministry of Health hospital located in the Central Plateau of Haiti. Opened in March 2013 in partnership with Zanmi Lasante, Partners In Health's sister organization in Haiti, HUM offers advanced care across clinical specialty and sub-specialty. These areas include a full-service emergency department, maternal health, critical care units, psychiatry, oncology, general and orthopedic surgery, laparoscopic surgery, medical evacuation capacity, amongst others. HUM also brings innovation and services previously unavailable in Haiti's public system: digital imaging and a portable CT scanner; an open-source electronic medical records system; telemedicine capacity and high-tech classrooms to train the next generation of Haitian doctors and nurses.

The Santé Famn program, Haitian Creole for women's health, is one of the fastest-growing departments at HUM, encompassing almost half of the hospital's services. Santé Famn focuses on providing high quality, comprehensive care in maternal health, including pre- and post-natal care, and C-sections.

HUM sustains one of the highest rates of C-Section in Haiti, as it is the largest hospital within the Haitian health system free of the financial burden to its patients. HUM is the primary referral hospital in the country for C-section surgeries. In 2019, HUM preformed 5,600 births, of which approximately 1,700 were via C-section (HUM EMR). C-sections represent over 25% of all labor and deliveries.

Improving C-section care

To better support women who have undergone a C-section and improve their chances of remaining healthy after this procedure, we need to create an environment of openness between clinicians and patients. This support begins with what clinicians share with women who have undergone a C-section, what they understand, and what they take home to practice and care for themselves after a C-section. In the event they do develop a complication after the C-section, we need to create an environment where women feel comfortable coming back for further treatment. While it is unclear what level of
complications post-C-section relates to C-section wound care, this is a first step in understanding how to improve the discharge process and, ideally, reducing overall complications after C-section in the process. **Barriers to care**

Thankfully, Collette’s uncle in the US was able to pay for the fees incurred for her emergency C-section; however, for most Haitians, one of the most significant barriers to health care is poverty. Over six million Haitians live below the poverty level (World Bank, 2019), and, as a result, accessing health care and paying for these services is an additional barrier for Haitians.

Haiti spends less on healthcare per capita than any of its closest neighbors. For example, the Dominican Republic spends $180 per capita, Cuba, $781, and the Latin American and Caribbean region, overall, $336. Haiti spends $13. While health care spending is the lowest in the region, this is only one of the factors leading to barriers to women seeking care.

Haiti’s landscape also plays a crucial role in preventing adequate access to services. Haiti includes ten administrative departments, each with its capital city and health care infrastructure. Haiti’s demographics contribute to the many complexities of maternal health care. Approximately 45% of the Haitian population lives in rural, mountainous areas that are only accessible by poorly maintained roads, which have high rates of accidents and long travel times (UNICEF, 2013; PAHO, 2011). Rural residents have limited access to primary health care and qualified medical facilities. Another barrier to a woman caring for her C-section wound is the lack of clean water and sanitation. In rural areas of Haiti, less than half of households have access to improved sources of drinking water, and many access water for bathing from rivers or unprotected water sources, including natural springs and wells (EMMUS, 2012). Access to household sanitation also remains low in rural Haiti, with approximately 40% of households having no toilet facilities compared to only 7% in urban areas (EMMUS, 2012).

Financial barriers to health care are one of the most significant obstacles for pregnant women needing access to obstetric care (DHS, 2012; PAHO, 2012). For Collette, had she not traveled to the main hospital in Cap Haitian to seek care, she would have stayed at home or gone to a nearby facility that
would not have been able to treat her high blood pressure and provide an emergency C-section. Her decision to travel to a hospital likely saved her and her son’s lives.

Public transportation in rural areas of this mountainous country is almost nonexistent, adding to the barriers of accessing health care, paying for services, and geographic isolation. The lack of transportation is most evident when arriving at HUM in the morning hours of the day just after the sun has come up. Even a few miles out from the hospital, one notices scores of individuals with bundles on their heads and babies strapped to their backs marching towards the hospital. Mixed into these groups are pregnant women who stop every few minutes to catch their breath. Some travel from just a few miles away, while others may have started their journey days before.

The Haiti earthquake of January 2010 had a catastrophic impact on Haitian health systems still felt today. The earthquake destroyed sixty percent of Haitian state-owned infrastructure and dozens of health facilities, including more than 50 health institutions with losses and damage in the health sector that exceeded 200% of annual expenditure in health from all sources (PAHO, 2011).

**Steps for a future with improved C-section wound care**

According to the existing literature, the majority of pregnant women in Haiti receive at least one antenatal visit (90%); however, far less complete the recommended four visits (67%) (EMMUS, 2012). Anecdotal evidence from patients and clinicians suggests that care varies in terms of service components and quality; however, there are no systematic reviews of data addressing the quality of antenatal care in Haiti. Standardized, high-quality prenatal care could potentially influence a pregnant woman's satisfaction with care, her knowledge of C-section wound care and the signs of an infection, danger signs in pregnancy, her decision to seek a facility-based delivery, and her knowledge of available postpartum family planning methods (Séraphin, 2015). Little is known about the quality and uptake of post-natal care. In 2016, only 30% of women and only 19% of infants received any post-natal care in the first two days after delivery (EMMUS, 2016). No evidence is available in the literature on these services provided at these visits, and there are no current estimates of post-natal care uptake at the recommended 1-week or 6-weeks visits (Mirkovic, 2017).
In the fall of 2018, the Santé Famn service at HUM began a new program focusing on the first year of a baby's life. While typically this would be from the day that a woman knows she is pregnant, in Haiti, this reality is much different. In the first group recruited from August through October of that year, ZL enrolled 265 women (161 in August alone) including 99 women in their 3rd trimester. The first cohort recruited women into the program in their 3rd trimester but after that recruited women in the first and second trimesters. They are near to giving birth, having come to HUM, as it is a trusted health care facility. Early findings of the Journey to Nine program are promising. This program is a new approach to group pre- and postnatal care introduced at HUM in the fall of 2018 to decrease maternal and infant mortality. Through this new program, evidence has uncovered that women have very few prenatal checks, and there are currently no protocols in place for women to have post-C-section checks.

Conclusion

As it currently stands, the Haitian health system is failing the women of Haiti; this is most evident for those most desperate to give birth in a safe environment. Let us look at the example of September 2019, when riots throughout Haiti led to roads manned by machete-wielding, masked gangs. Political unrest has proven to be one of the most significant barriers to access care in recent history. Even when care is available and nearby, unrest can make it so that access is all but impossible. Let us look at Loretta's recent experience.

Loretta Renoult woke up as soon as she felt her water break in Lascaobas, a town some 15 miles away from Mirebalais. She already knew she was a likely candidate for C-section as her previous child was born by C-section. She and her husband took their motorcycle and road as far as they could before reaching streets blocked with huge tree limbs set aflame the day before. Masked men demanded money to continue on the road; they paid as many times as they could until their few Haitian Gourdes ran out. They then walked the last few miles just before reaching Mirebalais when she passed out. From there, Loretta does not remember anything when she woke up that evening. As her husband tells the rest of the story, a few men helped him carry her the remaining distance to the hospital, where she was triaged then sent straight to the surgical ward. The husband shared the details of when the nurse had said that the baby was
born blue, but slowly came to life. Within a few days, Loretta was back home nursing her newborn when
the familiar pain from her mid-section began. Having had a C-section before, she was conscious of
checking her wound regularly. While it looked normal, the wound was painful to the touch. As soon as
she realized she might have a C-section wound infection, she returned to HUM, where a clinician cleaned
her wound and a new replaced the bandage. Clinicians prescribed antibiotics to Loretta, who was able to
return home the same day. For the roughly 80% of women having emergency C-sections at HUM women
at HUM (Millien, 2019 personal communication), the shock of having a major surgery should not be
compounded by potential complications in C-section wound infection.

We know that C-section delivery is one of the most frequent surgical interventions performed
worldwide and accounts for up to 60% of births in several countries (Gibbons, 2010; Belizán, 1999). We
also know that C-section carries an added risk for various short-term postoperative morbidities, including
C-section wound infection. Moreover, infections occurring after delivery may lead to substantial physical
and emotional burdens on the mother and a significant financial burden on the health care system (Olson,
2010). Given its substantial implications, recognizing the consequences, and building strategies to prevent
and treat SSI are essential for reducing post-C-section maternal morbidity and mortality (Zuarez-Easton,
2017). Besides, this is where we hope to create some level of understanding of the importance of C-
section wound care instructions and education at discharge. If we know what is at stake, for the woman,
for the child, for the families that will ultimately pay the price, a concerted effort to close this gap needs
to take place.

At present, HUM has over 1,000 patients at its front gates as the sun comes up each morning. ZL
never turns away patients from receiving health services, but many will wait days to see a doctor. Dozens
of these patients will be women in the early stages of labor. Others will go back because they have had
their babies and are not feeling well. While we know the challenges of meeting patients' health needs, we
need to make a concerted effort to ensure that there is sufficient staff on hand to discharge women after
delivering their babies, particularly those having undergone a C-section. This study's goal is to fill gaps in
the literature in understanding what happens after discharge. How does a woman in Haiti care for her C-
section wound? We need to have more outcomes like Collette’s, who had access to a health facility not far from where she lived, and a solution was found, and not more stories of how Haiti’s maternal mortality rate is the highest in the Western Hemisphere.
Part 2: Publishable Paper

Cesarean Wound Care after Hospital Discharge: A Qualitative Study in Rural Haiti

Authors: Elizabeth M. Campa, MSc MMSc (c), Dr. Bethany Hedd-Gauthier, Ph.D., Dr. Hannah Gilbert, Ph.D., Dr. Mary Clisbee, Ed.D, Marc Julmisse, MPH RN

Introduction

Cesarean sections (C-sections) provide lifesaving support when vaginal birth can lead to a higher risk of morbidity to the mother or baby (WHO, 2015) and redresses the most common causes of maternal mortality (World Health Report, 2010). The rate of C-section deliveries has increased dramatically over the last several decades, with an estimated for 29.7 million C-section deliveries in 2015 (Boerma, 2018). A systematic review of C-sections in low-and middle-income countries (LMICs) found that national increases in C-sections are associated with decreased maternal mortality (Betran, 2015).

As C-section deliveries increase globally, so have the number of surgical site infections (SSIs). SSIs after C-section increase the risk of maternal morbidity and mortality (Salim, 2012; Awad, 2012). Furthermore, SSIs can lead to extended hospital stays, additional monetary burdens to a family to cover health care costs, and loss of workdays (Salim, 2012). Women delivering via C-section in LMICs are at considerably higher risk of SSIs—with SSI rates ranging from 9.6-23.5% compared to an estimated 3% SSI rate in Europe (Surveillance of surgical site infections in Europe 2010-2011; Surveillance of surgical site infections in Europe 2012; Morhason-Bello, 2009; Koigi-Kamau, 2005; Mpogoro, 2015; Tran, 1998; Couto, 1998; Del Monte, 2010; Rizvi, 2013).

Preventing C-section SSIs requires appropriate antibiotic prophylaxis and wound care, including wound care after discharging a mother from the hospital. Currently, there is no literature on what clinicians recommend to mothers on how to care for their post-C-section wound in LMICs. According to The American Pregnancy Association, it is recommended that women regularly replace the dressing over the wound once a day, keep the wound clean and dry after washing with mild soap and water and avoid
soaking in bathtubs or swimming (“Care After a Cesarean Delivery: Physical and Emotional”, 2019)

When reviewing the literature for LMICs, the data is either not available or not published.

At 480 deaths per 100,000 live births, Haiti has the highest maternal mortality rate in the Caribbean region and one of the highest maternal mortality rates in the world (World Bank, 2019). In Haiti, where only 10% of health facilities across the country can perform a C-section, 6% of all deliveries are via C-section (EMMUS, 2016). In 2018, Hôpital Universitaire de Mirebalais (HUM), a referral tertiary hospital in rural Haiti and the site of this study, registered 5,007 live births; of these, almost 30% (1,500) were C-sections (Personal communication, data).

Given the risk of postoperative complications, appropriate discharge instructions should be available and provided to women on how to care for their C-section wound. We hypothesized that discharge messages may not be standardized and may not match the realities once a new mother arrives back home, particularly in rural areas where clean water is inaccessible. Therefore, the goal of this study is to develop a consensus on what a woman should be told before leaving the hospital, learn about how she cares for her C-section wound after discharge, and compare these instructions with what was communicated to the mother. We explore these questions from multiple perspectives: first, any formal documented guidance on post-discharge instructions that should be provided; second, clinicians' perspectives on what should be instructed to mothers regarding wound care, culminating in a set of consensus guidelines; third, mothers' perspectives on what was communicated. Together, this work sheds light on how to improve on existing messaging and communications between clinicians and patients related to wound care after discharge, with the overall goal to reduce C-section wound infections.
Methods

Overview of the study design

There were three parts to this study. First, we conducted a desk review, looking for global or Haitian guidance on post-C-section wound instructions to be provided at the time of discharge. Second, we conducted qualitative studies between August 1 and December 20, 2019 on messages shared by clinicians to women who have had a C-section at HUM. There were two distinct qualitative studies reported here; 1) semi-structured interviews with clinical staff at HUM to understand what type of information health care providers believe a woman should know at discharge regarding post-discharge wound care; and 2) semi-structured interviews with women delivering via C-section at HUM to collect their perspectives on wound discharge instructions.

Study setting

HUM is a Haitian Ministry of Health public hospital supported by Zanmi Lasante (ZL), Partners In Health’s (PIH) sister organization in Haiti. HUM provides healthcare to 180,000 residents of Mirebalais where HUM is located. Due to the lack of tertiary hospitals across Haiti, HUM’s services extends to Haitians across the country estimated at 3.1 million Haitians. HUM is a national referral hospital where services are either accessible for a small fee or free of charge to patients. A $1 registration fee is expected from all new patients, but this fee is waived if the patient is widowed, pregnant, or HIV or TB positive.

Patients arrive at HUM from around the country, with approximately 40% of all patients arriving from outside the Central Plateau. For patients inside of HUM’s catchment areas, patients arrived at the hospital either by walking or through a network of local minibuses, private vehicles or buses. When they arrive to HUM, pregnant women in labor check-in directly at the maternity emergency room. Nine OB/GYN doctors and seven residents, supervised by an attending, perform C-sections at HUM. Approximately 12 nurse midwives, supervised by the Maternity Nurse Manager, work in the postpartum ward providing postoperative follow-up care. Women that have undergone a C-section at HUM generally
remain at the hospital for up to 72 hours. Presently there are no official discharge protocols in place at HUM.

**Phase 1: Desk review**

The goal of the desk review was to identify existing information about C-section wound care and related discharge recommendations in LMICs. The structure of the desk review included a thorough search for existing policies or clinical protocols and manuals produced by international organizations working in the healthcare field. The PI looked specifically for any existing guidance or instructions a woman should receive at discharge regarding post-C-section wound care in LMICs and searched more intensively for protocols available in Haiti.

The PI conducted an online search on Pubmed using the keywords: cesarean section, C-section, wound care, discharge instructions, discharge orders, post-discharge C-section recommendations, perioperative and postoperative C-section wound care, C-section wound infection prevention, self-care instructions. The PI also searched the Haitian Ministry of Health’s website for any related protocols or recommendations on self care after a C-section.

**Phases 2 and 3: Interviews with clinicians and mothers**

*Data collection instruments*

Two instruments were developed for this study (Appendix 1). The first was an instrument for clinicians at the health facility and the second was for women who had recently delivered via a C-section at HUM. Both instruments were validated through pilot testing at the health facility. The semi-structured interview guide for clinicians included the following topics; 1) experience with C-section, 2) what a woman should know when she is leaving the hospital, back at home and 3) when she should return after discharge follow-up. The semi-structured interview guide for women included the following topics; 1) recovery from a C-section and C-section wound care, 2) the discharge process, 3) ability to follow new instructions, 4) and access to water, sanitation and hygiene (WASH).
Participants, Sampling, Enrollment

Enrollment and consent of clinicians: The first study population included clinicians. Prior to study commencement, the PI (EMC) received approval from the medical director of HUM to meet with clinicians to introduce the study and answer any questions. The research assistant conducted the meeting who then followed up with clinicians who were interested in participating in the study. Clinicians had to have worked at HUM for at least two years to be eligible and all participants signed an informed consent form prior to participation. The original goal was to enroll fifteen clinicians, but this was scaled back to ten due to ongoing political crisis on the ground in Haiti and the lack of individuals with extra time for these interviews.

Enrollment and consent of women: The second study population included women who had recently delivered via C-section at HUM. Prior to study commencement, the PI received approval from the medical director of HUM to enroll women in the postoperative ward and to re-consent and enroll women on their return for follow-up. The research assistant worked closely with the assistant women’s health coordinator to determine if a woman met inclusion criteria (between the ages of 18-49 years, in good health, baby in good health) prior to approaching woman. Once this information was confirmed, the research assistant then followed-up with individuals who were interested in participating in the study.

All participants signed an informed consent form prior to participation. The original goal was to enroll fifteen women during the month of September. The study was paused for three months due to the ongoing political crisis on the ground in Haiti; the enrollment and interviews with women continued in December with a total of 10 women.

Data collection procedures

Clinician interviews: The research assistant conducted interviews with clinicians in administrative offices for privacy between August 1-30, 2019 at HUM. All interviews were conducted in Creole, were audio-recorded, and lasted between 35-60 minutes. Audio recordings were labelled with the
date, time and ID, and then transferred to the research assistant’s password-protected laptop. Interviews were transcribed into Creole and then translated into English.

The clinicians’ interviews were subject to two rounds of data analysis. In the first round, the PI captured and synthesized recommendations offered by clinicians into a discharge wound care instruction checklist and then presented the checklist for review and verification to senior members of the OB/GYN team at HUM. This checklist became the basis for the women’s interviews.

Women’s interviews: The research assistant conducted interviews with women who had a C-section at HUM December 4-20, 2019. These interviews were conducted by a research assistant and took place in a quiet office space near the women’s health program. The interviews were all conducted in Creole and audio-recorded, lasting between 25-40 minutes. Audio recordings were labelled with the date, time and ID, and then transferred to the research assistant’s password-protected laptop. Once the interviews were completed, they were transcribed into Creole and then translated into English.

For both sets of interviews, the research assistant destroyed both the audio file and the transcription file once the PI confirmed receipt of the translated interviews via Dropbox. An assistant to the PI checked transcripts for accuracy by randomly selecting one section with 2-3 sentences of each interview and cross-referenced with the audio file. Interviews were then entered into Dedoose as two projects, one for clinicians and one for women.

Analyses

The first rapid analysis of clinician interviews culminated in a checklist of discharge recommendations that was the basis for the women’s interview guide. To develop this checklist, the PI read through each interview and from this, the PI took a deductive approach and extracted any text related to recommendations for the development of the checklist. This checklist was then submitted to the head of women’s health and head of OB/GYN for review and verification.

The clinicians interviews were then entered in Dedoose (Version, 2017) and coded. Transcripts of the clinician interviews were analyzed using an inductive, conventional content analytic approach (Hsieh
& Shannon, 2005). The PI open coded a subset of the transcripts in order to identify a draft set of codes that were named, defined and supported with quotes. These codes were piloted and systematically revised into a final codebook, which was then used to code the clinician interviews. The coded data was analyzed inductively to develop a set of initial descriptive themes, which were then revised through an iterative process, to develop a set of final themes that appear in section 2 of Results, below.

After a complete review of the women’s dataset it was determined that the content could be covered by same codebook with addition of three codes specific to women’s interviews. The transcripts from the women’s interviews were coded using the revised codebook. The women’s interviews were then entered in Dedoose (Version, 2017) and coded. Coded data was inductively analyzed following the process described above, resulting in a set of final themes that appear in section 3 of Results, below.

**Ethical considerations**

This study received IRB approval from Harvard University (IRB19-0672) and Zanmi Lasante (ZLIRB20062019b). The research assistant obtained informed consent to all clinicians and women. No compensation was provided to any of the study participants.
Results

Desk Review

The PI found no documents with details related to C-section wound care or recommendations for discharge from UNICEF, CDC, or USAID. The WHO has developed a manual on global guidelines on the prevention of SSIs, first published in 2016 (WHO, 2018) including 29 recommendations. The recommendations focus on infection control mechanisms within the clinical space but do not provide any discussion or recommendations once a woman leaves the hospital setting. A review of the Haitian Ministry of Health’s protocols resulted in no findings or mention of discharge recommendations for C-section. The results from the PubMed journal search are detailed in Table 1. Some of the resulting articles from the journal review included discharge recommendations within health systems in high-income countries. We found no clear documentation of what happens once a woman leaves a hospital setting. A few articles indicated additional research should be conducted to understand what women need in discharge instructions in order to manage wound care and when to seek out medical assistance once outside of the clinical setting (Kadhim, 2018; Macones, 2019; Zejnullahu, 2019).

Table 1 Pubmed Search

<table>
<thead>
<tr>
<th>Search</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cesarean section:</td>
<td>62,974</td>
</tr>
<tr>
<td>Cesarean section and wound care:</td>
<td>910</td>
</tr>
<tr>
<td>C-section wound care:</td>
<td>824</td>
</tr>
<tr>
<td>Cesarean wound/care discharge/instructions for mothers:</td>
<td>40</td>
</tr>
<tr>
<td>Cesarean section and discharge instructions:</td>
<td>3</td>
</tr>
<tr>
<td>Cesarean section, wound care, discharge instructions:</td>
<td>0</td>
</tr>
</tbody>
</table>

Clinician Interviews

The 10 clinicians interviewed included heads of women’s health services, obstetrics and gynecology, Attending physicians and residents and nurses working in the pre- and postoperative departments for laboring women. The clinicians interviewed focused on five key areas related to for C-
section wound care to communicate with women during the discharge process at HUM: bandage change, bathing, changing clothes, restricted physical effort, and when to return to a health facility for follow up.

**Bandage change**

The majority of clinicians interviewed recommended bandage changes after discharge every 2 to 3 days. Clinicians stated that this would vary depending on how the wound is healing for each individual. The majority of clinicians also recommended having the bandage replaced at a health facility by a health care professional and that a woman should not touch the wound. These same clinicians recommended that women should travel to the nearest health facility to their home to replace the bandage. If this was HUM, then to return to HUM.

“In the case of pregnant women who have a cesarean section, we always ask them to go change the bandage every 2 or 3 days at the health center near her.” Clinician interview #5

“Always tell them not to touch the wound; they cannot touch the wound with their hands. When we do the bandage, we use sterile material, that why we ask them to go to the health care center to have someone take care of it for them, and they should not do it at home.” Clinician interview #4

**Bathing**

Clinicians reported a range of recommendations, often conflicting, related to bathing to avoid germs entering the space of the wound. Some clinicians proposed regular bathing with soap and water. All but one clinicians reported being concerned that wetting the wound could lead to infection. Some recommended not wetting the wound at all and to and to focus on a dry bath. Several clinicians also reported washing the wound but drying it immediately with a clean towel.
"The wound should not get wet unless a staff member has permitted them to wet it because the water with the soap can lead to bacteria in the wound that can make it difficult. So, we tell the patient...we do not ask them not to take a bath; we ask them to take a dry bath with a wet towel with soap." Clinician interview #4

Lastly, a few clinicians also recommended not scrubbing the wound when bathing. They referenced cultural norms among Haitians who scrub during bathing. Clinicians reported that scrubbing could lead to the wound opening.

“And you must also take care of the wound. And when you bathe, you should not scrub it too much. Some Haitians like to scrub when taking a shower; if they do not scrub, they do not feel like they took a bath. You can scrub everywhere but not the wound.” Clinician interview #7

**Changing clothes**

Several clinicians described the importance of maintaining cleanliness by wearing clean clothes. The concern is that the clothes can be dirty, transfer to the wound, and cause an infection. They recommended that women wash their clothes regularly to avoid dirty clothes making contact with the wound.

“Personal hygiene, use clean clothes, change your clothes very often, and take a bath are the most essential elements.” Clinician interview #1

Several clinicians were able to put this into the specific context of Haiti, explaining that many of their patients do not have access to water, making washing their clothes more difficult.

"The difficulty that we find is because they do not have access to water. They do not have access to certain things that even after you advise them, they do not apply them because, during certain periods, there is a water crisis in many places, the person does not even
have water to bathe, the person does not have water to do laundry. So sometimes they wear dirty clothes because they do not get water.” Clinician interview #5

**Restrict physical effort**

Over half the clinicians interviewed for the study described why it is essential for a woman to limit her efforts after returning home from a C-section, including not performing labor or lifting heavy things. They emphasized that the woman should not overwork because this can lead to the wound opening up.

“They should not lift heavy things or sit down too fast.” Clinician interview #7

"A woman who has completed the cesarean section has a set of things to be careful about. The first precaution is to avoid trying too hard. There is a great deal of effort that she cannot do too early because the thread can break, and the wound will open even if it is not infected." Clinician interview #5

Some clinicians emphasized the importance of the tradition of having a woman cared for in the first weeks after giving birth. In some cases, the husband supported the recovering woman. In other cases, it could be a family member.

"Many people, even if the family has no means, but at the time of the delivery, you will see her husband make some arrangements to take care of the woman. Fifteen days they will take good care of the woman, to make sure she eats well and drink well, and not to overwork after the delivery." Clinician interview #2

**When to follow up at the health center**

Several clinicians also highlighted discussing with women the dangers signs that accompany an infection, such as fever or severe headache, vomiting or if they have heart pain. If any of these symptoms become apparent, the clinicians recommend that a woman should go to a hospital immediately. Additional
concerns included fluid coming from the wound, secretions from the vaginal area, and swelling of the wound. Clinicians also listed the different types of visits to the health facility, including change of the bandage and for their 8-day check after giving birth.

"Before the women leave the hospital. In general, we always discuss with them the signs of danger. Like we explain to the patient if she has a fever that does not go away, she needs to come back to the hospital. If they have severe headaches and are vomiting and their heart is hurting and if they are dizzy or having vaginal bleeding, or having secretions with bad odor from their vagina, or if they see fluids coming out of the wound, or if the wound is swollen and hurting." Clinician interview #2

Clinicians also listed a range of timeframes a woman should return to a health facility. First, some clinicians listed returning to a health facility every two days to replace the bandage. Second, a few clinicians recommended a visit to a health facility to follow up eight days after the C-section.

"We tell them to go to the hospital near them to change the bandage and every two days and to come back to their appointment after eight days." Clinician interview #8

*The discharge checklist*

The PI extrapolated all recommendations from clinician’s interviews and shared with the director of women’s health and chief medical officer for member checking, review and verification. Table 2 shows the the consolidated recommendations for discharge after a C-section, which expand upon the points highlighted above.

*Table 2 Final list of recommendations*

<table>
<thead>
<tr>
<th>Wound care</th>
<th>Nutrition, hygiene and rest</th>
</tr>
</thead>
<tbody>
<tr>
<td>- If prescribed antibiotics, ensure to take the whole prescription as directed by a doctor.</td>
<td>- For the first 15 days after surgery, take good care, eat well, rest, and drink lots of water.</td>
</tr>
<tr>
<td>- Monitor wound to check for fluids.</td>
<td>- Eat fruits and vegetables, as this will help the wound heal faster.</td>
</tr>
<tr>
<td>- Keep an eye out for fever, severe headache, vomiting, heart hurting, dizziness, vaginal</td>
<td></td>
</tr>
</tbody>
</table>
bleeding, and secretions with bad odor from vagina, swollen wound, or a wound that hurts. Must return to the hospital immediately if any of these symptoms exist.
- Do not put any products on the wound not approved by the doctor or nurse.
- Discuss with the patient the type of thread in the wound (absorbable or non-absorbable) and necessary steps to care/remove.
- Do not sit in hot water.
- Do not cover the body with tight clothes.

**East meat, milk…foods with protein more will help the wound heal quickly.**
- Rest properly in order to recover from surgery.
- Promote good personal hygiene ensuring a woman bathes regularly using regular soap
- Avoid contact with dirty things, keep clothes clean, and only wipe wound with a clean cloth.
- When bathing, one should not scrub the wound.

<table>
<thead>
<tr>
<th>Health facility follow-up</th>
<th>Bandage Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Come back to HUM to remove the bandage. If the person lives far away, visit a local health facility to replace the bandage.</td>
<td>- Cover wound to isolate from germs in the environment to protect from infection.</td>
</tr>
<tr>
<td>- Do not overwork yourself. Limit movements for up to 3 months because of the wound and the need to recover.</td>
<td>- Change the bandage every 2-3 days.</td>
</tr>
<tr>
<td>- A person should not lift heavy things or sit down too fast.</td>
<td>- If the wound is already closed, there is no need to cover it.</td>
</tr>
<tr>
<td>- Return to evaluate the wound 7-10 days after surgery.</td>
<td>- Keep wound dry. If the wound is wet, dry immediately, if bandage gets wet, replace bandage immediately.</td>
</tr>
<tr>
<td>- Keep moving after surgery with the assistance of family or friends, which will promote circulation and wound healing.</td>
<td></td>
</tr>
</tbody>
</table>

**Bandage Care**
- Cover wound to isolate from germs in the environment to protect from infection.
- Change the bandage every 2-3 days.
- If the wound is already closed, there is no need to cover it.
- Keep wound dry. If the wound is wet, dry immediately, if bandage gets wet, replace bandage immediately.

**Women’s interviews**

Of the 10 women interviewed, half traveled to HUM from Port au Prince and half lived in or were from the Department of the Central Plateau where HUM is located. The women’s ages ranged from 20-39 years (Table 3). For the majority of women, this was their first delivery and first C-section, while only two women had between 4-7 children and more than one previous C-section. Both women that underwent C-sections previously reported having their C-section wounds checked by clinicians.
<table>
<thead>
<tr>
<th>Measure</th>
<th>Item</th>
<th>Total</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (Years old)</strong></td>
<td>20-24</td>
<td>5</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>25-29</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>30-34</td>
<td>2</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>35-39</td>
<td>2</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Primary source of income</strong></td>
<td>Small commerce</td>
<td>3</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>Public sector</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Private sector</td>
<td>2</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>4</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Department</strong></td>
<td>West (Port au Prince)</td>
<td>5</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Central Plateau</td>
<td>5</td>
<td>50%</td>
</tr>
<tr>
<td><strong># children delivered</strong></td>
<td>1</td>
<td>8</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td>4 &lt;</td>
<td>2</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Previous C-section</strong></td>
<td>No</td>
<td>8</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>2</td>
<td>20%</td>
</tr>
</tbody>
</table>

**Women’s recall of discharge instructions provided**

**Bandage change:** The majority of women recalled some information about bandage changes, although there was a great deal of variation related to information about replacing their C-section wound bandage. While some women recounted that clinicians told them to report to a health facility for bandage changes, others did not recall being given these instructions. Among participants who recalled this directive, only some were able to specify how frequently the bandage should have been changed. One participant explained that without any clear directives for when to change her bandage, she preferred to simply keep it on until a nurse who was checking on the health of her baby told her to remove it. There was no coherence with women on what they understood on bandage change. When asked about bandage change, women responded:

"They told me that if I needed to change the bandage, I need to go to CDI [local health center], but then they did not tell me anything again." Women’s interview #2
"They did not tell me much; they only told me to go change the bandage every three days. After three days, a nurse changed it for me." Women’s interview #10

"No, I never understood, just recently, three days ago a lady who was at the pediatric ward with me ask me if I still have the bandage on, I told tell her yes, she told me I should not leave it, I should remove it." Women’s interview #7

Bathing: The women expressed uncertainty about the information provided by clinicians on bathing. Several women recounted clinicians telling them to bathe, but unclear as to how often.

"Yes, they told me to bathe, but they did not say to do it all the time. I spent a good amount of time I did not bathe; I washed my upper body, then after I went to change the bandage, they told me that I can bathe, and I need to dry it with a clean towel and put some Vaseline on it." Women’s interview #5

Several others explained that they were scared or nervous about bathing because they were unsure of whether it would help or hurt the wound. Unsure of what to do, some women decided not to bathe at all after returning home.

"Yes, they did, that made me a little scared, I didn't want to get it wet and get infected. They told me I can take a bath, but I was still scared when I was bathing. Women’s interview #1

"Yes, they did, that made me a little scared, I did not want to get it wet and get infected. They told me I can take a bath, but I was still scared when I was bathing." Women’s interview #1
Limit physical effort: A few women noted in their interviews that their clinician recommended that they minimize their physical effort after returning home. Most notably, women explained that they were not supposed to lift heavy things. Women also remember clinicians telling them not to move too fast in order to protect the wound.

"The doctor told me not to make too much effort. I did not feel good while I was at the hospital; I had a cough. He told me to be careful, but besides this, they did not give me any information." Women’s interview #2

"When I was recovering at the hospital, they told me that I should not move too fast or lift heavy things to protect the wound." Women’s interview #10

Follow-up after C-section: Less than half of the women recall clinicians sharing any information on when to follow up after a C-section. For those that did recall being told to return for a follow up, the time frames that women reported ranged from 3 days to 10 days after discharge.

"They only gave me an appointment in three days to come back to do change the bandage, but there was some problem on the streets that day, I could not get here. So, I did not come." Women’s interview #1

“Yes, they told me to return in 10 days after the surgery.” Women’s interview #9

Women’s perception on the context of delivery of instructions

Questions asked by women: Some women reported not receiving information from clinicians at HUM about bandage change, bathing or restricted physical effort. Several women then asked clinicians questions and reported not having received a response. A few women also reported being in a rush to leave HUM due to the ongoing crisis happening in Haiti at the time. One woman explained that she hesitated to ask questions and prolong her stay because she keenly felt the pressure to return home in an effort to avoid the intensifying crisis including road blocks and violence.
"They did not tell me anything, but I asked how many days to do with the bandage before I can change it, I asked about how many days before I could take a bath? The nurse told me, do I want to wet the wound? That's all she told me. She did not tell me anything else." Women’s interview #2

"At that time, there was some problem at the hospital; I did not have enough time. That did not come to my mind. I left immediately after to go home. Going home was important to me. I did not want to stay for a long time." Women’s interview #1

_Lack of information from clinicians:_ Several of the women interviewed stated that they did not receive discharge instructions from clinicians prior to discharge.

“They did not tell anything, they took care of me, but they did not give me any information.” Women’s interview #6

“After I was done with the operation, I tried to make a little effort to pass gas and to go to the bathroom, etc…, immediately after I was done with everything, I got discharged, I did not get any information from no one [anyone].” Women’s interview #1

_Community members as a source of information about wound care:_ Women reported reaching out to individuals outside the clinical setting, such as nurses in their communities or other women who had C-sections, for recommendations on how to care for their C-section wound.

“My sister in law is a nurse; she told me that I can shower. But I did not get this information from the hospital.” Women’s interview #6

"Other people from my neighborhoods told me not to make much effort, but while I was at the hospital, I did not know. They did not tell me." Women’s interview #1
Discussion

Surgical site infections are the most common C-section associated complication; however, as confirmed by our desk review, guidelines for post-discharge instructions for LMICs are lacking. At HUM and in the absence of a standardized discharge protocol, it is unclear what messages women receive for discharge recommendations and who is responsible for sharing these recommendations consistently between providers. The study allowed us to examine the communication between clinicians and women who had recently had a C-section at HUM, with the goal of working towards standardized recommendations and clearer processes for communication at discharge.

Clinician interviews highlighted two important points. First, there was inconsistency in what was communicated to women. The greatest inconsistency was about whether woman could bathe or wet the wound after returning home from a C-section. The challenge with this inconsistency is that if a woman does not bathe at all or does not understand that the wound cannot stay wet, there is a greater risk of developing an SSI. The second is that to avoid confusion, consensus guidelines can and should be developed. The checklist that is an output of this study is a first attempt at this. Checklists are used in LMICS in other clinical areas, for example in emergency room settings (Griffey, 2015), trauma care (Choudhry, 2016), cancer care (Golden, 2017), and most importantly, the surgical safety checklist (Van Klei, 2012; Abbott, 2018; Solsky, 2018). We recommend that national and international bodies support efforts to develop post-discharge wound instruction checklists for LMIC settings.

The interviews with women confirmed that discharge instructions were inconsistent and often times outright lacking. Having a set of written discharge recommendations would be the first step. Additionally, there is evidence that discharge instructions available in pictographs provides greater levels of comprehension and understanding about self care with low literacy populations (Winokur, 2019; Wolpin, 2016; Hill, 2016; Newnham, 2017). Another opportunity to explore is sharing discharge instructions with a family member or caregiver, which would encourage another person to support the patient throughout their recovery as well as having an additional person knowledgeable on the recommendations (Marcus, 2014).
Improving clinician-mother communication, particularly the opportunity for mothers to ask and get answers to any questions, is another key lesson from this study. In the clinicians’ interviews, there was little mention of what questions women asked during the discharge process. This was amplified by many of the women interviewed, recounting the inability to ask questions before leaving the hospital. In a few cases, women received answers that were not clear or no responses at all. In order to improve the discharge process, adding time during the process for patient and caregiver questions may aid in closing this gap of uncertainty from the patients. Studies on this topic have looked into respectful maternal care to investigate how this process could be improved through an increase in training of new medical professionals, and implementing new policy and program interventions (Sen, 2018; Haire, 2017). To close this gap, systematic approaches must be made to ensure all women receive clear information on warning signs for complications and what to expect postpartum as well as an opportunity to ask questions to clinicians (Miller, 2016).

We acknowledge the following limitations of this study, which should be considered in the interpretation of the study results. Qualitative research findings are specific to the participants and context of a study and therefore not intended to be generalizable. Instead, we seek to bring attention to an area of C-section wound care outside of the clinical setting that includes hearing the patient’s voice in what they understand in the clinical experience. The data presented here is specific to the patients and clinicians in one hospital in Haiti. The experiences of other clinicians in other health care settings may be different, although we emphasize we have found no example of any formalized discharge instructions for C-section patients from any LMIC.

The PI conducted the study in Haiti in the fall of 2019, 15 months into a period of civil unrest that led to a disruption of daily life for all involved in the study. This resulted in reduced sample sizes and shortened interviews, both which may have reduced saturation of themes. However, most of the results presented here were supported by multiple interviews and a few results only appeared in one interview which increases our team’s confidence in the thoroughness of these results.
Conclusion

The study highlights the importance and current deficit of discharge instructions to support safe recovery and reduce SSIs in C-sections wounds in LMICs. Clinicians lacked standardized discharge guidelines, and in parallel mothers reported confusing messaging and lack of opportunity for questions to be resolved. International organizations working in maternal health or global surgery should support further investigations on this topic so that research can be conducted in this area. The same organizations should promote a standardized process for discharge which includes training for clinicians about how to use the standardized checklist, make modifications based on the context they are in and how to improve communication with women during the discharge process.
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Appendix 1: Clinicians and Women’s Interview Guides

Clinician’s Interview Guide

My name is ______________ I am working with Elizabeth Campa conducting a study to understand how to assist women who have had a C-section to be better prepared to care for their C-section wound after discharge from the hospital. We would like to learn more about your experiences on this topic. The information that you share with us will not be shared with anyone outside of the research team.

*If you do not want to respond to a question presented below, please tell us and we can skip that question.*

I. **Background**

1. Describe your engagement with laboring women and specifically women delivering via C-section. Please tell me specifically the work you are doing here.

II. **Experience with C-section**

1. Please share with me what takes place at the hospital when a woman is recovering from a C-section.
   **Probe** Please be specific

2. Who is responsible for providing instructions for post C-section wound care to the woman?
   **Probe** how does that work in practice?

3. From your experience, what instructions are women provided before leaving the hospital?
   **Probe:** What do you think of the quality of those messages?

4. In your view, what works well in the current system?
5. What is not good about what is currently in place?
   **Probe:** What changes would you like to see?

6. What do women who have had a C-section ask about their C-section wound?
   **Probe:** Could you provide an example?

7. What concerns you about C-section wounds?
   **Probe:** If concerns are presented, please ask why.

   **Probe:** Could you provide an example from your experiences?

III. **When a woman is ready to leave the hospital**
8. When it is time for a woman to go home, what should a woman know about her post C-section wound before she leaves the hospital?
   Probe: What do you think of the quality of those messages?

IV. Back at home

In this section, we are going to be looking at the situation at the household level for the woman that has had the C-section.

9. Please describe what women should do to care for their post C-section wound once they are home.
   Probe: Please list.
   Probe: In your experience, do patients have the ability to do this?

10. Do you feel women who have had a C-section get the help they need in order to recover and rest? If yes, please tell me about the help they get. If no, please explain.
    Probe: for examples.

V. C-section wound care at home

In this section, I would like to ask you about specific instructions generally associated with C-section wound care

11. What do good bathing practices look like for these women post-surgery?
    Probe: Could you share an example from one of your patients? Please be specific.
    Probe: For a good experience and a bad experience on how to wash the body after a C-section.

12. Please describe what women should do to care for their post C-section wound once they are home. Please list.

13. In your experience, are your patients able to do this?

14. Should the C-section wound be covered?
    Probe: If so, can you explain why?
    Probe: Do your patients do this?

15. Are antibiotics provided to women when they leave the hospital?
    Probe: What is your experience with women using antibiotics?

16. Can you tell me about your experiences of women who have come back after a C-section?
    Probe for examples. For specific stories.
Discharge Follow up

17. Do you have any suggestions for improving post C-section wound care for your patients?

18. Is there anything else that I should know to understand better the topic of C-section wound care?

Thank you for your time today in providing this important information. If you have any questions, please contact me.
Women’s Interview Guide on C-Section Wound Care

My name is _________ and I am working with Elizabeth Campa conducting a study to understand what women are told at HUM related to their C-section wound. We are interested in learning about your experience at HUM. We would like to understand if you are able to follow through with the recommendations provided by clinicians on how to care for your C-section wound before leaving the hospital.

*If you do not want to respond to any of the questions presented below, please tell us and we can skip that question.*

******Part A******

*Background questions*

1. How are you feeling?
2. How long has it been since you had your baby? How is the baby doing?
3. Please, describe why you came to HUM for assistance with your labor.

*In the next several parts of the interview, I would like to discuss your recovery in general and specifically on your C-section wound care.*

1. What type of information was provided to you related to your C-section wound while you were recovering in the hospital?

   *Follow-up question:* Who provided this information about your C-section wound?

   *Follow up question:* When did they provide information on your C-section wound?

   Who provided this information and when?

2. Did you discuss your C-section wound with anyone else at the hospital?

   *Follow up question:* If yes, what did you discuss?

   *Follow up question:* Whom did you discuss this with?

3. Were you provided with any information of what to do for C-section recovery after you left the hospital?

   *Follow up question:* If yes, what was discussed with you?

   *Follow up question:* Who discussed this with you?

   If so, what and by who?

4. Did you ask any questions to the staff at the hospital about your wound or wound care?

   *Follow up question:* If so, what did you ask?

   *Follow up question:* Whom did you ask?
Follow up question: What was their response?
Follow up question: If you did not ask any questions, why not?

5. Were you asked to return to the hospital or health center for follow-up?

Follow up question: If you were asked to return, what were you instructed?
Follow up question: Who told you to return to the hospital to have your C-section wound check?

Discharge process
1. Please share with me the process when you were discharged from the hospital.
2. Who gave you information when you left the hospital about next steps for recovery?

Follow up question: When did they provide this information?
3. Did you receive discharge instructions from more than one person?

Follow up question: If more than one person, please list all the people who provided instructions to you? Were the instructions consistent?
4. Where you given any instructions for medications?

Follow up question: If yes, you were given instructions for medications, what instructions were you given?
Follow up question: Who gave you these instructions on the medications?
5. Were the instructions that you were given sufficient? Were you able to ask questions to clarify? Please explain.
6. Did they tell you about the symptoms you should watch out for infection?

Follow up question: Why do you need to pay attention to those signs?
7. Is there anything you wanted to discuss with the nurses or doctors before leaving the hospital related to your C-section wound? If yes, please explain.

STOP

******************************************************************************
Take a break at this point. Offer something to eat and drink. In these next two sections, there are a number of close ended and open-ended questions. The next two sessions will go by quickly with many yes and no questions.

*****Part B*****

Ability to follow new instructions
<<We are working with HUM to develop a new discharge instruction lists, based on this, you were provided specific instructions related to wound care>>
**Bandage care:**
1. Were you told to change your bandage every 12 hours? If yes, were you able to? If no, please explain why.
2. How often were you told to replace the bandage?
3. Were you told to keep the wound dry? What did you do if the wound became wet?
4. Were you told to cover your C-section wound to protect it from germs? If no, what did you do to protect the wound? If yes, tell me about how you took care of the wound to protect it from germs?

**Hygiene:**
1. Were you told to bathe regularly? If no, please explain why this was not possible.
2. Were you told to avoid contact with dirty things and to keep clothes clean and only to wipe the wound with a clean cloth? Where you able to follow this advise? If not, please explain.
3. Were you told to eat fruits and vegetables so that the wound would heal faster? Where you able to follow this instruction? If not, please explain.

**Recovery:**
1. Were you told to rest properly so that you could recover from surgery? Were you able to follow this instruction? If so, please explain, if not, please explain.
2. Were you told to limit movements for up to 3 months because of the wound and the need to recover? Were you able to follow this instruction? If no, please explain.
3. Were you told to not lift heavy things or to sit down too fast? Where you able to follow this instruction? If no, please explain.
4. Were you told to return to the hospital within 7-10 days after surgery to check on the wound? Were you able to follow this instruction? If no, please explain.

*****Part C*****

**Questions on Water, Sanitation and Hygiene (WASH) access**
The following questions relate to access to water and sanitation in your home.

a. Where do you access water?
b. How far is the water point from your house?
c. What type of water point is it?
d. Who is responsible for fetching water in your home?
e. Do you treat the water that you use in your house? If so, with what?
f. How many times a day does (person listed above) fetch water?
g. Where do you wash your hands?
h. When do you wash your hand?
i. Is there soap available in your home regularly?

j. Do you wash your C-section wound? If yes go to next question, if not, skip to L and M.

k. Where do you wash your C-section wound?

l. What do you use to wash your C-section wound?

m. Do you have a toilet in your house? If so, how far is it from your house?

n. If not, where do you go to the bathroom? How often do you go there?

**Final questions**

Do you have any questions at this time?

Is there anything else you would like to add?

*Thank you for your time today in providing this important information. If you have any questions, please contact me.*