

ABSTRACT

Approaching Barriers to Health Center Deliveries in Rural Western Kenya from a Liberation Theology Perspective: A Community-Based Needs Assessment

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Maternal health services play a vital role in optimizing pregnancy outcomes, especially for high-risk women in developing countries. In order to understand why few women utilize such services, extensive interviews were conducted on the Nyakach Plateau in rural western Kenya. Within a sample of 90 native Luo women (43 pregnant and 47 non-pregnant), 97.87% of the pregnant women intended to deliver at a health center, but only 45.00% of previously pregnant mothers actually did.

Within the larger context of liberation theology, Paul Farmer MD PhD contrasts “structural” barriers with “cognitivist-personalistic” barriers and recommends that studies elucidate which of these problems is primary. His own work has shown that knowledge and values are irrelevant if “structural violence” prevents people from taking advantage of services. This study similarly identified and categorized the major determinants of health center deliveries into accessibility versus knowledge and values. When weighing their relative contributions, it becomes clear that the women in this sample desired to deliver in a health center but faced significant accessibility barriers. That these problems are crucial is emphasized by the fact that 38.30% of the previously pregnant mothers have other serious problems impacting or resulting from pregnancy, including HIV/AIDS, death of a child, delivering a sick baby, or having chronic physical consequences from a difficult delivery.

Of the entire sample, 92.22% reported a transportation barrier. Women in labor must hike across rough terrain for an average of 3 miles to seek appropriate medical care. The other two most commonly identified barriers were financial issues (75.56%) and a lack of services (64.44%). In spite of knowledge and values, these conclusions direct significant intervention efforts toward accessibility barriers, particularly transportation aid, to increase the number of health center deliveries. Although specific to the Nyakach Plateau, these findings can be generalized to similar impoverished communities in the developing world.

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APPROACHING BARRIERS TO HEALTH CENTER DELIVERIES IN RURAL
WESTERN KENYA FROM A LIBERATION THEOLOGY PERSPECTIVE:
A COMMUNITY-BASED NEEDS ASSESSMENT

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“Mothers are crucial to good health. They protect the health of their families. They educate and train their children in healthy habits. They lead health improvement efforts in any community. Their death or absence almost always means the absence of emotional security and stability and has long-term detrimental effects...”

- *Turning the World Upside Down*, Nigel Crisp

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To my friends on the Nyakach Plateau.



CHAPTER ONE

Introduction

Maternal health services are an effective means to optimize pregnancy as well as reduce the risk of maternal morbidity and mortality. In developing countries, where the general health status of women is poor, early and frequent antenatal care attendance during pregnancy is a positive predictor of skilled attendance at childbirth and therefore a direct determinant of favorable birth outcomes. Although maternal health services are available in developing countries due to successful global health efforts, these resources frequently go unused.

In the attempt to increase the use of maternal health services on the Nyakach Plateau in rural western Kenya, this study has adopted a theological framework set forth by anthropologist and infectious disease specialist Dr. Paul Farmer. At the core of Paul Farmer's theological framework is a "preferential option for the poor" – a phrase and an idea derived from liberation theology. During the 1950s and 1960s, liberation theology began as a movement within the Catholic Church as a moral reaction against poverty resulting from social injustice in Latin America. Through Paul Farmer, it has grown to encompass clinical care as a means to alleviate the crushing social, political, and economic burden of poverty, transforming the meaning of global health. Recognizing that extreme poverty and social exclusion constitute a violation of human dignity, he promotes an essential human rights-based approach to health that aims to seek the root of the problem as well as elicit the experiences and views of the poor. He has thereby

reframed the struggle for equity and social, political, and economic justice within the context of health and medicine.

In 1946, the World Health Organization created a constitution that stated, “The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being... Health is a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity” (WHO Constitution 2006). Similarly, Article 25 of the Universal Declaration of Human Rights affirmed in 1948, “Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing, medical care, and necessary social services” (Universal Declaration of Human Rights 1948). Paul Farmer exemplifies the few who have dared to underline the deficiencies of the liberal human rights movement – arguing that these declarations are not a victory but a sign of defeat in the face of widespread destitution and death.

As the effectiveness of medical interventions increases, failure to use such interventions justly – that is, failure to make a preferential option for the poor in medicine – compounds the problem by widening the outcome gap. Declaring healthcare as a universal human right has not translated into individuals receiving the care that they need as a result of barriers to implementation. More than four decades later, the Vienna Declaration of 1993 served as a reminder that “All human rights are universal, indivisible and interdependent and interrelated. The international community must treat human rights globally in a fair and equal manner, on the same footing, and with the same emphasis” (Vienna Declaration and Programme of Action 1993). The UN Committee on Economic, Social, and Cultural Rights adopted a General Comment on the Right to

Health in 2000 that stated, “The right to health extends not only to timely and appropriate health care but also to the underlying determinants of health, such as access to safe and potable water and adequate sanitation, adequate supply of safe food, nutrition and housing, healthy occupational and environmental conditions, and access to health-related education and information including sexual and reproductive health” (The Right to Health 2012).

To identify the underlying determinants of health, Paul Farmer contrasts a “structural pole” with a “cognitivist-personalistic pole” (Farmer 2005). The structural pole emphasizes conditions that structure patients’ risk and comprise “structural violence” (for example, lack of access to potable water, lack of opportunities for women, unfair distribution of the world’s resources). In contrast, the cognitivist-personalistic pole emphasizes patients’ shortcomings as an individual failure of motivation, character, or knowledge (for example, failure to drink pure water, failure to use condoms, ignorance about public health and hygiene). Although there is a focus on the latter as healthcare professionals rarely blame societal structure for poor health, a focus on the structural pole encourages pragmatic solidarity – to make common cause with those who are both poor and sick.

In 1989 for example, Paul Farmer began an experiment in Haiti to understand the deaths of three of his patients from tuberculosis. Some community health workers believed that tuberculosis patients with poor outcomes were the most economically impoverished (structural pole) while others believed that patients abandoned biomedical therapy due to widespread beliefs regarding tuberculosis as a disorder inflicted through sorcery (cognitivist-personalistic pole). Fifty patients diagnosed with tuberculosis were

enrolled in a new treatment program in which they received daily visits from a health worker during the first month following diagnosis, financial aid of \$30 per month for the first three months, nutritional supplements, regular reminders from their village health worker to attend the clinic, and a \$5 honorarium to defray travel expenses to attend the clinic. If a patient did not attend the clinic, a physician or nurse from the clinic would make a visit to their home. A series of forms, including a detailed initial interview schedule and home visit reports, regularized these arrangements.

Other than the 50 patients enrolled in this program between February of 1989 and September of 1990, 213 patients were also diagnosed with tuberculosis. The first 50 patients within this group served as a control group that did not benefit from any community-based services and financial aid other than receiving free care. By June of 1991, 46 of the 50 patients receiving the “enhanced package” were free of all symptoms, and none of those with symptoms met radiologic or clinical diagnostic criteria for persistent tuberculosis. The participants had a cure rate of 100% as no one suffered from active tuberculosis. Of the 40 patients that were relocated from 50 patients in the control group, the cure rate was barely half that of the experimental group based on clinical, laboratory, and radiographic evaluation. Thus, the outcomes were related to the quality of the program rather than the quality of the patients’ disease. Initial exposure to infection, reactivation of quiescent tuberculosis, transmission to household members, access to diagnosis and therapy, length of convalescence, development of drug resistance, degree of lung destruction, and mortality were all strongly influenced by economic factors, i.e. the structural pole rather than the cognitivist-personalistic pole. Removing those structural barriers to compliance dramatically improved outcomes among poor

Haitians with tuberculosis. This experiment illustrated that impoverished people are at a higher risk of contracting diseases and are less likely to have access to care, much less possess the means to follow their doctor's instructions.

While this study, like many other studies, identifies barriers to maternal health services, it is unique in that it has adopted Paul Farmer's theological framework to do so. A review of literature has confirmed the identified barriers to maternal health services, however no research has been conducted to categorize and grade these variables in order to assess where current global efforts can most effectively be allocated. As progression of the United Nation's fifth Millennium Development Goal to reduce maternal mortality by 75% by the end of 2015 has stalled, it is important now more than ever to identify the most efficient means by which we can appropriately respond to the desperate need for pregnancy, delivery, and postpartum care in the developing world. This study has therefore identified and categorized the major determinants of health center deliveries in rural western Kenya into accessibility (structural pole) versus knowledge and values (cognitivist-personalistic pole).

Rather than simply identify the predominant barriers to maternal health services, this study aims to elicit the experiences and views of susceptible women and incorporate these views into all observations, judgments, and actions. It acknowledges that poverty puts susceptible women at a greater risk for unfavorable birth outcomes and then bars them from access to preventive treatment. In weighing accessibility to maternal health services with knowledge and values regarding maternal health services, this study will honor the experiences and views of the women on the Nyakach Plateau in designing strategies to respond to the low attendance of health centers for deliveries. Therefore, a

health intervention inspired by liberation theology, rather than one with more conventional underpinnings, will more accurately reflect the fundamental barrier to benefiting from such services.

This study is guided by the following objectives: 1) To categorize identified barriers to maternal health services into accessibility and knowledge and values and weigh their relative importance; 2) To determine whether or not accessibility is a greater determinant of utilization of maternal health services than knowledge and values; 3) To determine if transportation within accessibility is the greatest determinant of utilization of maternal health services. By evaluating responses from a unique sample of non-pregnant mothers and pregnant women, this study will (1) analyze the sample's identified barriers to maternal health services, (2) examine the non-pregnant mothers' recorded delivery outcomes as a consequence of such barriers, and (3) use the information gained to predict the pregnant women's unrecorded delivery outcomes, an incentive for future interventions.

The World Health Organization recommends that solutions to such barriers come from partnered approaches that reach beyond health system policies (World Health Organization 2010). In fact, many of the problems that result from the absence of quality health care and resources can be addressed through community-led interventions. Any intervention must be grounded in a clear knowledge of perceived needs and proposed solutions of the residents of a particular community. For this reason as well as its liberation theology framework, this study is a community-based needs assessment.

CHAPTER TWO

Review of Literature

Somewhere in the world a woman dies every minute from preventable complications related to childbirth. About half a million women die each year due to maternal causes, and 99% of these deaths take place in developing countries (Ochako 2011). In 2000, eight Millennium Development Goals (MDGs) were established with the aim of addressing the needs of the world's poorest by the target date of 2015. World leaders committed their nations to a new global partnership and thereby adopted the fifth Millennium Development Goal (MDG 5), which calls for a reduction in maternal mortality by 75% (United Nations Millennium Development Goals).

Maternal Mortality Estimates

Maternal mortality is the health indicator that shows the greatest disparity between developed and developing countries (Kowalewski 2000). The World Health Organization (WHO) defines maternal mortality as the death of a woman while pregnant or within 42 days after the termination of a pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental causes (Ochako 2011). Obstetric complications resulting in maternal deaths include obstructed labor, hemorrhage, dystocia, eclampsia, sepsis, and infections including tuberculosis and HIV (Eijk 2006).

Despite recent progress, maternal mortality remains unacceptably high in most low-income countries, especially in Sub-Saharan Africa. In fact, MDG 5 called for a 75% reduction in maternal mortality from 1990 to 2015, but by 2005 the rate had only declined by 6% (Singh 2009). In fact, a systematic analysis of 181 countries' progress towards MDG 5 from 1980 to 2008 revealed that only 23 countries were on track (Hogan 2010).

The challenge of reducing maternal mortality remains a major problem in Kenya and calls for an urgent revisit of existing safe motherhood programs (Conrad 2012). The 2008-09 Kenya Demographic and Health Survey (KDHS)—the latest Demographic and Health Survey for Kenya—identified a small increase in Kenya's maternal mortality rate since 2003 and estimated the maternal mortality ratio at 488/100,000 live births (Kenya Demographic and Health Survey 2008-09: 273). Maternal mortality data for 2010 reported a decrease to 360/100,000 live births with a lifetime risk of 1 in 55. According to the WHO however, Kenya has made insufficient progress to improving maternal health, as its maternal mortality ratio has not experienced an average annual decline of more than 2% (WHO 2010).

Importance of Prenatal Care

Experience from countries that have achieved low maternal mortality suggests that access to high-quality maternal health services is critical to improving maternal health (Conrad 2012). Attending prenatal clinics and delivery with the assistance of skilled professionals can lead to marked reductions in maternal morbidity and mortality through early detection and management of potential complications (Ochako 2011).

It is during prenatal care, or PNC, visits that advice is given on a range of issues including place of delivery and referral of mothers in the case of necessary emergency obstetric care (Magadi 2000). Prenatal care, however, not only promotes birth preparedness and readiness for unpredictable obstetric complications, but also maximizes the distribution of antimalarial drugs as well as iron and folic acid tablets (Conrad 2012). Causes of neonatal mortality in Africa are varied and could often be prevented with cost-effective interventions, including tetanus toxoid vaccinations and iron supplementation provided during prenatal care. This effect of prenatal care on neonatal mortality has led the WHO to adopt prenatal care as one of the eighteen low-cost interventions in the Mother-Baby Package, a part of the Safe Motherhood Initiative, designed to reduce maternal and infant mortality in countries with limited financial resources (McCurdy 2011).

Receiving prenatal care increases the chances that a woman will deliver at a health facility and obtain emergency care if she needs it. In fact, timely care for complications of pregnancy and delivery that meets recommended standards not only saves women's and infants' lives, but also protects their future health (Singh 2009). A study conducted in urban Uttar Pradesh, India found that the use of prenatal care among low- to middle-income women positively influenced the likelihood of using trained assistance at the birth of a child. Women with a relatively high level of care were four times more likely to use trained assistance at delivery than women with a low level of care (Bloom 1999). With many pregnant women in sub-Saharan Africa starting prenatal care late however, they do not fully benefit from its preventive and curative services.

Importance of Skilled Attendance at Birth

Similarly, timely access to skilled birth attendants is vital to mothers' and their children's lives. A study conducted at the Mikumi Health Center in Tanzania evaluated the causes of high maternal mortality. Of the 977 deliveries at the health center, the main cause for two maternal deaths during pregnancy and seven deaths during and after labor culminated in delayed presentation at the health center. Aggravating circumstances such as long distance from the health center and hospital fees hindered patients from a timely and life-saving presentation (Zeck 2006). In many developing countries, traditional birth attendants, or TBAs, often serve as providers of pregnancy and childbirth care outside of clinics because they are the only people that are accessible. These home deliveries, however, are even more associated with adverse maternal and infant outcomes. Presence of a professional attendant at birth is vital and is therefore one of the process indicators to assess progress towards MDG 5 (Eijk 2006).

A study aimed at clarifying the processes involved in reducing maternal mortality reviewed national-level data from developing countries to develop four basic models of care based on where women gave birth and who performed the deliveries. Model 1 described deliveries performed by a community member at home, while Model 2 described deliveries performed by a professional at home. Model 3 described deliveries performed by a professional in a basic essential obstetric care facility, and Model 4 described deliveries performed by a professional in a comprehensive essential obstetric care facility. Only the models that involved the use of professional attendants led to marked reductions in maternal mortality ratios, regardless of delivery location. Model 2 and 3 reduced maternal mortality ratios to 50 or less per 100,000. Surprisingly, Model 4

only reduced the maternal mortality ratio to 100 per 100,000. Considering cost-effectiveness and affordability, Model 2 and 3 are more successful and emphasize the importance of skilled attendance at childbirth (Koblinsky 1999).

Another study examined the history of maternal mortality in industrialized countries of the early 20th century. In analyzing the conditions under which the industrialized world reduced maternal mortality over the last 100 years, the importance of skilled attendance becomes clear once again. Making modern obstetric care available to the population as well as holding professionals accountable to address maternal health in an effective manner allowed for a successful reduction in maternal mortality. According to this study, a similar reduction has been unattainable in the developing world as a result of ill-informed professionalization strategies. Strategies focused on prenatal care and training of traditional birth attendants should shift to the development of first-line midwifery and second-line hospital delivery care (De Brouwere 1998).

Thus, increasing the availability of skilled health professionals to supervise deliveries has been identified as a key strategy for reducing maternal death, with the proportion of births attended by a skilled birth attendant as a direct indicator for MDG 5. The importance of professional medical attention is further emphasized in a study that estimated that skilled attendance at childbirth could prevent 16% to 33% of maternal deaths (Graham 2001).

Despite a global target for at least 90% of births worldwide to be supervised by a skilled birth attendant, the proportion of supervised births in sub-Saharan Africa remains less than 50% (Crowe 2012). The proportion of these births is significantly lower in rural than in urban areas (Boerma 2008). In fact, an estimated 180 million births in sub-

Saharan Africa from 2011 to 2015 will occur without skilled birth attendance, with 90% of these births occurring in rural areas (Crowe 2012).

Prenatal Care Coverage

The 2008-09 KDHS was carried out by the Kenya National Bureau of Statistics (KNBS) in partnership with the National AIDS Control Council (NACC), the National AIDS/STD Control Programme (NASCOP), the Ministry of Health and Sanitation, the Kenya Medical Research Institute (KEMRI), and the National Coordinating Agency for Population and Development (NCPD). While more current survey data is not available, the 2008-2009 results indicate that 92% of women in Kenya received prenatal care from a medical professional, either from doctors (29%), or nurses and midwives (63%). A very small fraction (less than 1%) received prenatal care from traditional birth attendants, and 7% did not receive any prenatal care at all. Trends in the use of prenatal care show that the proportion of women who had prenatal care from a trained medical provider for their most recent birth in the five years prior to the survey rose slightly, from 88% in 2003 to 92% in the current survey. Moreover, there has been a shift away from the use of nurses and midwives (70% in 2003 down to 63% in 2008-09) towards doctors (18% in 2003 and up to 29% in 2008-09). Examination of differentials in prenatal care show that rural women are less likely than their urban counterparts to seek prenatal care from a doctor, and they are more likely to get no care at all. There are marked regional variations in prenatal care coverage, with over 25% of women in North Eastern province not getting any prenatal care at all. Women in Western and Nyanza provinces have low use of doctors for prenatal care compared with their use of nurses, while women in Coast and

Central provinces have low use of nurses compared with their use of doctors (Kenya Demographic and Health Survey 2008-09: 113-115).

Sources of Prenatal Care

The 2008-09 Kenya DHS data shows that the mother's age at delivery and the child's birth order are not strongly related to the use of prenatal care, except that high-parity women are more likely than low-parity women not to utilize prenatal care. Women's level of education, however, is associated with prenatal care coverage. Women with higher education are much more likely to receive prenatal care from a medical doctor than are those with no education (36% versus 21%). The proportion of women who do not access prenatal care declines steadily as the mother's education and wealth quintile increases. For example, 25% of women with no education and 14% of women in the lowest quintile do not get any prenatal care from a doctor (Kenya Demographic and Health Survey 2008-09: 115).

The vast majority of Kenyan women who do obtain prenatal care go to government sources (83%). Use of private medical sources was reported by only 16% of women because the most common sources of prenatal care are government hospitals and government dispensaries. The public-private distribution of sources for prenatal care differs for urban and rural women. Urban women are more likely to visit government hospitals and private hospital and clinics, while rural women are more likely to visit government dispensaries and health centers. Women in Nairobi use private sources more than women in other provinces, while women in North Eastern and Coast provinces are more likely to visit public (government) sources for prenatal care. The proportion of

women in North Eastern province receiving prenatal care at home declined from 22% in 2003 to 3% in 2008-09, however 5% of women in Western province still reported having received prenatal care at home (Kenya Demographic and Health Survey 2008-09: 115).

Number and Timing of Prenatal Care Visits

Prenatal care is more beneficial in preventing adverse pregnancy outcomes when it is sought early in the pregnancy and is continued through delivery. The WHO recommend that the first prenatal visit occur within the first three months of pregnancy, that subsequent visits continue on a monthly basis through the 28th week of pregnancy, and that visits thereafter take place every two weeks up to the 36th week or until birth. Under normal circumstances, the WHO also recommends that a woman without complications should have at least four prenatal care visits, the first of which should take place during the first trimester. Early detection of problems in pregnancy leads to more timely referrals in the case of women in high-risk categories or with complications; this is particularly true in Kenya, where 75% of the population lives in rural areas and where physical barriers pose a challenge to health care delivery (Kenya Demographic and Health Survey 2008-09: 116). In Kenya, less than half of all pregnant women (47%) make four or more prenatal visits. Of this 47%, 60% of urban women make four or more prenatal care visits compared to 44% of rural women. Moreover, most women do not receive prenatal care early in the pregnancy. Only 15% of women seek prenatal care in the first trimester of pregnancy, and only about half (52%) receives care before the sixth month of pregnancy. Overall, there has only been a slight improvement in the pattern of prenatal attendance by gestational age. The median gestational age at the first visit has

decreased slightly, from 5.9 months in the 2003 KDHS to 5.7 months in the 2008-09 survey. Comparing trends since the 2003 KDHS, the analysis shows a continuing decline in the proportion of women who make four or more prenatal visits, from 52% in 2003 to 47% in 2008-09. This decline translates to a call for interventions that will encourage more women to have regular prenatal visits throughout their pregnancies (Kenya Demographic and Health Survey 2008-09: 116).

Location of Delivery

Each year more than 60 million women deliver at home with no skilled care (Mramba 2010). Increasing the proportion of infants that are delivered in health facilities is an important factor in reducing the health risks to both the mother and her child. Proper medical attention and hygienic conditions during delivery can reduce the risks of complications and infection that can cause morbidity and mortality. The 2008-09 KDHS results indicate that 43% of births in Kenya are delivered in a health facility (approximately two out of five births), while 56% of births take place at home. This represents a slight improvement in the proportion of births occurring at a health facility, from 40% in 2003 to 43% in 2008-09. Births to older women and births of higher order are more likely to occur at home. Similarly, mothers in rural areas are more than twice as likely to deliver at home compared to those in urban areas. As the level of education and wealth quintile of the mother increase, the proportion of children born at home decreases. Eighty-four percent of children whose mothers have no education are born at home compared to 27% of children whose mothers have some secondary education. The fact that mothers who have more prenatal care visits during their pregnancy are less likely to

deliver at home further emphasizes the necessity for and importance of prenatal care. The proportion of births that take place at home is substantially lower (10%) in Nairobi province than in Eastern province (81%). Since 2003, births at home have declined from 59% to 56% in the 2008-09 survey. While the proportion of births in a public facility increased from 26% in 2003 to 32% in 2008-09, the proportion of births taking place in private facilities declined from 14% to 10% (Kenya Demographic and Health Survey 2008-09: 119-120).

Women whose most recent birth in the five years before the 2008-09 survey did not occur in a health facility were asked why they delivered elsewhere. The main reasons given for not delivering in a health facility included unavailable transportation for the long distance (42%) and that it was unnecessary (21%). Other reasons included that the delivery occurred too fast to get to a facility (18%) and that it cost too much to deliver in a facility (17%). Very few women said they did not deliver in a facility because: there were no female providers at the facility, it was not customary, their husband or family did not allow it, quality of service was poor, or the facility was not open. Differences by age at birth, birth order, and number of prenatal care visits are not major, however women with more prenatal visits are more likely than those with no prenatal care to say they did not deliver in a facility because of an abrupt delivery. Women in rural areas are more likely than those in urban areas to say they did not deliver in a health facility because it was too far away or they lacked transportation. Women in Nairobi who did not deliver in a facility are more likely to cite high cost as a factor than are women in other provinces. Women in North Eastern province are far less likely to cite cost as a factor, but they are more likely than women in other provinces to say they did not deliver in a facility

because of poor quality of service and distance from a facility. Abrupt deliveries are a more important factor in not having facility-based deliveries for more educated and wealthier women than they are for those with less education and wealth (Kenya Demographic and Health Survey 2008-09: 120-121).

Assistance during Delivery

In addition to place of birth, assistance during childbirth is an important variable that influences the birth outcome and the health of the mother and the infant. The skills and performance of the birth attendant are important in averting deaths from pregnancy complications through appropriate case management, referral, and effective emergency obstetric care (Gage 2007). Use of skilled professionals during delivery declined from 50% in 1989 to 42% in 2003, further demonstrating a deterioration in the use of maternal health services among Kenyan women (Ochako 2011). According to the 2008-09 KDHS data, 44% of births in Kenya are delivered under the supervision of a skilled birth attendant, usually a nurse or midwife. Traditional birth attendants continue to play a vital role in delivery, however, by assisting with 28% of births. Relatives and friends assist with 21% of births, and mothers do not receive any form of assistance for 7% of births. Maternal age and the child's birth order are associated with the type of assistance at delivery. Births to older women and those of higher birth order are more likely to occur with no assistance, compared with births to younger women and those of lower birth order. As expected, births in urban areas and births to mothers who have more education or wealth are more likely to be assisted by medical personnel than are those births to

mothers who reside in rural areas or have less education or wealth (Kenya Demographic and Health Survey 2008-09: 122-123).

Regional differentials in type of assistance at delivery are also pronounced, with Western province recording the lowest proportion (26%) of births assisted by medical professionals, followed by North Eastern province (32%). As expected, Nairobi has the highest proportion of births assisted by medical personnel (89%). Although a skilled provider attends 32% of births in North Eastern province, only 17% occur in a health facility. North Eastern province is the only province in Kenya where skilled providers attend a sizeable proportion of births at home. The proportion of births assisted by medically trained personnel has increased marginally (from 42% in 2003 to 44% in the 2008-09 survey) and was accompanied by a small increase in the proportion of caesarean sections (from 4% in 2003 to 6% in the 2008-09 survey). Births of lower order and those in urban areas are more likely to be delivered by caesarean section compared with those of higher birth order and those in rural areas. Births to mothers who have more education or who are in wealthier quintiles are more likely to be delivered by caesarean section than those whose mothers have less education or are in poorer wealth quintiles. There are regional differences in the proportion of births delivered by caesarean section, with North Eastern province recording the lowest proportion (less than 1%) followed by Western province (4%). Central province has the highest proportion of births delivered by caesarean section (15%) (Kenya Demographic and Health Survey 2008-09: 123).

Postnatal Care

Two-thirds of maternal deaths occur in late pregnancy through the first 48 hours after delivery (Gage 2007). Therefore, postnatal care is also vital for both the mother and the child in order to treat complications arising from the delivery, as well as to provide the mother with important information on how to care for herself and her child. It is recommended that all women receive a check on their health within two days of delivery, yet 53% of Kenyan women do not receive postnatal care. Twenty-eight percent of women receive postnatal care within four hours of delivery, while 7% receive care between 4 and 23 hours after delivery. Another 7% receive a check-up within two days of delivery, and 4% receive care between 3 and 41 days after delivery. Births of higher order and those in rural areas are more likely not to receive any postnatal care than those of lower birth order and those in urban areas. Similarly, mothers in the lowest wealth quintile are twice as likely not to utilize postnatal care services as are women in the highest wealth quintile. The proportion of women who do not receive postnatal care decreases with increasing level of education. Women with at least some secondary education, those in urban areas, and those in the highest wealth quintile are more likely to utilize postnatal services than other women (Kenya Demographic and Health Survey 2008-09: 123-124).

There are wide provincial differentials in the proportion of mothers who do not receive postnatal care. For example, 79% of mothers in North Eastern province do not receive postnatal care compared with 18% of mothers in Nairobi province. Nairobi province shows the highest proportion of women receiving postnatal care within four hours of birth (58%) compared with the lowest proportion in North Eastern province

(9%). Thirty-seven percent of women receive postnatal care from a medical professional (a doctor, nurse, or midwife), 10% receives postnatal care from traditional birth attendants, and a negligible fraction receives postnatal care from community health workers. The mother's location of residence and the child's birth order are strongly related to the type of health provider. Urban women and lower parity women are more likely than their rural counterparts and those with higher parity to receive postnatal care from a medical professional. Similarly, women with higher education and those in wealthier quintiles have greater use of a medical professional than those with lower education and in poorer quintiles. There are also marked regional variations in use of a medical professional for postnatal care services. For example, only 20% of women in North Eastern province receive postnatal care from a medical professional compared to 78% of women receiving care in Nairobi province (Kenya Demographic and Health Survey 2008-09: 124-125).

Age at First Birth

The onset of childbearing has a direct effect on fertility because the reproductive period is biologically limited between 15-49 years (Kenya Demographic and Health Survey 2008-09: 54). Compared with other regions of the world, Sub-Saharan Africa continues to have the greatest proportion of teenagers who are mothers (Birungi 2011). Women in urban areas have a higher median age at first birth than their rural counterparts for all age groups. Higher median age at first birth is recorded in Nairobi province for women age 25-49 (23 years), followed by Central and Coast provinces (both 20 years), while the lowest was observed in Nyanza province (19 years). This implies that women

in Nyanza province, on average, have their first birth nearly four years earlier than those in Nairobi (Kenya Demographic and Health Survey 2008-09: 54-56). The burden of maternal morbidity and mortality is higher among such women as the risk of developing serious complications and subsequent death during pregnancy and childbirth increases (Ochako 2011). A number of studies in the developed and developing world have documented worse maternal and child health outcomes among teenage mothers than among older mothers, including increased risks of preterm delivery, low birth weight, neonatal mortality, and late spontaneous or induced abortions. This disparity has been attributed to teenagers' physiological immaturity, lower use of prenatal and delivery care services, lower socioeconomic status and higher rates of unintended pregnancy (Birungi 2011). Many health providers have little training and experience in meeting special reproductive health needs of younger women and are ill equipped to solve their problems. Furthermore, cultural and religious biases also discourage young women from seeking reproductive health services, while some health providers are reluctant to provide contraceptives to young, unmarried women (Ochako 2011). Early initiation into childbearing also lengthens the reproductive period and subsequently increases fertility, which is likely to pose a risk for socioeconomic disadvantages in later life—even for adolescent mothers from relatively comfortable backgrounds. Delayed initiation into childbearing has advantages, as it shortens the reproductive duration, hence reducing fertility (Kenya Demographic and Health Survey 2008-09: 54-56).

Women's level of education is positively related to age at first birth, and women with at least some secondary education begin childbearing more than three years after women with no education (22.1 and 18.7 years, respectively). Similarly, women in the

highest wealth quintile delay the onset of childbearing by about three years relative to women in the lowest quintile. As expected, the levels of teenage childbearing are highest in Nyanza (27%) and Coast (26%) provinces and lowest in Central province (10%). Thirty-two percent of uneducated teenagers have begun childbearing, compared with only 10% of those with some secondary education and above. Similarly, teenagers from poorer households are more likely to have begun childbearing (24%) than are teenagers from wealthier households (16%) (Kenya Demographic and Health Survey 2008-09: 55-56).

The 2008-09 data show that childbearing among Kenyan women is nearly universal, and women attain a parity of 6.3 children per woman at the end of their childbearing period (1.7 children above the total fertility rate of 4.6 children per woman). As expected, women above 40 years have much higher parities with substantial proportions having 10 or more births each by the end of their childbearing years. For example, 34% of all women age 45-49 have given birth to eight or more children. The mean number of children ever born and the mean number of living children rise linearly with the rising age of women as expected in a normal population. A comparison of the mean number of living children with the mean number of children ever born shows that women have lost an average of 0.7 children by the end of their childbearing years (Kenya Demographic and Health Survey 2008-09: 52).

Identified Barriers to Maternal Health Services

The following 9 studies conducted in Kenya, Nigeria, and Tanzania consistently identify almost identical barriers to maternal health services. However, none of them

identifies the fundamental barrier that serves as the greatest contributor to low utilization of maternal health services.

A cross-sectional study including 635 women of the rural area of Asembo (Rarieda Division) and Gem (Wagai and Yala Divisions) in western Kenya discovered that a trained provider attended fewer than 1 in 5 deliveries. Most of the women (83%) delivered outside of a clinic with 80% of these women delivering in their own home, 18% in the home of a traditional birth attendant, and 3% on their way to a clinic. The most frequent reason for not seeking professional care during delivery was a lack of means of transportation, particularly at night (49%). Other important barriers included fast progression of labor (47%) and expenses (24%). Fourteen percent of the women did not think facility attendance was necessary and a small 3% reported anticipation of unpleasant treatment (Eijk 2006). Another study conducted in Asembo Bay in Kenya also explored the perceptions of rural women regarding barriers to maternal care. Common social themes that emerged included fears associated with HIV testing or disclosure of HIV status, gender inequalities, and attitudes towards facility-based care (Byford-Richardson 2013).

A cross-sectional study including 200 women in Mbeere District in eastern Kenya discovered that 97.5% of mothers utilized health facilities for prenatal services while a much lower 52% utilized health facilities for delivery services. The major constraints experienced by the mothers included a lack of transportation means, lack of money for transportation and the hospital fee, delay in admission to the health facility, and a lack of satisfaction with the quality of care (Mwaniki 2002). This study as well as the one before it shows that prenatal care usage was high in these two locations in western and eastern

Kenya, however attendance of local health facilities for deliveries was much lower as a result of overwhelming barriers.

A study in South Nyanza province of Kenya (very close to this study's data collection site) reported 52.3% of deliveries occurring outside of a health facility. Using regression techniques, the most significant predictors of a traditional birth attendant or home delivery included distance from the nearest health facility and whether or not a household member had insurance. The average cost of delivery was much higher in health facilities than for traditional birth attendants with almost half of the traditional birth attendants charging nothing (Hodgkin 1996). Another study conducted in South Nyanza province of Kenya examined poor pregnancy outcomes specifically among adolescents. Through 1247 surveys of adolescent girls aged 12 to 19 and in-depth interviews with 39 of the adolescents that had experienced very early pregnancy, possible explanations for poor pregnancy outcomes – including poor maternal health-care and unsafe induced abortions – emerged. The results showed a higher incidence of poor pregnancy outcomes among rural residents, those with low educational attainment, very young mothers, unmarried teenagers, and first order pregnancies (Magadi 2007).

A study conducted in the slums of Nairobi, Kenya interviewed 1,927 women who had experienced pregnancy in 2004-2005. Seventeen variables measuring autonomy were used to construct women's decision-making, freedom of movement, and overall autonomy. While results identified recurring household wealth, education, and demographic and health covariates to have strong relationships with place of delivery, the effects of women's overall autonomy, decision-making, and freedom of movement were rather weak. Among middle to least poor households, all three measures of women's

autonomy were associated with place of delivery while they were strong and counter-intuitive for the poorest women (Fotso 2009).

A study including 107 women in Nigeria revealed that 96.3% of the women had delivered or planned to deliver at home without a skilled attendant. The identified barriers included economic, cultural, and those related to the women's perception of their condition (Adamu 2002). A study in Tanzania assessed the timing of pregnant women's first prenatal care visit and identified factors influencing early and late attendance. Factors including poor quality of care, lack of awareness about the health benefits of antenatal care, late recognition of pregnancy, and social and economic factors were all responsible (Gross 2012). Another study in southern Tanzania attempted to identify barriers preventing high-risk pregnancies to seek referral level care as encouraged by prenatal care. Expert-defined risk-status was found to have little influence on a woman's decision to seek hospital care. The main obstacles, as reported by mothers-to-be, included geographical and financial accessibility, traditional family structures and poverty, perception of care and fear of the hospital environment, and community perceptions of the causes and severity of pregnancy-related problems. Besides these well known geographical and financial barriers, pregnant women were found to have different perceptions and interpretations of danger signs (Kowalewski 2000).

Needless Deaths and Disabilities

In the nations of sub-Saharan Africa, the disability-adjusted life years, or DALYs, are more than twofold higher than the rest of the world, largely due to high mortality rates. Communicable, maternal, perinatal, and nutritional disorders account for two-

thirds of the disease burden in sub-Saharan Africa (Harris 2013). Compared to current levels of maternal and newborn care, providing recommended standards of maternal care to every pregnant woman in the developing world would have a major impact. The number of maternal deaths would drop by 57% from the current level to 240,000 deaths per year. The healthy years of life lost due to disability and premature death (DALY) among women and their newborns would be reduced by more than 60%. More women would survive hemorrhage and infection, and fewer would endure needless suffering from fistula, infertility, and other health problems related to pregnancy or childbirth (Singh 2009). However, as the studies have described above, there are significant barriers to maternal health services that need to be addressed. Closing the gaps in access to and use of services – and preventing the loss of life among women – requires focusing resources on those least likely to be receiving care.

Summary

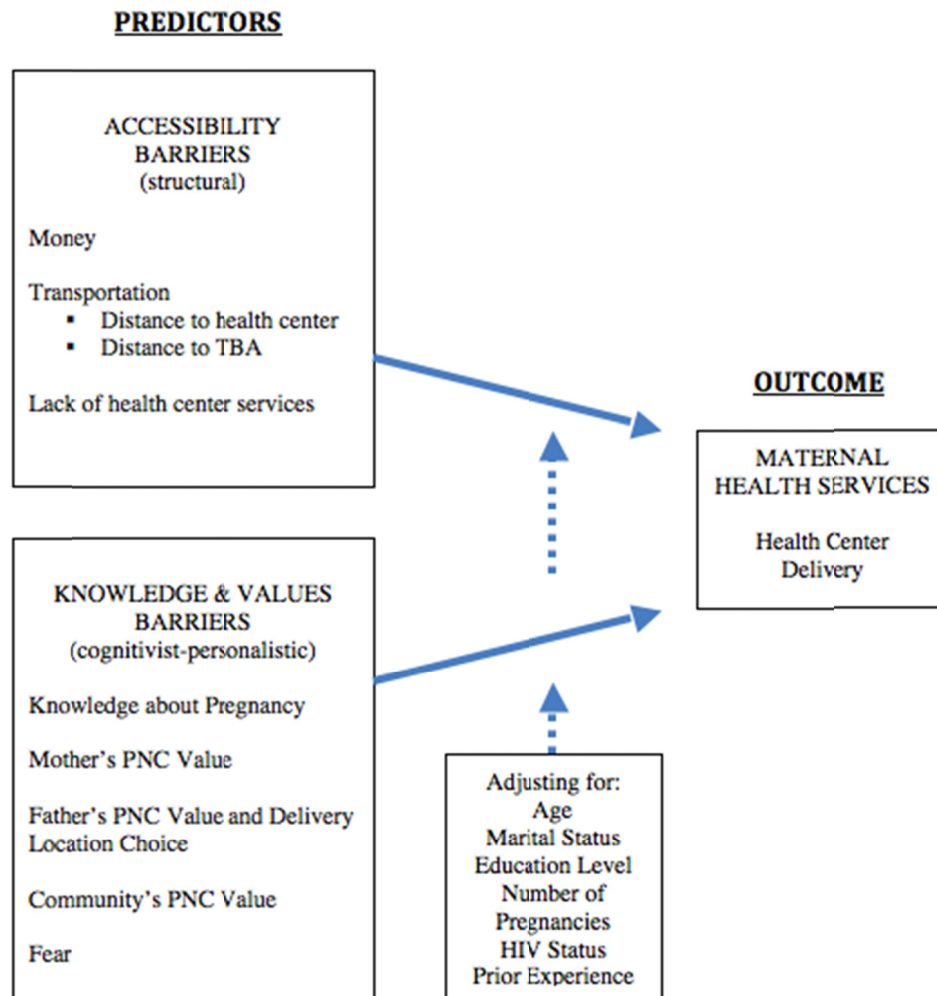
Skilled attendance at childbirth is a critical factor in improving pregnancy outcome, especially for high-risk women in developing countries such as Kenya. Although home births are already strongly discouraged on the Nyakach Plateau (Ogola 2012), poor attendance for delivery at nearby health centers is widespread. The 2008-09 KDHS results with regard to Nyanza province in particular, which encompasses the Nyakach Plateau, further elucidates the necessity for additional investigation of the predominant barriers to maternal health services in this vulnerable population. Attention to the barriers in a woman's life will lead to a much richer understanding of her behavior during this time that is so crucial both for her and for her child. Furthermore, these

barriers need to be analyzed as a community-based needs approach as well as within a liberation theology framework to identify the most appropriate intervention.

CHAPTER THREE

Hypothesis

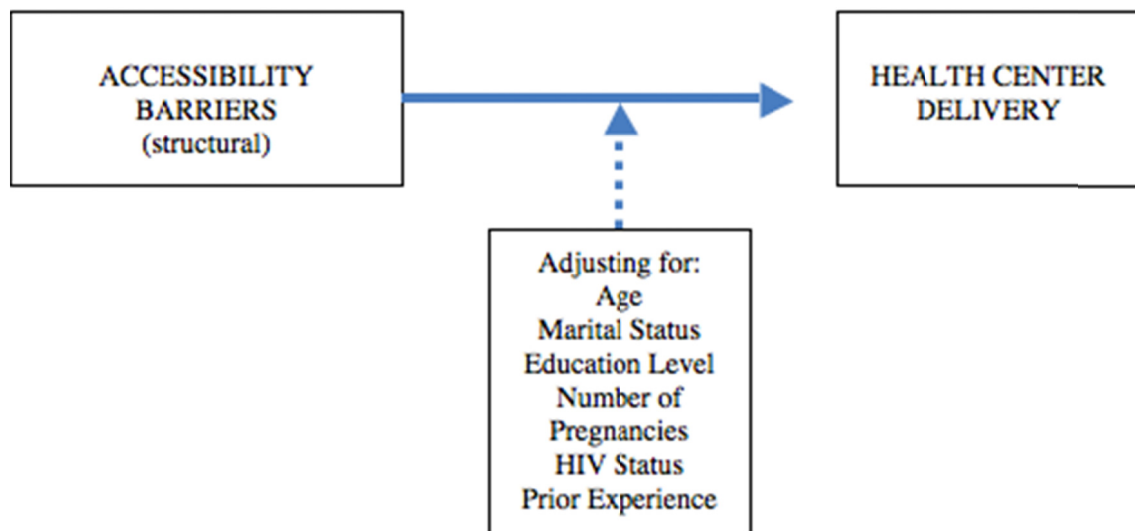
With the general objective of identifying the predominant barriers to health center deliveries in a rural Kenyan community, this study hypothesizes that accessibility to maternal health services, particularly the availability of transportation, is a greater determinant of health center deliveries than an individual's personal knowledge and values regarding maternal health services.



Primary Research Question: Is accessibility to maternal health services a greater determinant of health center deliveries than knowledge and values regarding maternal health services?

Hypothesis: While adjusting for age, marital status, education level, number of pregnancies, HIV status, and prior experience, accessibility to maternal health services is a greater determinant of health center deliveries than knowledge and values regarding maternal health services.

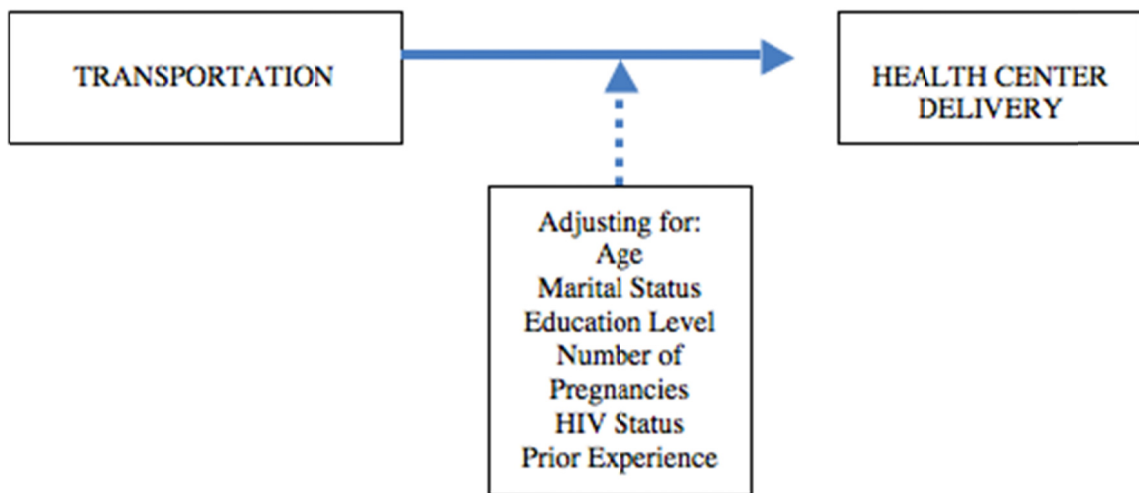
Null Hypothesis: Accessibility to maternal health services is not a greater determinant of health center deliveries than knowledge and values regarding maternal health services.



Secondary Research Question: Is transportation to maternal health services the greatest determinant of health center deliveries?

Hypothesis: While adjusting for age, marital status, education level, number of pregnancies, HIV status, and prior experience, transportation is the greater determinant of health center deliveries within accessibility than money or a lack of health center services.

Null Hypothesis: Transportation is not the greatest determinant of health center deliveries.



CHAPTER FOUR

Methodology

Study Design

This is a cross-sectional study that involved the use of a Prenatal Questionnaire developed by the principle investigator. With the participation of research assistants and translators, interviews were conducted in a convenience sample of women on the Nyakach Plateau in rural western Kenya. The results from this study will be used to develop community-based interventions that will focus on improving pregnancy, delivery, and postnatal care.

Study Site

This study was conducted in the Nyanza Province, a larger administrative region of western Kenya that lies next to Lake Victoria and the Tanzanian border. The population inhabiting this region is predominately (63%) Luo – the third largest ethnic group in Kenya. While the Luo are becoming more westernized, particular traditions such as polygamy are still practiced.

Since 2009, a non-profit organization called *Straw to Bread* led by Dr. Lisa Baker has returned annually to the Upper Nyakach Plateau to set up a temporary clinic and carry out numerous public health projects. With the support of students and volunteer professionals, an enduring relationship has grown with the Luo people over the years. As a result of *Straw to Bread's* partnership and mission to provide “the physical,

educational, and spiritual nourishment necessary for our Kenyan partners to live fruitful and loving lives,” this study was made possible.

Women representing multiple sub-locations of the Nyakach District within Nyanza Province – including East Kadianga, East Koguta, Ramogi, and Ndori – were interviewed (see Appendix A). It was during *Straw to Bread’s* annual visit in May of 2012 that this study was completed.

Selection Criteria

Pregnant women and non-pregnant mothers were included in this study. Anecdotal data was also collected from health professionals (including Habil Ogola, Nelly Omunde, and Ann Otieno) and traditional birth attendants (including Syprine Omollo, Margaret Otieno, Margaret Aketch, Dusilla Amadi, and Grace Ochuka).

Sample Size

Ninety-two women were interviewed (45 pregnant women and 47 non-pregnant mothers) over a seven-week period between May 14th and July 3rd of 2012. Despite the initial aim to directly compare an equal 45 pregnant women and 45 of the non-pregnant mothers, two missing consent forms resulted in a lower than expected 43 pregnant women. Instead of reducing the sample size even more, it was more favorable to compare 43 pregnant women with 47 non-pregnant mothers and keep a sample size of 90 than reduce the sample size to 86.

Training Protocol

Research was conducted through individual interviews with consenting participants that were interested in “answering several questions to allow us to improve the health of women in her community.” Fourteen research assistants and fourteen Luo translators attended a training session before interviewing participants. All of the research assistants and translators were female to ensure that pregnant women and non-pregnant mothers were comfortable in sharing their stories. Training protocol involved an overview of the study, description of eligible participants, and clear instructions regarding the Prenatal Questionnaire. In order to minimize participant anxiety, appropriate interview behavior was emphasized.

Sample

Recruitment of participants occurred through community health workers as well as door-to-door visits by the principle investigator. Some interviews were conducted at *Straw to Bread*'s temporary clinic as well as the local Sigoti Health Center, however a majority of the interviews occurred in the participants' private homes. Fourteen research assistants that were members of the *Straw to Bread* medical team interviewed 37 participants at the Sigoti Health Center between May 14th and May 25th. After the *Straw to Bread* medical team left Kenya, the principle investigator and one research assistant interviewed (45 and 8) participants respectively in their homes from May 25th to July 3rd as a result of an extended stay. All of these Prenatal Questionnaires were administered to each participant in private, whether underneath a tree outside of the health centers or in the participant's private home.

Pregnant women mainly were interviewed at *Straw to Bread's* temporary clinic and the Sigoti Health Center, while both pregnant women and non-pregnant mothers were interviewed in their own homes. The latter interviews occurred as two main translators took the principle investigator and research assistants to homes scattered over four sub-locations within the Nyakach District. If women decided not to participate in the study, the principle investigator and research assistants politely thanked them for their time. Consenting participants were allowed to say “I don’t know” and skip questions that they were not comfortable answering as well as stop the interview at any time. At the conclusion of the interview, the principle investigator and research assistants thanked the participant, invited the participant to contact the principle investigator for any additional information about the study, and left the health center or home.

Each interview lasted approximately one hour with the following breakdown: description of the study and signed consent form (5 minutes), Community Health Assessment Profile (5 minutes), and Prenatal Questionnaire (55 minutes) (see Appendix B, C, and D).

Community Health Assessment Profile and Prenatal Questionnaire

Dr. Lisa Baker developed the Community Health Assessment Profile, or CHAP, and the principle investigator developed the Prenatal Questionnaire. Both are not part of standardized, previously published questionnaires. Although additional external information is lacking regarding the validity and reliability of the questions, similar questions have been used successfully with women in rural traditional communities in other developing regions. Additional questions were added based on data gathered by the

2008-2009 Kenya Demographic Health Survey as well as Shannon Wood's previous needs assessment, *Reproductive Health and Contraceptive Use in Rural Kenya: A CBPR Study of Needs and Capacities* (Wood 2011).

Questions were divided into the following sections: Demographics, General Health, Cultural Practices/Beliefs, Prenatal Care Utilization, Behavior during Pregnancy, Delivery, and Pregnancy Outcome. Finally, the Knowledge Assessment section assessed the Luo women's knowledge of appropriate maternal care during pregnancy, delivery, and post-birth recovery. Collecting quantitative as well as qualitative data, the Prenatal Questionnaire asked "yes/no" questions, "mark all that apply" questions, as well as many open-ended questions. While many of the questions asked about the women and their pregnancy experience, others also focused on the women's perceptions of general viewpoints of men as well as the entire community regarding pregnancy, delivery, and postnatal care. The trained principle investigator and research assistants marked the corresponding responses.

Measurements and Variables

The "Prenatal Questionnaire" is an eight-page comprehensive survey with more than 400 questions initially aimed at identifying the predominant barriers to prenatal care utilization on the Nyakach plateau. With 92.68% of the non-pregnant mothers and 93.02% of the pregnant women seeking prenatal care, however, this study could not analyze barriers to prenatal care. As a result of a much lower 45.00% of the non-pregnant mothers delivering at a health center, this study shifted its focus from prenatal care to health center deliveries.

Since this study was conducted to learn from *both* pregnant women and non-pregnant mothers, the outcome variable – whether or not these women *planned to experience* or *had already experienced* a health center delivery – was different. Pregnant women were asked, “*Do you prefer* to deliver your baby at home or at the health center?” while non-pregnant mothers were asked, “*Did you* deliver your baby at home or at the health center?” Therefore caution was taken to avoid comparison with the disparate health center delivery variable.

Non-pregnant mothers’ delivery location was assessed using “Did you deliver your baby at home or at the health center?” To be even more specific, this question was combined with “Who helped deliver your baby at home?” to determine whether or not home deliveries occurred with at least the skilled attendance of a traditional birth attendant or with no skilled attendance of any kind.

The CHAP was used to group responses according to age, marital status, number of pregnancies, education, income, and income provider. The completed questionnaires were used to generate group response frequencies and percentages for fixed questions and to identify emerging response themes for open-ended questions. In categorizing identified barriers into accessibility versus knowledge and values, particular questions were combined or responses to questions were grouped to create new variables that better reflected the concepts for subsequent data analysis.

Accessibility

To assess accessibility responses to the following two questions were combined to identify financial barriers, transportation barriers, and a lack of health center services:

1. “What could the health center provide for you that would help you get prenatal care?”
2. “Why did you deliver your baby at home?”

Financial barriers were identified when responses to Question 1 included “less expensive services” or “food” and responses to Question 2 included “inadequate income.” Transportation barriers were identified when responses to Question 1 included “transportation services,” “health center services closer to home,” or “more health center locations,” and responses to Question 2 included “transport obstacle” or “no one else was around to take me.” Similarly, a lack of health center services was identified when responses to Question 1 included “more maternal health services,” “more health professionals,” “nurses that treat their patients well,” or “improved medical facilities,” and responses to Question 2 included “felt the health center was less effective” or “no health center at the time.”

To evaluate distance, a Distance Score was created that subtracted the distance to the nearest traditional birth attendant from the distance to the nearest health center. Both distances were estimates reported by the participants and were not actually measured. It is important to note that an outlier of 61 km to the nearest health center was recoded as 26 km, the next closest distance that had been identified.

Knowledge and Values

To assess the sample's knowledge of pregnancy, this study used 8 Knowledge Assessment questions to develop a "Knowledge Score" that graded responses on a scale from 0 to 8. The questions included were as follows:

1. "Is it important to drink a lot of water during pregnancy?"
2. "Is it important to take multivitamins or prenatal vitamins during pregnancy?"
3. "Is it bad for the baby if a pregnant woman smokes during pregnancy?"
4. "Is it bad for the baby if a pregnant woman drinks alcohol during pregnancy?"
5. "Are chemicals such as insecticides, lead, and mercury bad for the baby?"
6. "Should you avoid heavy exercise and activities during pregnancy?"
7. "How long does a normal pregnancy usually last?"
8. "Are pregnant women who are older than 35 at a higher risk of unfavorable birth outcomes?"

Questions were counted correct if answered correctly, but questions were counted incorrect if answered incorrectly or with "I don't know." Women were considered to have adequate knowledge of pregnancy, or to have a "passing score," if they answered correctly more than six of the eight questions.

To assess women's value of prenatal care, responses to "How useful are prenatal care services?" were used. To assess fathers' value of prenatal care and delivery location choice, responses to "Does the baby's father want you to go to the health center for prenatal care?" and "Does the baby's father want you to go to the health center for the delivery?" were used.

Similarly, responses to “What does your community think about a pregnant woman going to the health center several times during her pregnancy, even if she is not sick, just to see if the pregnancy is going well?” were used to assess the community’s value of prenatal care.

Responses including “nurses that do not mistreat patients” and “afraid of health center” to “What could the health center provide for you that would help you get prenatal care?” and “Why did you deliver your baby at home?” were used to assess fear as a barrier to utilizing services.

Possible Confounding Variables

To compare pregnant women’s current marital status to the non-pregnant mothers marital status during their last pregnancy, this study used the CHAP to assess pregnant women and the Prenatal Questionnaire’s “What was your relationship with the father of the baby?” to assess non-pregnant mothers.

To assess a woman’s prior pregnancy experience, this study used responses to the following 5 questions to develop a “Bad Score” that takes into consideration any serious problems impacting or resulting from pregnancy:

1. “Do you have HIV/AIDS?”
2. “Have you delivered any sick children?”
3. “Have any of your children died at an age <5 years?”
4. “Some women have very difficult deliveries that leave them unable to control their urination or defecation.” – “Do you have such a problem with urination?”

5. “Some women have very difficult deliveries that leave them unable to control their urination or defecation.” – “Do you have such a problem with defecation?”

The following scores represent the varying combinations of responses observed within the sample in increasing severity on a scale of 1 to 14:

1 = sick child

2 = urination problem

3 = urination problem + sick child

4 = defecation problem

5 = defecation problem + urination problem

6 = defecation problem + urination problem + sick child

7 = death under five

8 = death under five + sick child

9 = death under five + defecation problem + urination problem

10 = HIV positive

11 = HIV positive + sick child

12 = HIV positive + urination problem + sick child

13 = HIV positive + death under five

14 = HIV positive + death under five + urination problem

Statistical Analysis

The data was double-entered into Microsoft Excel using a codebook created by the principle investigator. After discrepancies were corrected, the data was imported into SAS Version 9.3, where variable recoding took place and errors were corrected as

necessary. Univariate, bivariate, and multivariate statistics were used in the analysis. Univariate statistics were used to describe the distribution of all pertinent variables. Bivariate and multivariate statistics were used to test the two hypotheses and determine statistical significance with alpha set at 0.05. Contingency tables were used primarily, as a majority of the variables were categorical.

Logistic regression was used to test which predictor variables significantly contributed to the variance in outcome variables after adjusting for possible confounders.

CHAPTER FIVE

Results

“Non-pregnant mothers” are defined as women who were not pregnant during data collection but have experienced pregnancy in the past. “Pregnant women” are defined as women who were pregnant during data collection.

The following results are divided into two parts based on the 47 non-pregnant mothers and 43 pregnant women in our sample of 90:

- Non-pregnant Profile
- Non-pregnant and Pregnant Profile

These profiles will be organized according to Accessibility variables, Knowledge and Values variables, and possible confounding variables based on the diagram in Chapter 3.

- Outcome Variable: Delivery Location
- Non-pregnant Profile / Non-pregnant and Pregnant Profile Combined
 - Accessibility Variables
 - Financial Barriers
 - Transportation Barriers
 - Distance to health center and distance to traditional birth attendant
 - Lack of Health Center Services
 - Knowledge and Values Variables
 - Knowledge About Pregnancy

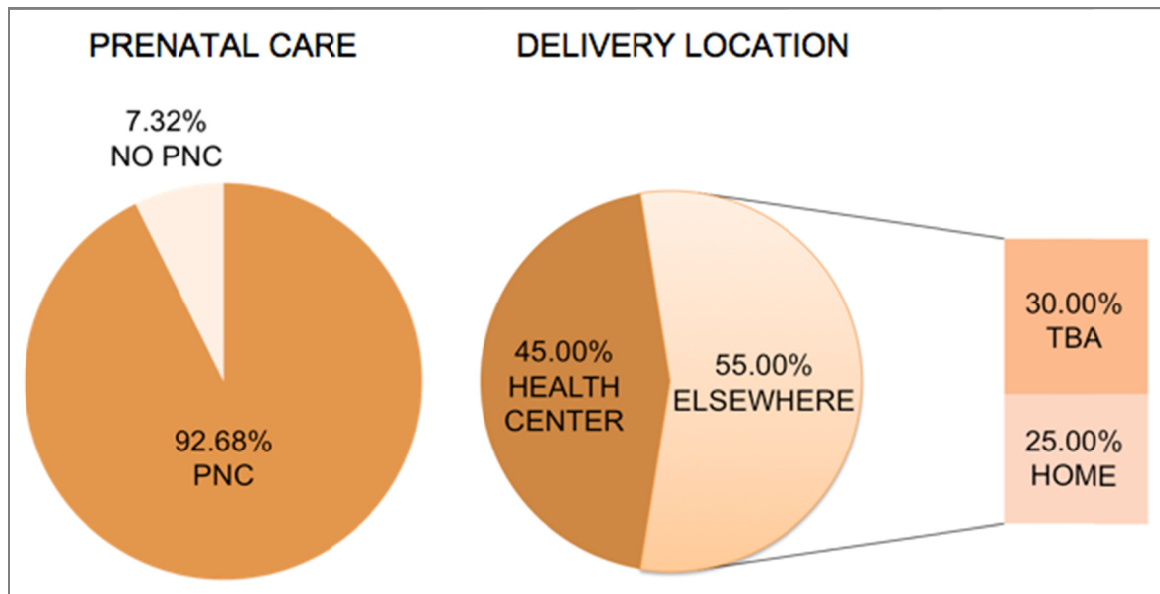
- Mother's Prenatal Care Value
- Father's Prenatal Care Value and Delivery Location Choice
- Community's Prenatal Care Value
- Fear
- Possible Confounding Variables
 - Demographic Variables
 - Age
 - Marital Status
 - Education Level
 - Number of Pregnancies
 - Medical Variables
 - HIV Status
 - Prior Bad Outcomes
- Summary:
 - Accessibility and Knowledge and Values
 - Non-pregnant versus Pregnant Profile
- Logistic Regression

Outcome Variable: Delivery Location

Both pregnant women and non-pregnant mothers highly valued health center services. The results show that 83.72% of the pregnant women valued prenatal care services, 93.02% planned to get prenatal care at a health center, 87.50% already received their first prenatal care check-up, and 97.56% preferred – or intended – to deliver at a

health center. More of the non-pregnant mothers valued prenatal care services (97.78%) and almost all of them received prenatal care (92.68%), however less than half (45.00%) actually delivered at a health center – 30.00% delivering at the home of a TBA and 25.00% delivering elsewhere (assumed to be their own home).

Figure 1:



*PNC = Prenatal Care

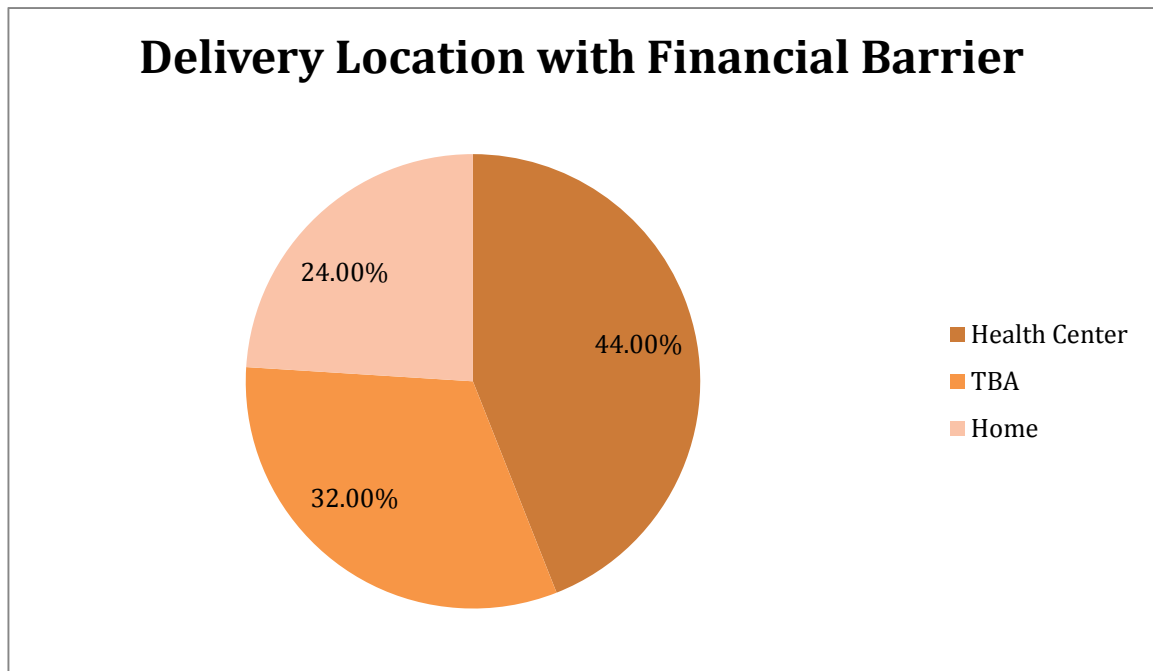
*TBA = Traditional Birth Attendant

Non-Pregnant Profile

Accessibility Barriers

Financial Barriers: 63.83% of the non-pregnant mothers surveyed in this study reported money as a barrier to maternal health services and only 44.00% of them delivered at a health center. Although a majority of these mothers delivered outside of a health center (32.00% with a TBA and 24.00% at home), 61.11% of the mothers who did deliver at a health center referred to a financial barrier related to health centers.

Figure 2:



Of the 4.26% of non-pregnant mothers who had absolutely no income, none delivered at a health center. Of the non-pregnant mothers who did have an income, only about half (47.37%) delivered at a health center. The other 52.63% delivered elsewhere (31.58% at a health center and 21.05% at home). In light of the 44.00% of women who still managed to deliver at a health center despite listing a financial barrier, we realize that money is a barrier for the very poor.

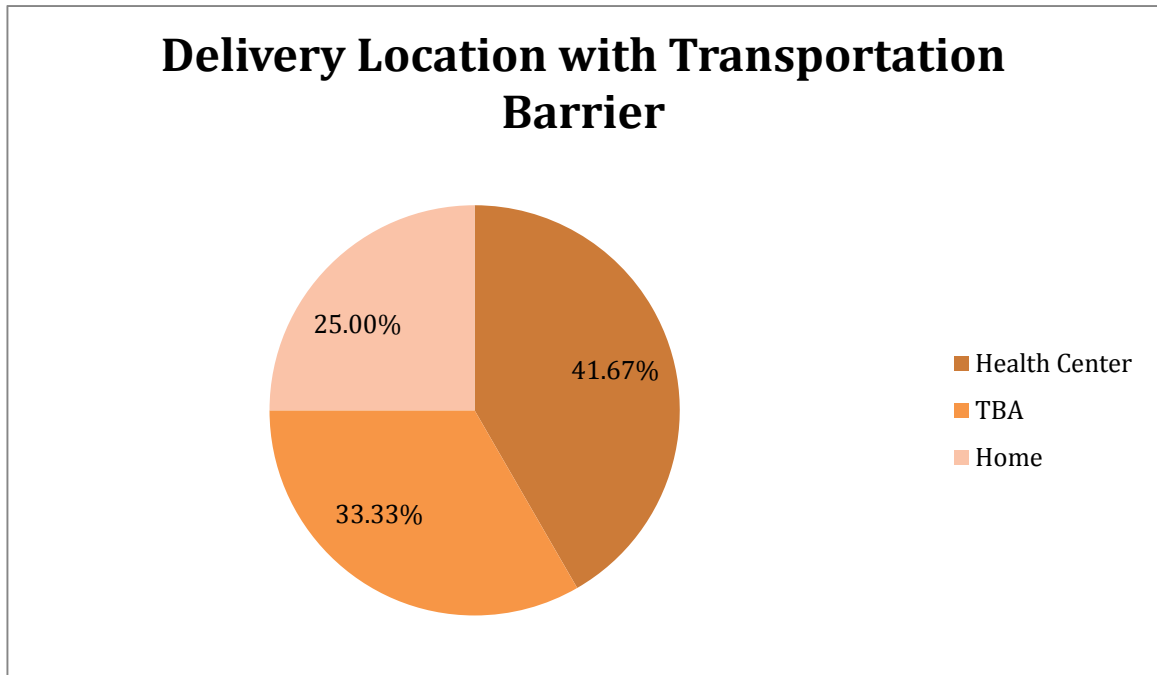
In addition, more than 1/3 of the non-pregnant mothers were the sole provider for their families (36.17%). These mothers were responsible for financially supporting their immediate family and frequently extended family as well. These mothers were less likely to deliver at a health center than mothers who had at least one other individual's financial support (40.00% of them delivering at a health center and 60.00% of them delivering elsewhere).

If these mothers had at least one other individual's financial support, 48.00% of them delivered at a health center. Of the remaining 52.00%, however, more of the mothers with another income provider delivered at home (28.00%) than with a TBA (24.00%). On the other hand, more of the 60.00% of the non-pregnant mothers who were sole providers and delivered outside of a health center delivered with a TBA (40.00%) than at home (20.00%).

Transportation Barriers: 74.47% (35) of the non-pregnant mothers had only walking as the means to get to their prenatal care services. Of the 25.53% (12) that had some other form of transportation, one mother had access to a bicycle while the rest used public services such as motorcycles, cars, or buses.

89.36% of the non-pregnant mothers surveyed in this study admitted that transportation was a barrier to important maternal health services. Still, a greater percentage of these mothers delivered at a health center (41.67%) compared to the 33.33% that delivered with a TBA and 25.00% that delivered at home. Although a combined 58.33% of them delivered outside of a health center, we are once again surprised that 83.33% (15) of the 18 mothers who did deliver at a health center listed a transportation barrier. Of the 10.00% (4) of the non-pregnant mothers who did not identify transportation as a barrier, one of them delivered at home (therefore no transportation necessary) and three of them delivered at a health center (having the transportation means to make it there in time).

Figure 3:



Distance: The non-pregnant mothers lived an average 1.87 km (1.16 miles) away from the nearest health center. Compared to the average distance to a health center, the non-pregnant mothers lived closer to a TBA (0.43 km = 0.27 miles). It is important to note that all of the non-pregnant mothers (12) who delivered with a TBA thought transportation to a health center was an issue. These mothers lived an average distance of 0.18 km (0.11 miles) away from a TBA, while those that delivered at a health center lived 0.30 km (0.19 miles) away from a TBA. Those that delivered at home lived the greatest distance of 0.40 km (0.25 miles) away from a TBA. Thus, the mothers who delivered with a TBA were almost two times as close to a TBA than the mothers who delivered at a health center or at home (0.18 km versus 0.30 km versus 0.40 km = 0.11 miles versus 0.19 miles versus 0.25 miles). Note the approximate trend of distance from a TBA with

0.2 km for mothers who delivered with a TBA, 0.3 km for those that delivered at a health center, and 0.4 km for those that delivered at home.

While the non-pregnant mothers described above chose to deliver with a TBA based on distance, they did not use the same reasoning to deliver at a health center. In fact, the distance to a health center has absolutely no impact on delivery location as the average distance to the nearest health center was 1.90 km (1.18 miles), 1.92 km (1.19 miles), and 1.93 km (1.20 miles) for mothers who delivered at a health center, with a TBA, and at home respectively. As shown in Table 1 below, a health center was 6.3 times farther away from a TBA for those that delivered at a health center. It was 10.5 times farther away from a TBA for those that delivered with a TBA, and it was 4.8 times farther away from a TBA for those that delivered at home. Thus, mothers who delivered at a health center walked six times as far – an average of 1.90 km or 1.19 miles – to deliver at a health center than with a TBA. When the distance became too great, however, mothers delivered with a TBA with the point of diminishing return somewhere between a distance that was 6.3 and 10.5 times farther from a TBA.

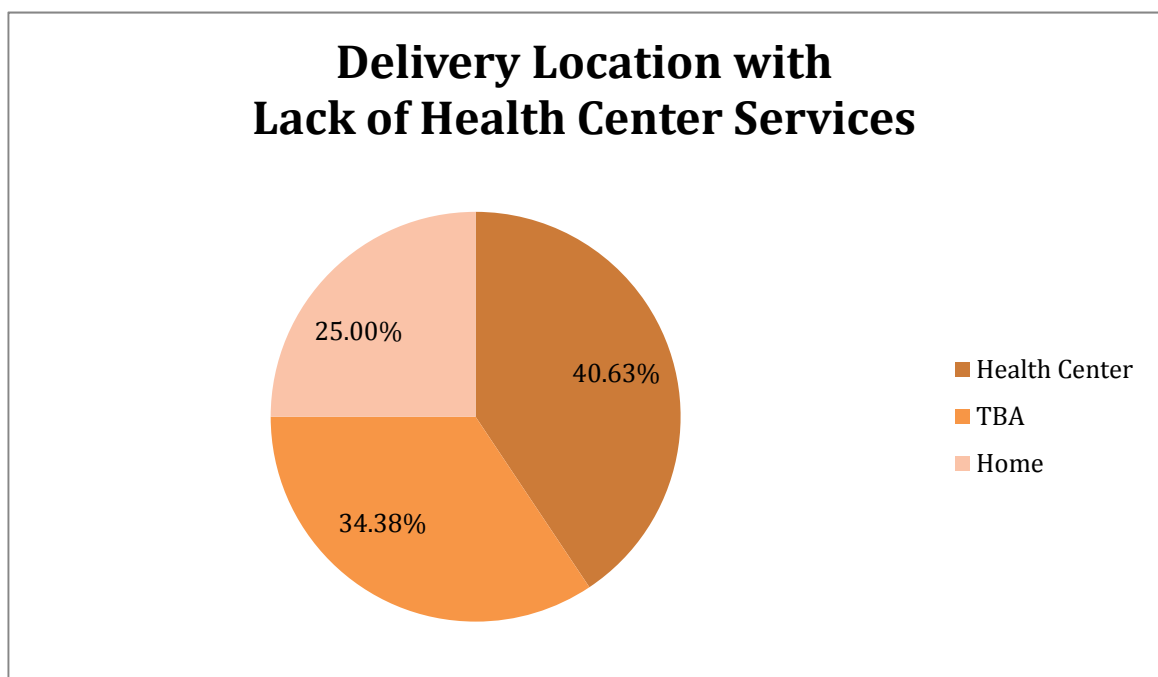
Table 1:

Delivery Location	Distance to TBA	Distance to Health Center	How much farther is a health center from a TBA?
Health Center	0.30 km	1.90 km	6.28x farther from TBA
TBA	0.18 km	1.92 km	10.48x farther from TBA
Home	0.40 km	1.93 km	4.82x farther from TBA

Lack of Health Center Services: 76.60% of the non-pregnant mothers described a lack of appropriate maternal health services as a critical barrier to health center deliveries yet 40.63% delivered at a health center. Compared to the 59.38% that delivered outside

of a health center (25.00% with a TBA and 34.38% at home), these 13 mothers had experienced a health center delivery and thereby recognized the need for additional services. From a different perspective, 72.22% of the mothers who delivered at a health center, 91.67% that delivered with a TBA, and 80.00% that delivered at home felt there was a lack of sufficient health center services.

Figure 4:



Knowledge and Values Variables

Knowledge about Pregnancy: Of the 37.50% of the non-pregnant mothers who made a perfect Knowledge Score of 8, a majority delivered at a health center (46.67%) compared to with a TBA (33.33%) or at home (20.00%). The average score for the non-pregnant mothers who delivered at a health center was higher (7.17), although not significantly higher, than the average score for those that delivered with a TBA (6.75)

and at home (6.30). Of the mothers who delivered at a health center, none of them scored less than a six. The lowest score for the mothers who delivered with a TBA was a five and at home was a three.

When the Knowledge Score is divided into pass/fail with a score of seven to eight considered passing and a score of zero to six considered failing, we find that approximately twice as many mothers who pass the Knowledge Score delivered at a health center (51.85%) versus those that delivered with a TBA (25.93%) or at home (22.22%).

However, among mothers who delivered at each of the locations, more mothers passed than failed the Knowledge Score with 77.78% passing for all health center deliveries, 58.33% passing for all TBA deliveries, and 60.00% passing for all home deliveries. 34.04% (16) of all of the non-pregnant mothers scored an 8, 29.79% (14) scored a 7, and the remaining 36.18% (17) scored anything from a zero to a six. Thus, approximately 1/3 of the sample scored an 8, 1/3 scored a 7, and the final 1/3 did not score as high.

Figure 5:

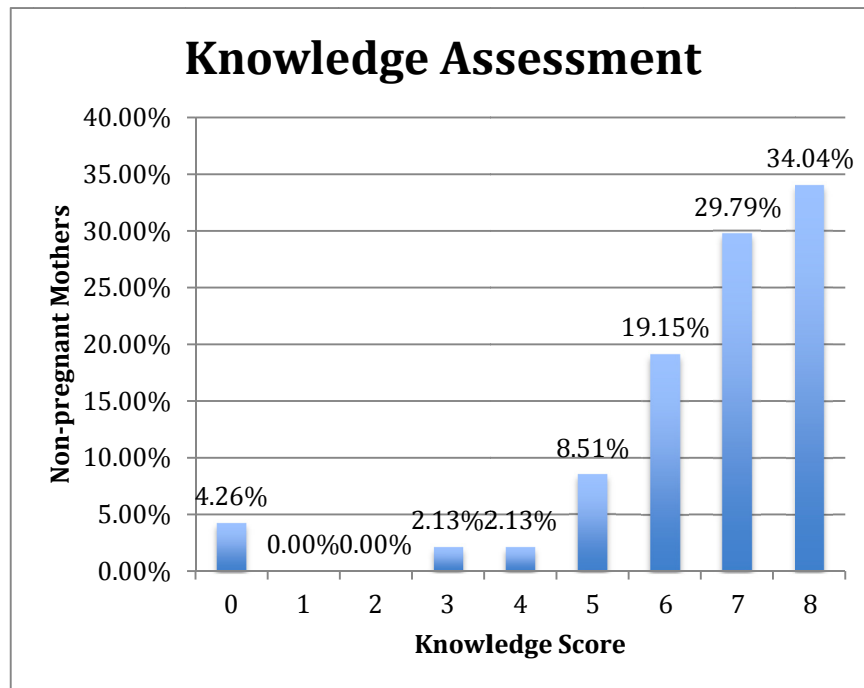
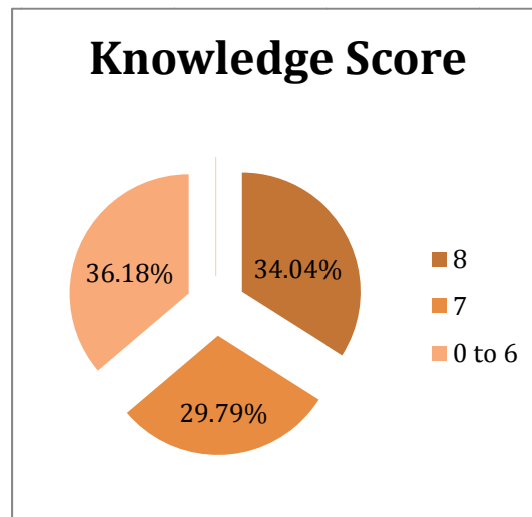


Figure 6:



Mother's Prenatal Care Value: Of all of the non-pregnant mothers, only one mother did not value prenatal care. Of the 97.87% of the non-pregnant mothers who valued prenatal care and 92.68% that actually got prenatal care, however, only 45.00%

delivered at a health center. Of the non-pregnant mothers who valued prenatal care, 30.00% delivered with a TBA and 25.00% delivered at home.

Father's Prenatal Care Value and Delivery Location Choice: Among the non-pregnant mothers, 91.89% of their partners had encouraged them to seek prenatal care during their pregnancy and 70.21% of them wanted their baby's mother to deliver at a health center. These mothers were 3.6 times more likely to deliver at a health center than the mothers whose partners did not want them to have a health center delivery (51.52% versus 14.29%). Although this difference only approaches statistical significance ($X^2 = 3.2341$, $p = 0.0721$), it becomes clear that both mothers and fathers value health center deliveries with the father's choice playing an important role. When the baby's father wanted a health center delivery, approximately half (51.52%) of the mothers delivered at a health center. Of the 17.50% of mothers who did not have their partner's consent, only one of them still delivered at a health center.

Community's Prenatal Care Value: All of the non-pregnant mothers report that their communities value prenatal care. However, only 45.00% of the mothers who responded to this question delivered at a health center.

Fear: Of the non-pregnant mothers, only one mother reported fear as a barrier to maternal health services. She delivered with a TBA along with the other 28.21% of mothers who did not find fear a barrier to maternal health services and delivered with a TBA.

Possible Confounding Variables
Demographic Variables

Age: Among the non-pregnant mothers, the mean age was 41.57. The mean age for each delivery location was 41.83 for a health center delivery, 48.42 for a TBA delivery, and 41.80 for a home delivery.

Marital Status: 80.85% of the non-pregnant mothers were married during their pregnancy while the other 19.15% were not. Among the married mothers, twice as many delivered at a health center (50.00%) compared to with a TBA (23.53%) or at home (26.47%). Among the unmarried mothers however, almost four times as many delivered with a TBA (66.67%) compared to at a health center (16.67%) or at home (16.67%). Although not statistically significant ($X^2 = 4.6187$, $p = 0.0993$), more married mothers were able to deliver at a health center than unmarried mothers. This is once again exemplified when delivering with a TBA or at home is lumped together. Of the married mothers, 50.00% delivered at a health center and 50.00% delivered outside of a health center. Of the unmarried mothers however, only 16.67% delivered at a health center while a greater 83.33% delivered outside of a health center.

Interestingly, only 55.26% of the non-pregnant mothers who were married during their last pregnancy were still married when interviewed for this study. The other 44.74% were now divorced or widowed.

Education Level: Education level was categorized as high education (secondary school or university), low education (primary school), and no education. 18.60% of the non-pregnant mothers had a high education, 26.74% had a low education, and – taking

into account their age – a shocking 6.98% had never been to school. Approximately 2/3 of the highly educated mothers (63.64%) delivered at a health center while only 40.91% of the mothers with a low education and 40.00% of the mothers with no education delivered at a health center. Thus, a greater 59.09% and 60.00% among mothers with low education and no education, respectively, delivered outside of a health center.

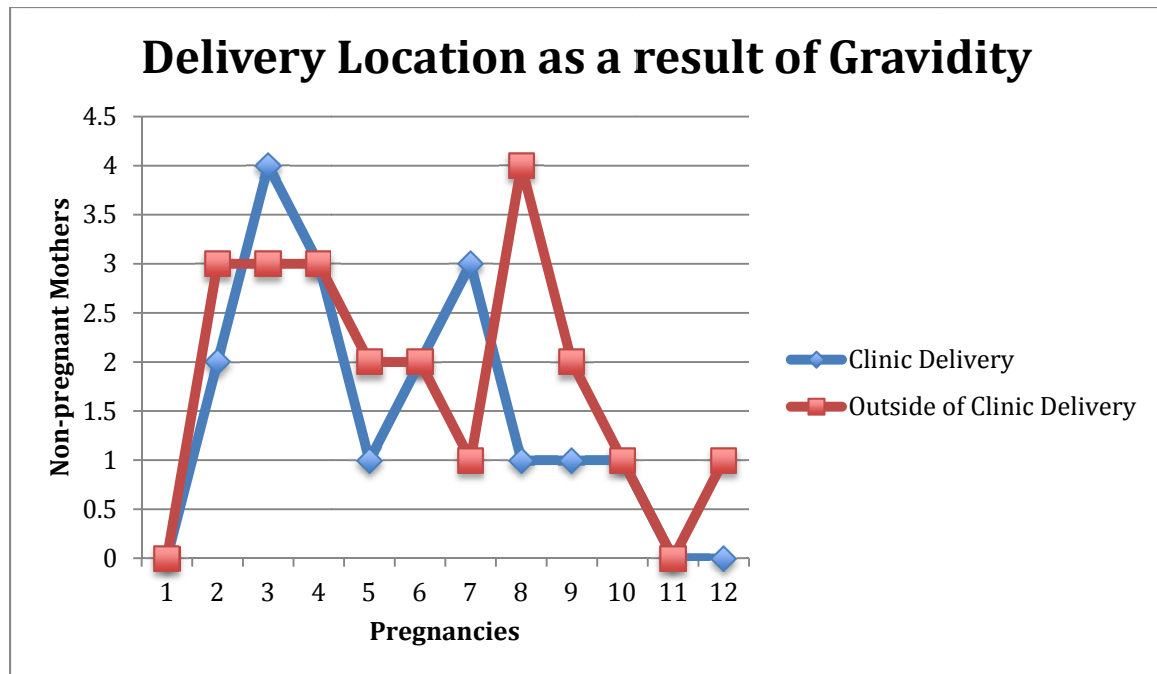
Considering the trend established by 2/3 of the highly educated women delivering at a health center, it is plausible to expect the women who delivered with a TBA to have a low education and the women who delivered at home to have no education. On the contrary, three of the 11 women who delivered with a TBA had a high education and seven of the nine women who delivered at home had a low education while one of the nine had a high education. In fact, among the five women with no education the least amount delivered at home as two delivered at a health center and two delivered with a TBA.

Number of Pregnancies: Among the non-pregnant mothers, the mean number of pregnancies was 5.02 with a range of one to 12. The mean number of pregnancies for mothers who delivered at a health center, with a TBA, or at home was 5.17, 5.75, and 5.90 respectively.

Although not statistically significant, Figure 7 below shows that more of the non-pregnant mothers with less pregnancies (three or seven) delivered their last child at a health center compared to the mothers who had more pregnancies. More of these mothers (with 8, 9, and 12 pregnancies) delivered outside of a health center – with a TBA or at home. Of the five mothers who had eight pregnancies, one of them delivered their

last child at a health center, two delivered with a TBA, and two delivered at home. Of the three mothers who had nine pregnancies, one delivered at a health center while two delivered at home. The mother that had 12 deliveries delivered her last child with a TBA.

Figure 7:



Medical Variables

HIV Status: 8.51% (4) of the non-pregnant mothers were HIV positive and 75.00% (3) of their deliveries occurred at a health center while the other 25.00% (1) occurred with a TBA.

Prior Bad Outcomes: 38.30% of the non-pregnant mothers have suffered from any of these negative outcomes with a mean Bad Score of 6.56. Half of these mothers (9) with a mean Bad Score of 6.78 (4.87) delivered at a health center while the other half (9) with a mean Bad Score of 6.33 (3.16) delivered outside of a health center.

When the non-pregnant mothers who delivered outside of a health center were asked “Who would you have gone to for help?” (regarding delivery and postpartum complications), 82.14% of the respondents said that they would go to a health center while only 7.14% said they would go to a TBA. While a majority of the mothers with a Bad Score delivered at a health center (50.00%), 27.78% still delivered with a TBA and 22.22% still delivered at home. On average, mothers with the highest Bad Score of 7.40 (standard deviation of 3.29) delivered with a TBA while mothers with a lower mean score of 6.78 (4.87) and 5.00 (2.83) delivered at a health center and at home, respectively.

Non-Pregnant and Pregnant Profile Combined

Accessibility Barriers

Financial Barriers: 75.56% of the sample reported money as a barrier to maternal health services. Significantly more pregnant women (88.37%) than non-pregnant mothers (63.83%) thought money was an issue ($X^2 = 7.3233$, $p = 0.0068$). 58.88% of the women did not have the money for prenatal care, and significantly more of them were pregnant (81.40%) than non-pregnant (38.30%) ($X^2 = 17.2280$, $p < 0.0001$).

Of the 11.11% of the sample that suffered from a lack of income, significantly more pregnant women had no income (18.60%) than non-pregnant mothers (4.26%) ($X^2 = 4.6815$, $p = 0.0305$). Of the women who suffered from a lack of income, four times as many were found in the pregnant population compared to the non-pregnant population (80.00% versus 20.00%).

Of the women who had at least some income, 73.33% had another provider while the other 26.67% were the sole provider for their families. Of the women who held this

great responsibility, there were significantly more non-pregnant mothers (36.17%) than pregnant women (16.28%) ($X^2 = 4.5433$, $p = 0.0330$).

Transportation Barriers: Almost all (92.22%) of the sample reported transportation as a barrier to maternal health services. Of the pregnant women, 95.35% said transportation was an issue compared to a lower 89.36% of the non-pregnant mothers. Although the difference between the groups was not statistically significant ($X^2 = 1.1222$, $p = 0.2894$), the fact that only 7.78% of the total sample did not report transportation as a problem is noteworthy.

82.22% of the sample walked to their prenatal care services. Significantly more pregnant women walked to their prenatal care services (90.70%) than non-pregnant mothers (74.47%) ($X^2 = 4.0464$, $p = 0.0443$). As expected, all of the women who walked to their prenatal care services reported a transportation barrier. However, even among the 17.78% of the sample that had another means of transportation, 56.25% still reported a transportation problem.

Distance: With an average of 3.34 km (2.08 miles) from a health center and 0.84 km (0.52 miles) from a TBA, the sample lived almost four times closer to a TBA than a health center. 3.28% of the sample even reported a distance of 0 km to the nearest TBA and therefore must have lived with a TBA.

The average distance to a health center was significantly greater for pregnant women (4.95 km with a range of 0.02 km to 26.00 km = 3.08 miles with a range of 0.01 miles to 16.16 miles) than non-pregnant mothers (1.87 km with a range of 0.20 km to

4.50 km = 1.16 miles with a range of 0.12 miles to 2.80 miles) ($t = 7.367531$, $p < 0.0001$). In fact, the pregnant women were on average 2.6 times farther away from the nearest health center than the non-pregnant mothers. With a mode of 2.00 km (1.24 miles), 51.20% of the pregnant women lived farther away than 2.00 km from a health center compared to only 19.10% of the non-pregnant mothers.

Significantly more pregnant women also lived farther away from a TBA. The average distance to a TBA was greater for pregnant women (1.84 km with a range of 0 km to 5.00 km = 1.14 miles with a range of 0 miles to 3.11 miles) than non-pregnant mothers (0.43 km with a range of 0 km to 2.00 km = 0.27 miles with a range 0 miles to 1.24 miles) ($t = 5.476472$, $p < 0.0001$). Thus, the pregnant women were on average more than four times farther away from a TBA than the non-pregnant mothers. With a mode of 0.25 km (0.16 miles), only 16.70% of the pregnant women lived farther away than 0.25 km from a TBA compared to a greater 27.90% of the non-pregnant mothers.

When comparing the distance to a health center and the distance to a TBA for each of the women in our sample, we find that the majority of the sample (91.80%) lived closer to a TBA while a small 8.20% of the sample lived closer to a health center. Four non-pregnant mothers lived 0.50 km (0.31 miles) closer to a health center ($t = 8.401284$, $p < 0.0001$) and one of them actually delivered there at the end of her pregnancy (data regarding delivery location for the other three is missing). One pregnant woman lived 2.00 km (1.24 miles) closer to a health center and planned to deliver there ($t = 2.193715$, $p = 0.0424$). Despite 94.44% of the other pregnant women living farther away from a health center than to a TBA, all of them except one still intended to deliver at a health center. The one exception lived an equivalent distance from a health center and a TBA.

Of statistical significance, the average difference between the distance to a health center and to a TBA was greater for pregnant women than non-pregnant mothers (2.86 km versus 1.43 km = 1.78 miles versus 0.89 miles) ($X^2 = 4.585463$, $p < 0.0001$). The greatest difference among pregnant women was 23.00 km (14.29 miles) compared to a much lower difference of 4.00 km (2.49 miles) among non-pregnant mothers. Only 8.20% (5) of the sample lived an equivalent distance from a health center and a TBA.

All of the women knew the approximate distance from their home to the nearest health center but 32.22% of them could not approximate the distance between their home and the nearest TBA. More of these women were pregnant (58.14%) than non-pregnant (8.51%).

Lack of Health Center Services: 64.44% of the sample reported a lack of services as a barrier to maternal health services. Of statistical significance, 76.60% of the non-pregnant mothers wanted additional services compared to only 51.16% of the pregnant mothers ($X^2 = 6.3391$, $p = 0.0118$). This is perhaps a result of the non-pregnant mothers having already experienced a variety of services or a lack thereof at a health center.

Knowledge and Values Variables

Knowledge about Pregnancy: Of the eight questions that made up the Knowledge Assessment portion of the survey, the following percentage of women answered correctly:

Table 2:

Knowledge Assessment Questions	Correct Answer
1. Is it important to drink a lot of water during pregnancy?	94.32%
2. Is it important to take multivitamins or prenatal vitamins during pregnancy?	94.32%
3. Is it bad for the baby if a pregnant woman smokes during pregnancy?	73.86%
4. Is it bad for the baby if a pregnant woman drinks alcohol during pregnancy?	72.73%
5. Are chemicals such as insecticides, lead, and mercury bad for the baby?	82.95%
6. Should you avoid heavy exercise and activities during pregnancy?	69.32%
7. How long does a normal pregnancy usually last?	93.18%
8. Are pregnant women older than 35 at a higher risk of unfavorable birth outcomes?	59.09%

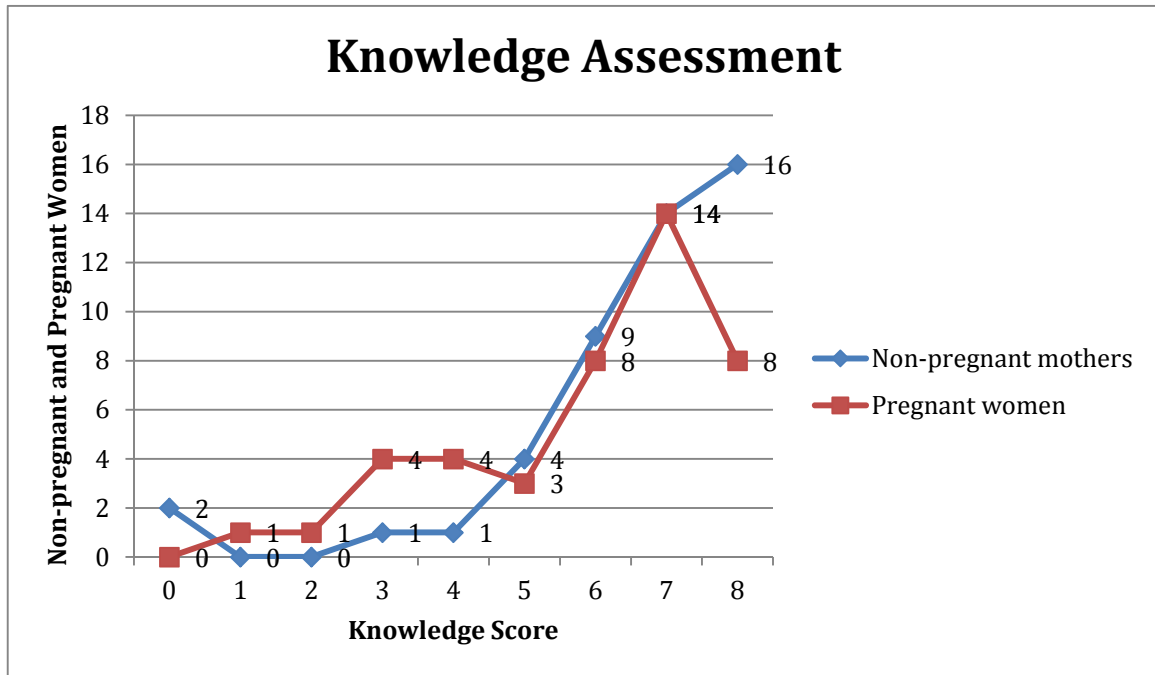
Within the sample, 26.67% of the women made a perfect Knowledge Score and 57.78% passed. On average, the non-pregnant mothers scored higher than the pregnant women (mean of 6.53 versus 5.95). Of the women who scored a perfect 8, twice as many were non-pregnant as pregnant (66.67% versus 33.33%).

Although close to but not reaching statistical significance ($X^2 = 2.7367$, $p = 0.0981$), 34.04% of the non-pregnant mothers scored an eight compared to 18.60% of the pregnant women. When the Knowledge Score is divided into pass/fail, 63.83% of the non-pregnant mothers passed compared to 51.16% of the pregnant women.

In fact, the difference between the percentage of non-pregnant mothers who passed or failed was a large 27.66% (63.83% minus 36.17%) compared to a much smaller 2.32% for the pregnant women (51.16% minus 48.84%). This shows that there was a greater disparity in knowledge about pregnancy among the non-pregnant mothers than the pregnant women, with more of the non-pregnant mothers scoring higher.

As shown in Figure 8 below, more non-pregnant mothers consistently scored 5 to 8 or 0 while more pregnant women scored 1 to 4.

Figure 8:



Mother's Prenatal Care Value: 98.89% of the sample valued prenatal care (stating that it was “useful”) compared to only 1.11% that found prenatal care ‘not useful at all’. All but one of the non-pregnant mothers valued prenatal care (97.87%) while all of the pregnant women valued prenatal care.

Father's Prenatal Care Value and Delivery Location Choice: 79.75% of the women in the total sample said that the father of the baby valued prenatal care and 72.22% wanted the mother to deliver at a health center. Significantly more partners of the non-pregnant mothers (91.89%) valued prenatal care than the partners of the pregnant women (69.05%) ($X^2 = 6.3558$, $p = 0.0117$). A greater number of the pregnant women (74.42%) however, said that the father of the baby wanted them to deliver at a health center than the non-pregnant mothers (70.21%).

Community's Prenatal Care Value: 96.59% of the sample reported that their communities value prenatal care. The 3.41% of the sample that believe their communities do not value prenatal care, however, is completely found within the pregnant population. Thus, all of the non-pregnant believe they have their community's support compared to only 92.68% of the pregnant women.

Fear: Only two women within the sample reported fear as a barrier to maternal health services (one non-pregnant mother and one pregnant woman).

Possible Confounding Variables
Demographic Variables

Age: Of the 90 women sampled, the non-pregnant mothers were significantly older than the pregnant women ($f = 30.85$, $p < 0.0001$). The non-pregnant mothers were an average age of 41.57 with a range of 18 to 90. The pregnant women were an average age of 25.12 with a range of 15 to 48.

Marital Status: 75.28% of the sample was married at the time of their pregnancy while 24.72% was single. Although not significant ($X^2 = 1.6606$, $p = 0.1975$), more non-pregnant mothers (80.85%) were married during their last pregnancy than pregnant women (69.05%) that were currently married.

22.47% of the sample were married sole providers while 20.22% were unmarried sole providers. Compared to the married non-pregnant mothers, more of the pregnant women's husbands worked (86.21% versus 57.89%) while the other 13.79% of the pregnant women and 42.11% of the non-pregnant mothers were solely responsible for

providing for their families. Similarly, more of the non-pregnant mothers were married sole providers than the pregnant women (34.04% versus 9.52%) ($X^2 = 3.0277$, $p = 0.0819$ and $X^2 = 0.5570$, $p = 0.4555$ respectively). Although more non-pregnant mothers were married sole providers however, only 2.13% were also unmarried compared to a larger 7.14% of the pregnant women.

Education Level: 27.91% of the sample had a high education, 65.12% had a low education, and 6.98% had never been to school. The six women with no education were all found within the non-pregnant population. Thus, among the non-pregnant mothers, 13.33% had no education, 51.11% had a low education, and 35.56% had a high education. Among the pregnant women, no one was uneducated, 80.49% had a low education, and 19.51% had a high education. Although twice as many non-pregnant mothers had a high education (66.67% versus 33.33%), more pregnant women had a low education (58.93% versus 41.07%) and more non-pregnant mothers had never been to school (100.00% versus 0.00%). These differences were statistically significant ($X^2 = 10.2886$, $p = 0.0058$).

Number of Pregnancies: The older non-pregnant mothers had a significantly greater number of pregnancies (5.02) than the pregnant women (2.95) with a range of one to 12 pregnancies versus a range of one to seven pregnancies ($f = 16.10$, $p = 0.0001$).

Medical Variables

HIV Status: 11.11% (10) of the sample was HIV positive. Although not significant, more pregnant women were HIV positive (six women, 13.95%) than non-pregnant mothers (four women, 8.51%). All of the HIV positive pregnant women intended to deliver at a health center, and 75.00% of the HIV positive non-pregnant mothers actually did.

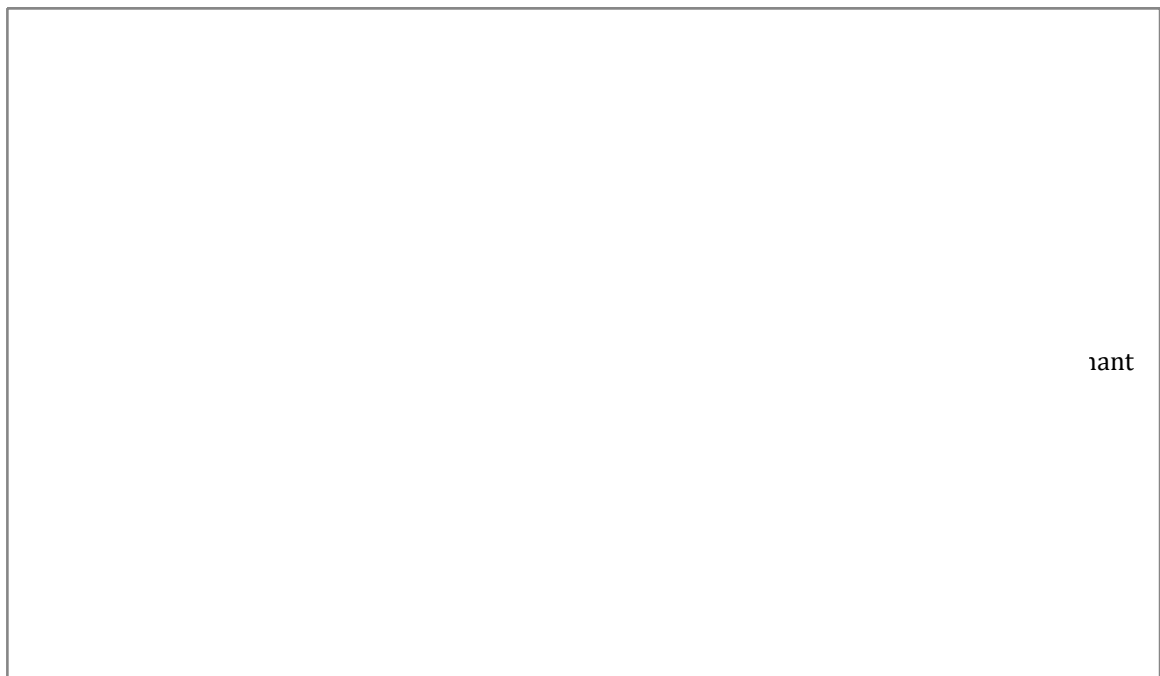
Prior Bad Outcomes: 38.89% (35) of the sample suffered from negative outcomes related to pregnancy with a mean Bad Score of 6.71. 51.43% of these women were non-pregnant while 48.57% were pregnant. The mode score among these 35 women was a 7, meaning 20.00% of them suffered the death of a child under the age of five. The second most common score was the same for 2, 5, and 10, meaning 14.29% of the women suffered from urination problems as well as urination and defecation problems as well as HIV. Of the entire sample, 57.10% suffered a Bad Score of seven (death of a child under the age of five) or more and 28.60% suffered a Bad Score of 10 (HIV positive) or more.

The mode score among the 18 non-pregnant mothers (38.30%) was a 7, meaning 27.78% (5) of the mothers suffered the death of a child under the age of five. The second most common score was a 5, with 16.67% (3) of the mothers suffering from urination and defecation problems. 39.53% of the pregnant women had already been pregnant before and suffered from a negative outcome. The mode score among these 17 women was a 10, meaning 23.50% (4) of the women suffered from HIV. The second most common score was a 2, with 17.60% (3) of the women suffering from urination problems. The

non-pregnant mothers admitted negative outcomes ranging from one to 14 on the Bad Score while the pregnant women admitted negative outcomes ranging from one to 12.

Although not significant, the pregnant women (with a mean Bad Score of 6.88 and a standard deviation of 3.55) were worse off than the non-pregnant mothers (with a mean Bad Score of 6.56 and a standard deviation of 3.99).

Figure 9:



- | | |
|---|---|
| 1 = sick child | 8 = death under five + sick child |
| 2 = urination problem | 9 = death under five + defecation problem + urination problem |
| 3 = urination problem + sick child | 10 = HIV positive |
| 4 = defecation problem | 11 = HIV positive + sick child |
| 5 = defecation problem + urination problem | 12 = HIV positive + urination problem + sick child |
| 6 = defecation problem + urination problem + sick child | 13 = HIV positive + death under five |
| 7 = death under five | 14 = HIV positive + death under five + urination problem |

Accessibility & Knowledge and Values Summary

Regarding the Knowledge Assessment about pregnancy, only 26.67% of the women scored a perfect eight and 57.78% of the women passed with a score above six. Similarly, only 27.91% of the women had a university education while a greater 65.12% had completed or were in the process of completing secondary school and a shocking 6.98% had never been to school. Despite a concerning lack of knowledge and low education, 98.89% of the sample still found prenatal care important. Even though only 85.23% of the women could somewhat qualitatively define prenatal care, a greater 98.89% of the sample believed prenatal care was useful.

Despite 58.89% of the women stating that they did not have the money for prenatal care and 82.22% with no means of transportation other than walking, 92.22% of the non-pregnant and pregnant women did receive prenatal care during their last pregnancy and current pregnancy. This data quantitatively demonstrates the high value of this particular maternal health service.

Despite such a high value of prenatal care, delivery outcomes among the non-pregnant mothers clearly reflect a significant problem. Only 46.67% of the women who made a perfect Knowledge Score, 51.58% of the women who passed, 63.64% of the highly educated mothers, 40.91% of the women with a secondary school education, and 45.00% of the women who valued prenatal care delivered at a health center.

Compared to the high 92.68% of the non-pregnant mothers who received prenatal care despite identified money and transportation barriers, there must have been additional barriers that contributed to the difficulty of a health center delivery. Only 44.00% of the non-pregnant mothers who reported a financial barrier, 41.67% that reported a

transportation barrier, and 40.63% that reported a lack of services still delivered at a health center.

Table 3:

MEASURED VARIABLES	HEALTH CENTER DELIVERY	AVERAGE
Knowledge and Values		
Perfect Knowledge Score	46.67%	49.56%
Passing Knowledge Score	51.58%	
University Education	63.64%	
Secondary School Education	40.91%	
Prenatal Care Value	45.00%	
Accessibility		
Financial barrier	44.00%	42.10%
Transportation barrier	41.67%	
Lack of services	40.63%	

Thus, only approximately $\frac{1}{2}$ of the women with a high knowledge of pregnancy and value of prenatal care and $\frac{2}{5}$ of the women who reported accessibility barriers delivered at a health center. It becomes clear that these women most likely made it there with significant difficulties and sacrifices that are reflected in their responses to questions regarding improved access to maternal health services.

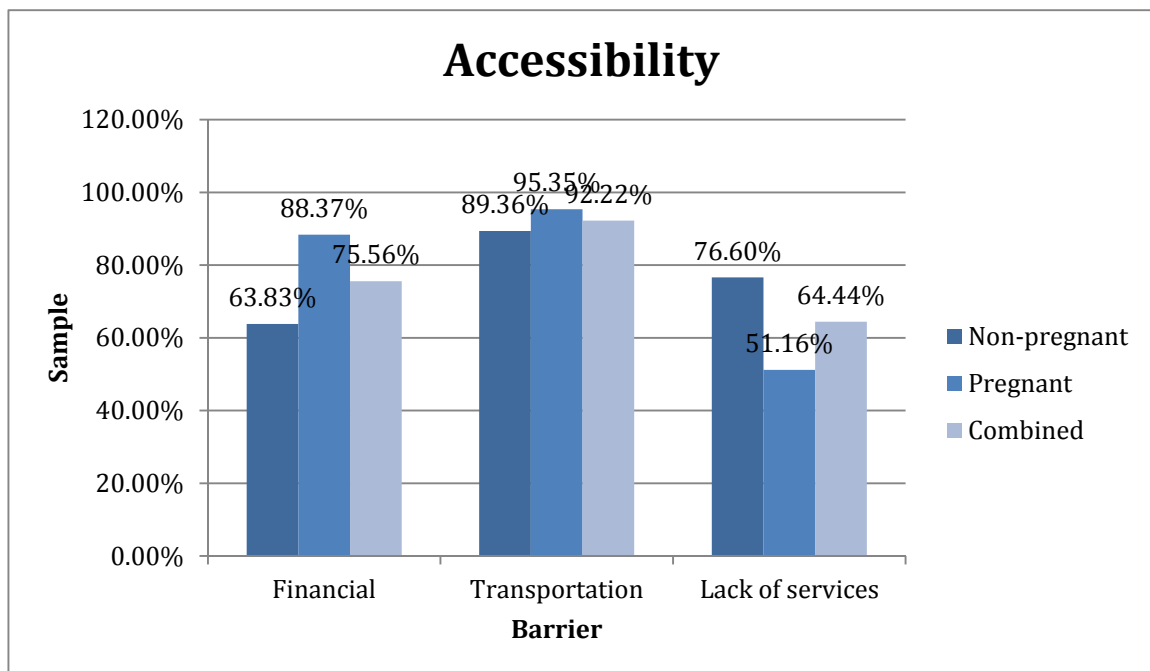
With not even a trend between knowledge and values and health center deliveries as 64.71% of the women who failed the Knowledge Score and 40.00% of the uneducated women still delivered at a health center, it becomes clear that knowledge and values are not the sole determinants of health center deliveries.

Almost 2/3 of the women sampled faced one or more of the following barriers:

Table 4:

Barrier	Non-pregnant	Pregnant	Combined	P-value	Statistical Significance
Financial barrier	63.83%	88.37%	75.56%	p = 0.0068	√
Transportation barrier	89.36%	95.35%	92.22%	p = 0.2894	
Lack of services	76.60%	51.16%	64.44%	p = 0.0118	√

Figure 10:



More than 2/3 of the sample reported both a financial and transportation barrier (72.22%). Only 43.33% of the sample reported both a financial and service barrier while a greater 60.00% reported both a transportation and service barrier.

Within the sample, more women consistently reported transportation barriers over financial barriers and a lack of services. Even though more non-pregnant mothers reported a lack of services over financial barriers and more pregnant women reported financial barriers over a lack of services, transportation remained first within all three profiles.

Table 5:

Profile	Determinants of Health Center Deliveries
Combined	Transportation Barrier > Financial Barrier > Lack of Services 92.22% > 75.56% > 64.44%
Non-Pregnant	Transportation Barrier > Lack of Services > Financial Barrier 89.36% > 76.60% > 63.83%
Pregnant	Transportation Barrier > Financial Barrier > Lack of Services 95.35% > 88.37% > 51.16%

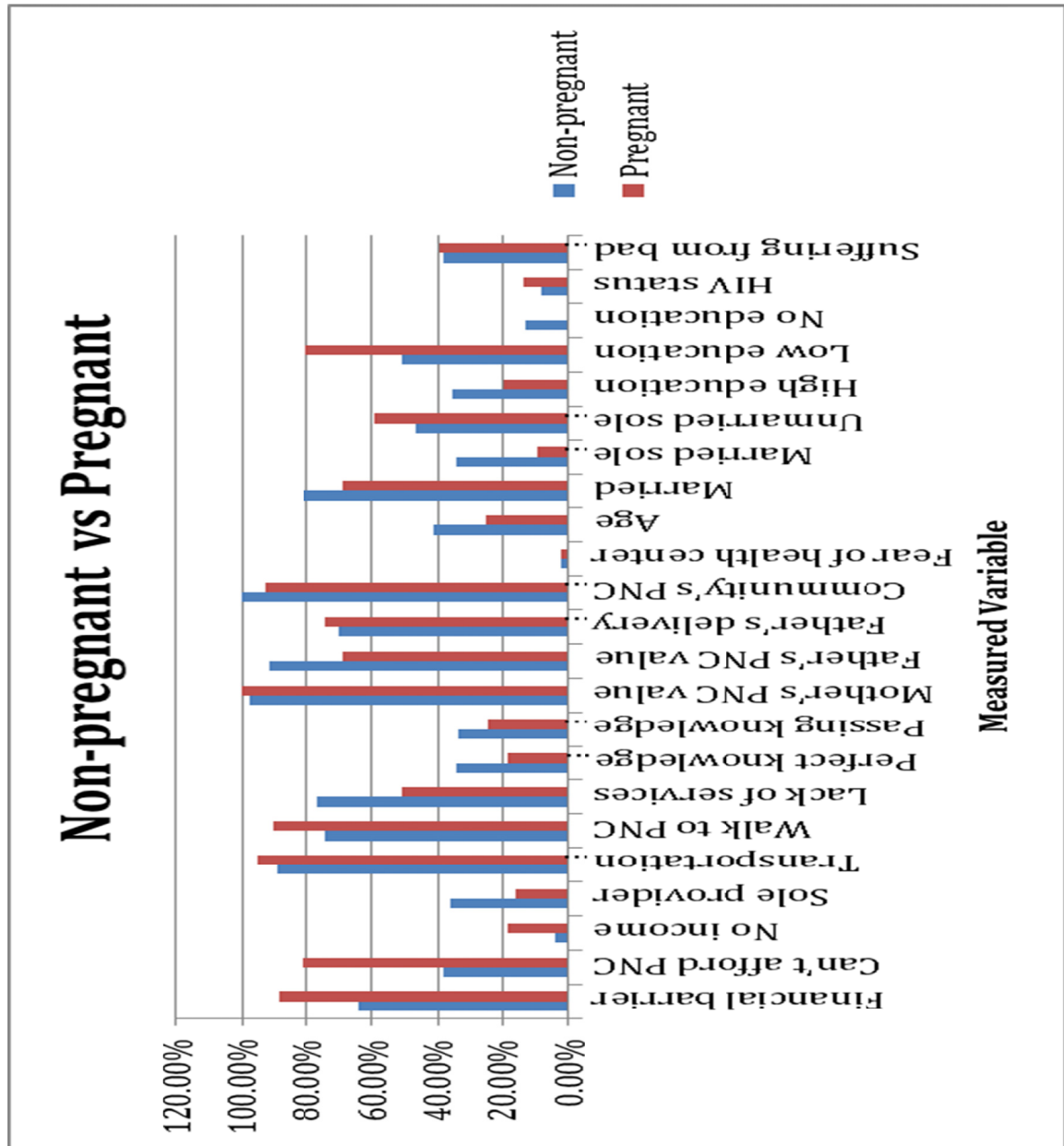
Non-pregnant versus Pregnant Profile Summary

As the more extreme values in Table 6 indicate in **bold** below, the pregnant sample was worse off than the non-pregnant sample for 68.97% of the analyzed variables below:

Table 6:

Variable	Non-pregnant Mothers	Pregnant Women	P-value	Statistical Significance
Financial barrier	63.83%	88.37%	p = 0.0068	√
Cannot afford PNC	38.30%	81.40%	p < 0.0001	√
No income	4.26%	18.60%	p = 0.0305	√
Sole provider	36.17%	16.28%	p = 0.0330	√
Transportation barrier	89.36%	95.35%	p = 0.2894	
Walk to prenatal care	74.47%	90.70%	p = 0.0443	√
Mean distance to health center	1.87 km (1.16 miles)	4.95 km (3.08 miles)	p < 0.0001	√
Mean distance to TBA	0.43 km (0.27 miles)	1.84 km (1.14 miles)	p < 0.0001	√
Mean distance difference	1.43 km (0.89 miles)	2.86 km (1.78 miles)	p < 0.0001	√
Lack of services	76.60%	51.16%	p = 0.0118	√
Mean knowledge score	6.53	5.95	p = 0.1384	
Perfect knowledge score	34.04%	18.60%	p = 0.0981	
Passing knowledge score	33.33%	24.44%	p = 0.2243	
Mother's PNC value	97.87%	100.00%	p = 0.3361	
Father's PNC value	91.89%	69.05%	p = 0.0117	√
Father's delivery choice	70.21%	74.42%	p = 0.6563	
Community's PNC value	100.00%	92.68%	p = 0.0592	
Fear of health center	2.13%	2.33%	p = 0.9493	
Age	41.57	25.12	p < 0.0001	√
Married	80.85%	69.05%	p = 0.1975	
Married sole providers	34.04%	9.52%	p = 0.0819 p = 0.4555	
Unmarried sole providers	46.81%	59.52%	p = 0.0819 p = 0.4555	
High education	35.56%	19.51%	p = 0.0058	√
Low education	51.11%	80.49%	p = 0.0058	√
No education	13.33%	0.00%	p = 0.0058	√
Number of pregnancies	5.02	2.95	p = 0.0001	√
HIV status	8.51%	13.95%	p = 0.4118	
Suffering from Bad Score	38.30%	39.53%	p = 0.5418	
Mean Bad Score	6.56	6.88	p = 0.8000	

Figure 11:



Logistic Regression

Logistic regression was used to attempt to distinguish between the pregnant women and non-pregnant mothers. When all of the predictor variables were included, none emerged as significant.

Table 7:

Logistic Regression with All Predictor Variables					
Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	-7.4432	222.8	0.0011	0.9733
Financial barrier	1	4.2702	2.9052	2.1604	0.1416
Cannot afford prenatal care	1	-0.6878	1.6576	0.1722	0.6782
No income	1	0.7437	2.3161	0.1031	0.7481
Sole provider	1	0.7543	2.7128	0.0773	0.7810
Walk to prenatal care	1	8.1291	222.8	0.0013	0.9709
Mean distance to health center	1	0.5745	0.6757	0.7227	0.3952
Mean distance to TBA	1	1.8433	1.2554	2.1558	0.1420
Lack of health center services	1	-0.0226	2.3489	0.0001	0.9923
Father's delivery location choice	1	3.9672	2.6540	2.2343	0.1350
Age	1	-0.1955	0.1791	1.1908	0.2752
Education level	1	-2.9102	1.8739	2.4118	0.1204
Number of pregnancies	1	-0.3557	0.6834	0.2708	0.6028

Total Model: $X^2 = 7.3237$, $p = 0.8352$

When all of the variables that approached significance were included, financial barriers ($X^2 = 10.5978$, $p = 0.0011$), income level ($X^2 = 3.9005$, $p = 0.0483$), and age ($X^2 = 13.4883$, $p = 0.0002$) emerged as significant.

Table 8:

Logistic Regression with Significant Predictor Variables					
Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept	1	3.8430	1.1218	11.7362	0.0006
Financial barrier	1	-2.0371	0.6257	10.5978	0.0011
No income	1	2.2627	1.1457	3.9005	0.0483
Father's delivery location choice	1	1.3582	0.7031	3.7316	0.0534
Age	1	-0.1438	0.0391	13.4883	0.0002

Total Model: $X^2 = 18.7659$, $p = 0.0009$

Compared to the non-pregnant mothers, the pregnant women were younger, had a lower income level, and faced more financial barriers related to health centers.

CHAPTER SIX

Discussion

The fifth Millennium Development Goal (MDG) to reduce maternal mortality by 75% before the end of 2015 is no longer attainable. Therefore, it is important to discuss now more than ever the most effective means by which the United Nations and its partners can attempt to make substantial progress. This community-based study was specifically designed to learn about challenges faced by a population of women living on the Nyakach Plateau in rural western Kenya. The results will be used to develop and implement an appropriate intervention with the hope of improving their pregnancy outcomes. The findings can be applied to other comparable populations in the developing world and can contribute to global efforts in improving maternal health.

Ninety native Luo women between the ages of 15 and 90 were interviewed in this cross-sectional study. With generation after generation of Luo families building their lives upon the Nyakach Plateau, it becomes clear that this escarpment of approximately 1,600 meters above sea level has become an integral part of their existence. With every aspect of their lives governed by its rough terrain, vast distances, and poor health facilities, they are a people who are intricately entwined with the unique nature of their surroundings. The beautiful place that they call “nyumbani,” or home, has enhanced and burdened their lives, fostering the growth of an isolated traditional community as well as significantly hindering their access to desperately needed healthcare.

The Nyakach Plateau leaves women susceptible to a high disease burden, with Luo women suffering from the highest HIV prevalence (22.8%) of any gender and

ethnicity category in Kenya. Similarly, tuberculosis and malaria, among many other infectious diseases, are prevalent on the plateau and result in adverse outcomes particularly for the most vulnerable pregnant women. Having few health centers, limited clinical medical officers or qualified nurses, and no physicians leaves these women in a succession of unfavorable delivery outcomes that intensifies generation after generation.

Women representing multiple sub-locations upon the plateau including East Kadianga, East Koguta, Ramogi, and Ndori, were sampled in this study. Their experiences remained consistent as each comprehensive 45-minute interview added to an emerging depiction of their difficult lives. Lives plagued by both structural and cognitivist-personalistic barriers that bar women from access to health center deliveries.

Primary Hypothesis: Accessibility to maternal health services is a greater determinant of health center deliveries than knowledge and values related to maternal health services.

Among the women interviewed in this study, accessibility barriers to maternal health services – including money, transportation, and a lack of services – were found to be greater determinants of health center deliveries than knowledge and values. As described below, none of the knowledge and values variables kept women from seeking a health center delivery. Contrary to the general consensus regarding the need for education in developing countries (cognitivist-personalistic pole), the Nyakach Plateau has proven otherwise – identifying a greater need for community-based participatory interventions focused on accessibility (structural pole).

Knowledge and Values

Mother's Prenatal Care Value

Almost all of the non-pregnant mothers interviewed in this study valued prenatal care and managed to overcome barriers to seek at least one prenatal care visit at a health center. While research has shown that early and frequent prenatal care visits during pregnancy is an important predictor of skilled attendance at childbirth, this is not the case on the Nyakach Plateau. Only less than half of the non-pregnant mothers (45.00%) managed to overcome barriers to deliver at a health center. With all of the results in the previous chapter describing native Luo women's high value of maternal health services, it is alarming to find that they are unable to fulfill their intentions of a health center delivery.

30.00% of the non-pregnant mothers delivered with TBAs whose practice is to cut the umbilical cord with the sharpened stem of maize or unsterile razor blades and to smear the site with charcoal or the juice of indigenous fruits to prevent infection. Similarly, an unacceptable 25.00% of the non-pregnant mothers in this sample delivered with no skilled attendance of any kind (whether a physician, clinical medical officer, nurse, midwife, or TBA). As there was no statistically significant difference between the non-pregnant mothers and pregnant women regarding their knowledge about pregnancy or their value of prenatal care, we can assume that, like the majority of the pregnant women, almost all of the non-pregnant mothers intended to deliver their last child at a health center as well.

Knowledge about Pregnancy

Overall, a majority of the women were well educated regarding pregnancy as more than half correctly answered a majority of the Knowledge Assessment questions and more than a quarter made a perfect score. Of the non-pregnant mothers who failed the Knowledge Assessment however, more than half (64.71%) delivered at a health center. Even among uneducated women, 40% delivered at a health center. It becomes clear that a deep value of maternal health services – one that is not significantly influenced by knowledge and is independent of education level – already exists on the plateau. For example, a majority of the sample (81.61%) believed that there were bad consequences of little or no prenatal care, but they were unable to explain those consequences. Thus, it was not their knowledge of the problems that prenatal care can prevent or treat that resulted in their seeking of these services. Similarly, these women tried to deliver at a health center and appreciated its value without having any knowledge of the life-threatening consequences of hemorrhage, infection, eclampsia, and obstructed labor.

Father's Prenatal Care Value and Delivery Location Choice, Community's Prenatal Care Value, Fear

Compared to almost all of the women valuing a health center delivery, less than 3/4 of their partners valued health center deliveries. More women delivered at a health center when their partner also supported that choice. However, educating men about the importance of health center deliveries is not the main key as it is not the father's value of maternal health services that ultimately predicts a health center delivery. Even when the father of the unborn child wanted their partner to deliver at a health center, only

approximately half of the non-pregnant mothers managed to do so. Likewise, even the support of the entire community only resulted in 2/5 of the non-pregnant mothers delivering at a health center. Neither fear of health center care providers and their professional services nor the treacherous journey to most health centers was a factor in predicting health center deliveries. Thus, it is not the lack of knowledge or absence of value that is responsible for the low number of health center deliveries.

It is interesting to note that TBAs also provide prenatal care services, yet almost all of the non-pregnant mothers got prenatal care at a health center. Similarly, most of the pregnant women planned to get prenatal care at a health center or already received their first prenatal care check-up at a health center. Three of the five interviewed TBAs themselves also sought prenatal care at a health center, and two of the five delivered several of their children at a health center. In fact, one TBA delivered six of her eight children at a health center. With even TBAs seeking maternal health services at a health center, it becomes clear that these women already possess the knowledge and values that so many incorrectly judge as their greatest need.

Accessibility

With the intention of avoiding such an imperialistic attitude, this study encouraged the women themselves to identify their greatest needs and thereby based several of its arguments on the following question: “What could the health center provide for you that would help you get prenatal care?” The three most common responses to this question as well as to “Why do you prefer/did you deliver your baby at home?” identified barriers related to money, transportation, and a lack of health center services.

Financial Barriers

Several of the women interviewed in this study suffered from a lack of income, and all but one of them had at least one child to support. Regardless of the partner's presence or absence, these women have at least one other mouth to feed – with one of them even responsible for six children – and do not have the means to do so. With significantly more of the financially barred women being pregnant, it is alarming to consider the impending consequences of another mouth to feed in less than nine months.

Many of the women who did have a source of income were solely responsible for that income. Most of these women worked as housekeepers, cooks, gardeners, farmers, hairstylists, and also sold things that they grew or made. With scarce and unreliable job opportunities, these women live day by day with the hope of collecting enough Kenyan shillings to feed their hungry children and send them off to school. When employment becomes too difficult, however, more and more children are taken out of school to help scramble together some sort of income. With their tuition money spent on food rather than their education – their only “ticket” out of the rampant destitution that prevails on the plateau – these children's futures become just as bleak as their mothers'. At a young age, they are already set up for a life full of hardship, one in which the young girls will inevitably become vulnerable to multiple life-threatening pregnancies.

As the results show, Kenyan society places a great burden of responsibility on women regardless of whether or not they are pregnant. Given that all of the non-pregnant mothers who had no income delivered at home while almost half of the non-pregnant mothers with at least a small income delivered at a health center, it becomes clear that

money is a significant barrier for the very poor. These conditions resulted in 3/4 of the women reporting money as a barrier to maternal health services.

Transportation Barriers

Bicycles, motorcycles, and cars are the only means of transportation on the plateau other than walking, though almost no one owns one of these vehicles. Taking a motorcycle taxi – the most feasible form of transportation other than walking – already costs more than two times as much as a single prenatal care visit. Not only are the rest of these forms of transportation more expensive, but the drive frequently leaves people nauseated and exhausted. Narrow dirt roads, characterized by heavy boulders, potholes, and ruts as well as dangerous flooding and mud slides during Kenya's two rainy seasons (from November to December and May to March), make transportation very dangerous.

As a result, most of the women interviewed in this study walked to their prenatal care services. Taking into account the absence of paved roads and level ground, walking an average of 3.34 km (2.08 miles) is much more challenging for a Kenyan woman, let alone a pregnant Kenyan woman, than for an individual in the developed world. As many of these women live in remote locations, they must literally hike to the main road before even considering another form of transportation (see Appendix E). As expected, all of the women who routinely walked to their prenatal care services reported transportation as a barrier. However, almost 2/3 of the women who had another means of transportation also reported transportation as a problem.

Most of the sample lived closer to a TBA than to a health center. Delivering with a TBA, however, does not mean that the TBA comes to the home of the pregnant woman,

but rather that the pregnant woman must travel to the TBA's home. As delivering with a TBA still entails some form of travel, the women who delivered within their own homes and without any skilled attendance most likely suffered from the greatest number of accessibility barriers, with even the smaller distance to a nearby TBA being an insurmountable obstacle.

Despite the shorter distance, all of the pregnant women who lived closer to a TBA still intended to travel the greater distance to deliver at a health center. Reflecting this intention, the non-pregnant mothers who had previously delivered at a health center traveled on average 6.3 times further than the closest TBA. The high value of maternal health services as well as the limitation of transportation is once again demonstrated as more non-pregnant mothers delivered outside of a health center once the distance became too great. These circumstances resulted in almost all of the women reporting transportation as a barrier to maternal health services.

Lack of Health Center Services

A large proportion of the sample lived closest to the Sigoti Health Center, a government-operated health facility that serves approximately 8,000 people in its catchment area. The Sigoti Health Center provides a variety of services, including free consultations, free immunizations, free HIV testing, free counseling and anti-retroviral drugs, free TB testing, and cheap prenatal care (50 KSH, or 60 cents, per visit for the four expected visits) among other services (Otieno 2012).

Although the Sigoti Health Center provides a variety of services, almost 2/3 of the sample reported a lack of services. Most of the non-pregnant mothers who reported that

lack of services was a problem had delivered their last child at a health center and thereby recognized the need for additional services, including more health professionals. With few qualified healthcare providers at the Sigoti Health Center and a shortage of nurses and midwives at night, inexperienced and unavailable healthcare providers leave women concerned about their health and the health of their babies. A lack of electricity to refrigerate immunizations and no surgical instruments and skills to perform emergency obstetric surgery once again reflect the powerless economic and social conditions as well as geographic isolation of the plateau.

Despite these shortcomings, however, women still recognize the importance of professional medical attention during delivery and understand that it is safer to deliver at a health center that lacks all of the desired maternal health services than to deliver with a TBA or at home. When all of the discussed variables were put into a logistic regression, more accessibility variables emerged as significant than knowledge and values variables.

Secondary Hypothesis: Within accessibility, transportation is a greater determinant of health center deliveries than money or a lack of health center services.

Compared to the high percentage of non-pregnant mothers who received prenatal care despite accessibility barriers, it becomes clear that these barriers are much more serious when faced at the time of delivery. The non-pregnant mothers were able to make the necessary financial and transportation sacrifices *during* their pregnancies, but they were not able to do so once labor began.

In spite of the expense, it is possible for some women to access public transportation for a daytime health center visit when they can plan ahead and walk to the main road. If a mother goes into labor at night, however, it may be impossible to find

transportation other than walking, a dangerous undertaking in an area of steep, rocky paths, no electric lights, and the threat of attack from strangers or the ubiquitous cattle thieves present on the plateau. Thus, transportation to a health center for delivery means overcoming more than just financial challenges. Without help to take care of her other children, mothers have no choice but to take other toddlers or young children along with her to the delivery. Some or all of these challenges are faced when a mother is in active labor—not the optimal condition in which to take a hike.

These challenges cause women, who value and intend to deliver at a health center, to deliver with more accessible birth attendants. The huge extent to which transportation is a problem, however, is further exemplified when it becomes clear that it actually costs less to deliver at a health center than with a TBA. While the Sigoti Health Center, for example, charges 500 KSH (\$5.92) for delivery and 100 KSH (\$1.18) for every additional day at the health center, TBAs typically charge two to three times as much between 1,000 KSH and 1,500 KSH (\$11.83 – \$17.75) (Otieno 2012).

With a number of the non-pregnant mothers serving as the sole provider for their families and reporting that they did not even have the money for prenatal care, great financial sacrifices were made to deliver with a TBA. This becomes clear as approximately 1/3 of the non-pregnant mothers that reported a financial barrier still delivered with a TBA. Perhaps TBAs allow their patients to pay back the greater charge over a period of time rather than before being ‘discharged.’ As all of the non-pregnant mothers who delivered with a TBA reported a transportation barrier, it becomes clear that the necessary transportation sacrifices could *not* be made to deliver at a health center.

Thus, distance and therefore transportation was a greater determinant of health center deliveries than money or a lack of health center services.

Within Kenyan society, we see that men and women take pride in their number of children. In a way, Kenyan culture itself leaves pregnant women susceptible to unfavorable delivery locations and birth outcomes as a result of the shorter labor periods and greater risk of complications that arise with multiple pregnancies. Compared to the three children in an average American family, almost 2/3 of the non-pregnant mothers had between four and 12 children (61.70%). The issue of transportation is once again supported when considering the natural physiological changes that occur as a result of multiple childbirths. Several childbirths and a looser vagina lead to faster deliveries. As women only begin the difficult journey to a health center once labor begins and pass by several nearby TBAs on the way, their options diminish as labor progresses more rapidly. Confirmed by the data, all of the non-pregnant mothers who delivered with a TBA lived closer to a TBA.

Potential Sources of Error

The principle investigator trained research assistants and translators in administering the Prenatal Questionnaire and debriefing participants. As there were words difficult to translate between English and Luo, the need for translation was a source of potential error.

Possible translation errors may have occurred regarding the Knowledge Assessment questions. These questions could have been better worded to eliminate any confusion. For example, “Is it bad for the baby if a pregnant woman smokes during

pregnancy?” could have been better phrased as “Should a pregnant woman smoke during her pregnancy?” Research assistants also had to be attentive to translators not answering questions for the study’s participants or revealing the answer in the question. For example when asking, “What is prenatal care?”, research assistants had to prevent translators from asking “What is the care that women receive during their pregnancy?” Similarly, potential errors may have occurred as “hospital” and “clinic” were used interchangeably to refer to a health center.

Although translators may have contributed to error, they were vital in clarifying misconceptions and thereby reducing error as well. Instead of asking, “Is it bad for the baby if a pregnant woman drinks alcohol during pregnancy?” translators asked, “Is it bad for the baby if a pregnant woman takes alcohol during pregnancy?” Similarly, “Do you need to stop having sex when you are pregnant?” was reworded as “Do you need to stop playing sex when you are pregnant?” These are colloquialisms that added to the face validity of the questions and responses.

The study’s sample size was limited to 90 women, thus decreasing the study’s statistical power and increasing the possibility of random error. Several of the demographic variables – including age, education, income, and income provider – could not be precisely compared between the pregnant and non-pregnant groups. These demographic variables represented the non-pregnant mothers at the time of data collection instead of at the time of their last pregnancy.

However, although the non-pregnant mothers were older and perhaps lived during a time when health centers were less available and TBA’s more recognized, the pregnant women in this sample still suffered worse accessibility conditions. Despite the presence

of health centers, the progression of medicine, and global efforts to improve healthcare in developing countries, these women were still likely to deliver outside of a health center.

Future Studies

A subsequent study could follow up with this study's sample of pregnant women and determine whether their delivery outcomes suffered from similar accessibility barriers as the non-pregnant mothers. As this study was initially intended to analyze prenatal care rather than health center deliveries, a survey specifically examining health center deliveries would eliminate the need for any inference. A larger and evenly divided sample size might also result in more statistically significant findings. More data could explore the issue of multiple pregnancies leading to more home deliveries as a result of a shorter labor period and perhaps a false sense of security regarding childbirth after many deliveries.

CHAPTER SEVEN

Conclusion

In the face of extreme poverty, circumstances on the Nyakach Plateau appear to be getting worse. In fact, the younger pregnant women suffered more extreme conditions than the older non-pregnant mothers on a majority of the measured variables. Significantly more of the pregnant women reported a financial barrier, the inability to afford prenatal care, a lack of income, walking as the only means of transportation, a greater distance to the nearest health center, a greater distance to the nearest TBA, partners with a lower value of prenatal care, and less women with a university education. Although not significant, more of the pregnant women also reported a transportation barrier, had less knowledge about pregnancy and childbirth, communities with a lower value of prenatal care, less married women, less married sole providers, more unmarried sole providers, more HIV positive women, more bad scores, and a worse mean bad score.

Significantly favoring pregnant women, less pregnant women were sole providers, less reported a lack of health center services, they were much younger, more women had a secondary school education, less women were uneducated, and more women had a lower mean number of pregnancies. Although not significant, more pregnant women also valued prenatal care and had partners that consented to a health center delivery.

Extrapolating from this information and comparing to the known birth outcomes of the non-pregnant mothers, it becomes clear that the women who were pregnant at the

time of these interviews most likely suffered even worse delivery outcomes. Despite all of the pregnant women valuing maternal health services such as prenatal care and all of them intending to deliver at a health center (97.56%), more than half of their deliveries most likely occurred outside of a health center as a result of accessibility barriers. With more of the accessibility variables being statistically significant than the knowledge and values variables, the data presents pregnant women who possess less money and live much farther away from a health center – a health center that the experienced non-pregnant mothers have deemed unfit. Ultimately, Table 6 creates an image of the pregnant population within this sample hiking almost 5 km, or 3 miles, to the nearest health center once labor pains have begun. With an average of 3 children trailing behind as well as the continued responsibility of supporting their families financially, these women hold a great burden on their shoulders, including the food and supplies literally carried on their heads.

Reflecting on the deliveries that the non-pregnant mothers and pregnant women have already experienced, the data disturbingly shows that the significantly younger pregnant women had slightly higher mean Bad Scores. As 34.04% of the older non-pregnant mothers were past childbearing age, it is shocking to consider that the younger pregnant women already suffered from their previous pregnancies but 20.93% still intended to have more children. Perhaps accessibility barriers interfered with high-risk non-pregnant mothers as women with the worst problems delivered with a TBA while women with less severe problems went to a health center or stayed at home. The greater accessibility barriers faced as well as the pregnant women's more extreme expected Bad Scores foreshadow discouraging futures.

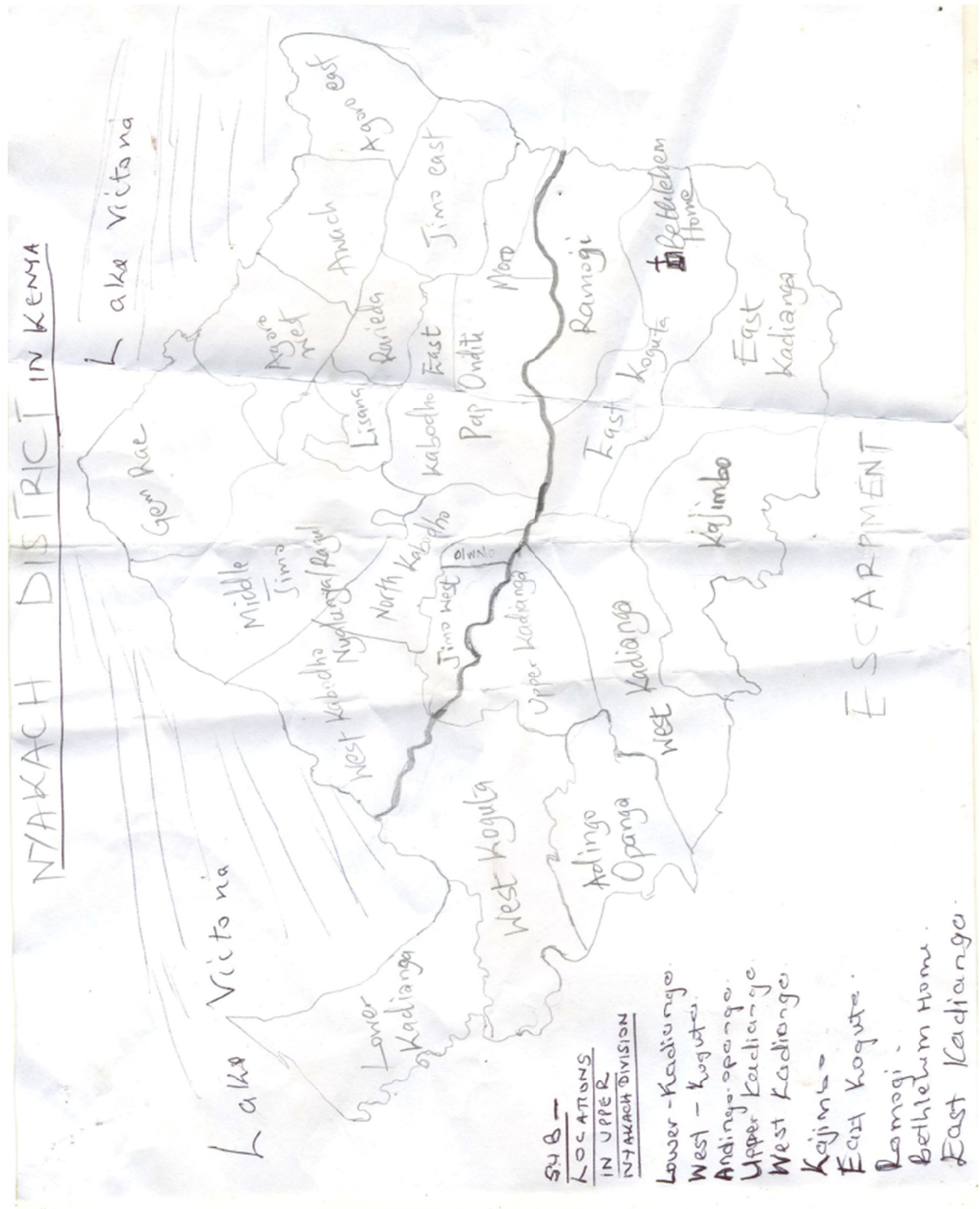
While the predicted delivery outcomes of the sample's pregnant women serve as a cold wake-up call to the realities of a desperate community, the need for change is similarly reflected in the number of children that these women already have. All of their young innocent daughters will grow up to become mothers much faster than the developed world's little girls – at an age as early as 13. As the cyclic succession of unfavorable delivery outcomes persists, it is imperative that interventions addressing structural violence take priority within this particular community over the somewhat effortless cognitivist-personalistic approach.

With the privilege of interviewing these women, it is this study's responsibility to share their stories and galvanize people into action. Rather than simply report these results, the information presented illustrates the great injustice to healthcare as a universal human right. In employing liberation theology, this study has elucidated the fundamental concern on the Nyakach Plateau and can thereby focus efforts on appropriate community-based participatory interventions.

APPENDICES

APPENDIX A

Nyakach District Map



APPENDIX B

Informed Consent Form for Individual Interviews

1-Who are we and why are we here? We are a team of people associated with Baylor University who have come to the Nyakach Plateau to assess health needs in order to provide better healthcare to your village. We have come here to ask you and other women some questions about your health because we care about you and your family. We would like to partner with you to create ways to help women in your village safely deliver healthier babies. If you have questions about this study, please contact: Dr. Lisa Baker, Baylor University, One Bear Place #97388, Waco, TX, 76798-7313, PH: (254) 710-2584, E-mail: Lisa_Baker@baylor.edu. For more information about your rights as a participant, please contact Dr. Michael E. Sherr, Chair, Baylor University IRB, One Bear Place #97320; Waco, TX 76798-7320; Phone: (254) 710-4483; Fax: (254) 710-6455; Email: Michael_Sherr@baylor.edu.

2-What are we asking you to do? We are asking you to partner with us to promote prenatal care in your village. You can do this by participating in one individual interview that will take no more than 45 minutes of your time. There will be women in the village interviewing you at your house or at the local clinic. The interviewer will ask you how old you are, if you are married or not, how many children you have, and how many people live with you. She will ask you about your general health, behavior during pregnancy, childbirth experience and outcome, and knowledge of prenatal care. The questions will also ask about whether or not anyone has ever forced you to have sex, and if so, did you get pregnant. We know that these are very personal questions, and you are completely free to choose not to answer some or all of them.

3-Your name will not be used. The interviewer will write your answers on a form that will not have your name on it, and we will later group your answers with answers from interviews of other women. Your name will not be written in our notes for either interview.

4-What will we do with your answers? We will use all of the information you give us to think of ways to help women in your village take care of their health and the health of their families. We will report this information back to women in your village and to other health professionals who are interested in partnering with us to promote village health. We will also share this information with health professionals in other parts of the world who are interested in the health of women in similar developing areas. However, we will not use your name in any of these reports.

5-There are some small risks to you. You may feel uncomfortable about some questions, but you can choose not to answer a question or just say, "I do not know." The

interviewer will simply move on to the next question. You may also stop the interview at any time, and nothing bad will happen if you do this.

6-You can choose! You do not have to do this interview! If you sign up today, you can also change your mind later and choose not to do the individual interview. At any time during the interview, you may stop without any penalty or loss of benefits.

7-You must be at least 18 years old. By signing this form, you are saying that you are at least 18 years old.

I hereby give my consent to participate in this study. I understand all of the above information, and I understand my rights as a participant in this study.

Print name here: _____

Sign here: _____

Print today's date: _____

Witness: _____

Date: _____

APPENDIX C

COMMUNITY HEALTH ASSESSMENT PROFILE (CHAP)											
Date: _____				Interviewer: _____				Patient ID: _____			
Setting: (Circle one) <input type="checkbox"/> Straw to Bread Clinic <input type="checkbox"/> Permanent plateau clinic <input type="checkbox"/> At home of participant <input type="checkbox"/> Elsewhere in community											
Age: _____ yrs OR _____ number of months if <1 yr old											
Gender: M / F Bethlehem Home: Y / N											
Medical History (switch spacing for HIV and others)											
Malaria Number of times since Jan 2012: _____ times Medicine to treat it _____ N/A _____ Yes _____ No Time since last treatment: _____ N/A _____ wks			Immunizations _____ None _____ Polio _____ Tetanus _____ Diphtheria/Pertussis/ Tetanus _____ Hep B _____ Hib Other: _____ Completed all required immunizations: _____ Yes _____ No				Does patient have HIV? _____ Yes _____ No _____ Don't know When diagnosed? _____ N/A _____ yrs or _____ months if <1 yr Treatment now? _____ yes _____ no _____ N/A How long? _____ N/A _____ yrs or _____ months if <1 yr Ever unable to get treatment? _____ N/A _____ Yes _____ No				
Last time treated for worms : _____ weeks ago _____ months ago _____ never											
Current Meds: (mark with 'yes' or 'no' for each category) <div style="display: flex; justify-content: space-between;"> <div> _____ HTN _____ Diabetes _____ Pain </div> <div> _____ Skin _____ Malaria _____ Vitamins </div> <div> _____ Indigestion, vomiting, constipation _____ Breathing problems, cough, congestion </div> </div>											
Instructions: If yes, put a number in the box: Put 1 if only one person has it, OR e.g. put 2 if 2 brothers have the disease											
	asthma	diabetes	HTN	sickle cell	stroke	heart attack	HIV	Employed	Died within the last year	Drinks alcohol at least once a month	Smoker
Self											
Mother											
Father											
Brother(s)											
Sister(s)											
Spouse											
Child(ren)											
Social History											
Number living in pt's household: _____						How many people in the household smoke? _____					
Number of each category living in household: <div style="display: flex; justify-content: space-between;"> <div> _____ pt's child or child-in-law _____ pt's spouse _____ pt's grandchild _____ non-family member </div> <div> _____ pt's grandparent or spouse's GP _____ pt's parent or spouse's parents _____ pt's sibling or in-law </div> </div>											

Patient ID: _____

Social History (cont.)

How many wives does the man have who is the head of the household? _____

How many wives live in the household? _____

Is the patient married:

- ☐ Yes
☐ Widowed
☐ Divorced
☐ Never married
☐ No, too young

Number of times married _____

Yrs married to current or last spouse _____

Number of pregnancies

- ☐ N/A
☐ #

How many living children does the pt have? _____

What is the age of the pt's oldest living child?

_____ yrs OR _____ months if <1yr

If the pt has a paying job what is it? _____

Years of school completed

- ☐ still in school
☐ primary
☐ secondary
☐ university
☐ trade school

Source of main household income

- ☐ paid by someone else for doing a job
☐ selling things that the family grows or makes
☐ no household income

Main household income provider?

- ☐ self
☐ spouse
☐ children
☐ parents
☐ no household income

Nutrition

Mark with 'x' when applicable

	Morning Meal	mid-day Meal	Evening Meal
Protein (Meat/fish/Poultry/ Dagaa/Omena/ Eggs)			
Other Protein (beans)			
Milk			
Green Vegetable/Tomatoes			
Fruit			
Starch (bread/porridge, ugali, maize, rice, chapati, pots, sweet pots, cassava, beans)			
Added Sugar			
Soft Drinks			

Has the pt ever eaten things that were not food, such as mud or dirt?

_____ yes _____ no

When was the last time the pt ate something that was not food (e.g. mud)?

- ☐ never
☐ in the last week
☐ not in the last week, but in the last month
☐ not in the last month, but in the last year
☐ years ago when you were a child

How often does the pt drink alcohol?

- ☐ Never
☐ 1-2 times a year
☐ 1-2 times a month
☐ 1-2 times a week
☐ 3-6 times a week
☐ daily

When pt drinks alcohol, how much?

- ☐ 1 drink
☐ 2 drinks
☐ >2 drinks

Breastfeeding

_____ N/A (pt is child or male or never pregnant)

_____ No, didn't breastfeed

Shortest time: _____ N/A _____ # days

Longest time: _____ N/A _____ # months

Add salt to food?

- ☐ never
☐ seldom
☐ at least one meal per day occasionally
☐ at least one meal per day most of the time
☐ at least one meal every day

Use iodized salt?

_____ yes _____ no _____ do not know

Patient ID: _____

Electricity, House, Water

Electricity in house used for: <input type="checkbox"/> N/A—no elec <input type="checkbox"/> lights <input type="checkbox"/> TV <input type="checkbox"/> radio <input type="checkbox"/> stove <input type="checkbox"/> refrigerator <input type="checkbox"/> computer	Any household member own <input type="checkbox"/> Bicycle <input type="checkbox"/> motorbike <input type="checkbox"/> car/truck Does pt pay someone for transportation? <input type="checkbox"/> never <input type="checkbox"/> daily <input type="checkbox"/> weekly <input type="checkbox"/> monthly <input type="checkbox"/> few times a year	What is the one main source of drinking water for pt's household? <input type="checkbox"/> river, stream, spring Location: _____ <input type="checkbox"/> pond Location: _____ <input type="checkbox"/> well Location: _____ <input type="checkbox"/> tap Location: _____ <input type="checkbox"/> shared tank Location: _____ <input type="checkbox"/> tank at your home <input type="checkbox"/> rainwater caught in buckets
What kind of toilet facilities do you use when you are at home? <input type="checkbox"/> none, go in the bush <input type="checkbox"/> community latrine <input type="checkbox"/> open pit latrine <input type="checkbox"/> closed pit latrine <input type="checkbox"/> flush to pit latrine <input type="checkbox"/> flush to piped sewer system	Water tank at pt's home? <input type="checkbox"/> yes <input type="checkbox"/> no Straw to Bread tank? <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> N/A Keep it covered? (partially covered is "no") <input type="checkbox"/> N/A <input type="checkbox"/> less than half the time <input type="checkbox"/> all the time <input type="checkbox"/> not covered <input type="checkbox"/> most of the time Do you share your tank water with people outside the household? <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> N/A How many people share the tank water? _____ How long does your tank water last during the dry season? _____ Water purifier? <input type="checkbox"/> yes <input type="checkbox"/> no Straw to Bread water purifier? <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> N/A Are there mosquitoes on, around, or inside your home water tank? <input type="checkbox"/> N/A, no water tank <input type="checkbox"/> all the time <input type="checkbox"/> most of the time <input type="checkbox"/> less than half the time <input type="checkbox"/> none of the time	
<u>House questions</u> Roof: <input type="checkbox"/> thatched <input type="checkbox"/> metal <input type="checkbox"/> tile Wall: <input type="checkbox"/> mud/dung <input type="checkbox"/> brick <input type="checkbox"/> metal Floor: <input type="checkbox"/> dirt/dung <input type="checkbox"/> concrete <input type="checkbox"/> tile Cooking fire: <input type="checkbox"/> inside open wood fire <input type="checkbox"/> outside open wood fire <input type="checkbox"/> inside stove <input type="checkbox"/> none Where does pt sleep: <input type="checkbox"/> dirt floor <input type="checkbox"/> concrete floor <input type="checkbox"/> bed How many separate bedrooms? ___#	<u>Farming</u> Does household grow food to eat themselves? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Sometimes Does household grow food to sell? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Sometimes Do they use pesticides on the food grown by household? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Sometimes If so, what are they? _____ (list) Do they store pesticides in the house? <input type="checkbox"/> Yes <input type="checkbox"/> No Is the pesticide container open or closed? <input type="checkbox"/> N/A <input type="checkbox"/> open <input type="checkbox"/> closed Do any of the neighbors next to where pt lives use pesticides on the food they grow? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Have a mosquito net? <input type="checkbox"/> Yes <input type="checkbox"/> No Insecticide treated net? <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No How long have you had your current net? <input type="checkbox"/> N/A <input type="checkbox"/> 1-3 months <input type="checkbox"/> 4-6 months <input type="checkbox"/> > 1 year Sleep under a mosquito net? <input type="checkbox"/> never <input type="checkbox"/> seldom <input type="checkbox"/> occasionally <input type="checkbox"/> more than half the time <input type="checkbox"/> almost always Sleep under a net last night? <input type="checkbox"/> Yes <input type="checkbox"/> No Net have holes in it? <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No	How many of these animals does pt's household have? <input type="checkbox"/> cattle sometimes indoors: <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> goats sometimes indoors: <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> sheep sometimes indoors: <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> chickens sometimes indoors: <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> donkeys sometimes indoors: <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> dogs sometimes indoors: <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> cats sometimes indoors: <input type="checkbox"/> yes <input type="checkbox"/> no	
Windows: <input type="checkbox"/> none <input type="checkbox"/> glass <input type="checkbox"/> curtains, but no glass <input type="checkbox"/> open with no closure		

		Patient ID:
Miscellaneous		
<p>Is the person wearing shoes? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is person pregnant? <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> does not know</p> <p>How would pt describe their health in general? <input type="checkbox"/> very good <input type="checkbox"/> good <input type="checkbox"/> fair <input type="checkbox"/> poor <input type="checkbox"/> very bad</p>	<p>How often does pt leave the plateau to go to... Sondu <input type="checkbox"/> Never <input type="checkbox"/> a few times a yr <input type="checkbox"/> a few times a month <input type="checkbox"/> a few times a week <input type="checkbox"/> almost every day Kisumu and beyond <input type="checkbox"/> Never <input type="checkbox"/> a few times a yr <input type="checkbox"/> a few times a month <input type="checkbox"/> a few times a week <input type="checkbox"/> almost every day</p> <p>How many times has pt been to Nairobi? _____ How many times has pt been out of Kenya? _____</p> <p>What are the reasons that pt leaves the plateau? (check all) <input type="checkbox"/> School, return home at night <input type="checkbox"/> boarding school <input type="checkbox"/> Shopping/entertainment <input type="checkbox"/> Business <input type="checkbox"/> Job <input type="checkbox"/> Personal business (ex. Banking)</p>	
<p>How often does pt go to the local clinic: <input type="checkbox"/> Never <input type="checkbox"/> Almost never <input type="checkbox"/> a few times a yr <input type="checkbox"/> a few times a month <input type="checkbox"/> a few times a week <input type="checkbox"/> almost every day</p> <p>Purpose of going to local clinic: <input type="checkbox"/> N/A never go <input type="checkbox"/> prenatal care, deliver baby <input type="checkbox"/> family planning/birth control <input type="checkbox"/> HIV testing <input type="checkbox"/> HIV treatment <input type="checkbox"/> sick <input type="checkbox"/> child's immunizations <input type="checkbox"/> take sick family member</p> <p>Reason for not going to clinic more often: <input type="checkbox"/> not sick <input type="checkbox"/> money <input type="checkbox"/> family member doesn't want me to <input type="checkbox"/> no transportation, cannot walk there <input type="checkbox"/> too crowded, cannot be seen <input type="checkbox"/> do not think it helps</p>	<p>Birth control <input type="checkbox"/> N/A <input type="checkbox"/> condom <input type="checkbox"/> pill <input type="checkbox"/> shot</p> <p>How often birth control: <input type="checkbox"/> Never <input type="checkbox"/> Almost never <input type="checkbox"/> occasionally <input type="checkbox"/> often <input type="checkbox"/> regularly all the time</p>	
		Circumcised? <input type="checkbox"/> N/A <input type="checkbox"/> yes <input type="checkbox"/> no

Pain Inventory

Have you had pain for at least 3 months?

____ Yes ____ No

Indicate on the figure all the locations in which you have been having pain for at least 3 months:

Have you had any of the following problems for at least the last 3 months?

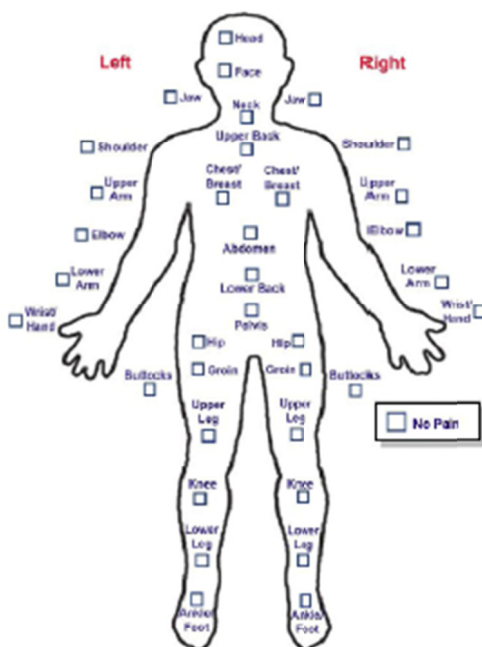
Feeling unusually tired _____ Yes _____ No

Trouble with sleep _____ Yes _____ No

Anxiety or depression _____ Yes _____ No

Trouble thinking or remembering _____ Yes _____ No

Use the following scale to describe how bad the problem has been over the last 3 months: (indicate with an 'x' in the appropriate box)



	No problem	Slight or they come and go	Moderate; often present	Severe and continuous
Pain				
Fatigue				
Trouble with sleep				
Anxiety or depression				
Trouble thinking or remembering				

What do you think is the most likely cause of these problems?

- | | |
|--|--|
| <input type="checkbox"/> Do not know | <input type="checkbox"/> A previous injury |
| <input type="checkbox"/> Frequent hunger | <input type="checkbox"/> A long-term illness that you have (such as HIV or asthma) |
| <input type="checkbox"/> Working hard physically | <input type="checkbox"/> Upsetting things going on in your family or communities |
| <input type="checkbox"/> Getting older | <input type="checkbox"/> Worries about the future |

What do you think is the next likely cause of these problems?

- | | |
|--|--|
| <input type="checkbox"/> Do not know | <input type="checkbox"/> A previous injury |
| <input type="checkbox"/> Frequent hunger | <input type="checkbox"/> A long-term illness that you have (such as HIV or asthma) |
| <input type="checkbox"/> Working hard physically | <input type="checkbox"/> Upsetting things going on in your family or communities |
| <input type="checkbox"/> Getting older | <input type="checkbox"/> Worries about the future |

APPENDIX D

Page 1	Date: (month/day/year)	Interviewer:	Patient ID: _____
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PRENATAL QUESTIONNAIRE: Questions for females at least 14 years of age who are or have been pregnant:	
Instructions: 1) Determine whether or not the participant is a pregnant woman or non-pregnant mother. 2) ONLY fill in the side of the form that applies -- Knowledge Assessment questions are applicable to both pregnant women and non-pregnant mothers. 3) Read the italicized sentences out loud to the participant before beginning each questionnaire section.	
PREGNANT WOMAN: only ask information about this particular pregnancy	NON-PREGNANT MOTHER (has children already): ask information about FIRST AND LAST pregnancy
I. Community Health Assessment Profile (CHAP) Form	
II. General: Hello, my name is ... and I was wondering if you would be willing to participate in our study. We are very interested in learning more about your health and the health of other pregnant women/non-pregnant mothers in your village. The interview should only take about 45 minutes of your time, and you can stop the interview at any point if you wish to do so. It is okay to say "I don't know" or skip a question if you don't feel comfortable answering it. (IF WILLING TO PARTICIPATE) Great! I will begin with a few general questions about your pregnancy/pregnancies.	
1000 Are you a first time mother? ____ Yes (1) ____ No (0) 1001 Do you know how far along you are in your pregnancy? ____ Yes (1) ____ No (0) ____ I don't know (99) 1002 When you are due to have your baby? ____ months ____ I don't know (99) 1003 How long ago was your last menstrual period? ____ months ____ I don't know (99) 1004 What was your weight before you got pregnant? ____ kg 1005 What is your weight now? ____ kg 1006 How did you find out that you were pregnant? ____ at the local clinic (1) ____ missed a menstrual period (2) ____ felt different (3) ____ other (4): _____ 1007 If not a first time mother: How old were you when you first became pregnant? ____ years ____ I don't know (99) 1008 If <16 years at first pregnancy: Why did you become pregnant at that age? ____ tradition (1) ____ intentional (2) ____ accident (3) ____ forced sex by husband (4) ____ rape (5) ____ exchanged sex for money (6) ____ other (7): _____ 1009 Do you want to have any more children? ____ No (0) ____ Yes (1) 1010 If yes: How many? ____ children 1011 How do you see your role in your family? ____ very important (1) ____ somewhat important (2) ____ not at all important (3) 1012 How many wives does your husband have? ____ wives 1013 If applicable: Do they all live in the same home? ____ Yes (1) ____ No (0) 1014 If applicable: How do you feel about being in a marriage in which your husband has other wives? ____ happy/positive (1) ____ bad/sad/mad/negative (2) ____ don't care/neutral (3) 1015 What is your relationship with the father of the baby? ____ husband (1) ____ man whom I live with (2) ____ man I know, friend or boyfriend (3) ____ man I know, not friend (4) ____ stranger who forced me to have sex (5) ____ someone who paid me to have sex (6) ____ I don't know (99) 1016 Did you tell the baby's father you are pregnant? ____ Yes (1) ____ No (0) 1017 If no: Why not? _____	1300 What was your weight before you got pregnant? ____ kg 1301 What was your weight after you delivered your baby? ____ kg 1302 What was the weight of your baby? ____ kg 1303 What is your weight now? ____ kg 1304 How did you find out that you were pregnant? ____ at the local clinic (1) ____ missed a menstrual period (2) ____ felt different (3) ____ other (4): _____ 1305 How old were you when you first became pregnant? ____ years ____ I don't know (99) 1306 If <16 years at first pregnancy: Why did you become pregnant at that age? ____ tradition (1) ____ intentional (2) ____ accident (3) ____ forced sex by husband (4) ____ rape (5) ____ exchanged sex for money (6) ____ other (7): _____ 1307 Do you want to have any more children? ____ No (0) ____ Yes (1) 1308 If yes: How many? ____ children 1309 How do you see your role in your family? ____ very important (1) ____ somewhat important (2) ____ not at all important (3) 1310 How many wives does your husband have? ____ wives 1311 If applicable: Do they all live in the same home? ____ Yes (1) ____ No (0) 1312 If applicable: How do you feel about being in a marriage in which your husband has other wives? ____ happy/positive (1) ____ bad/sad/mad/negative (2) ____ don't care/neutral (3) 1313 What is your relationship with the father of the baby? ____ husband (1) ____ man whom I live with (2) ____ man I know, not friend (3) ____ man I know, friend or boyfriend (4) ____ stranger who forced me to have sex (5) ____ someone who paid me to have sex (6) ____ I don't know (99) 1314 Did you tell the baby's father you were pregnant? ____ Yes (1) ____ No (0) 1315 If no: Why not? _____ 1316 How long did you wait until you told the baby's father about your pregnancy? ____ days ____ months

PREGNANT WOMAN:

NON-PREGNANT MOTHER:

Patient ID: _____

- 1018 How long did you wait until you told the baby's father about your pregnancy? ____ days ____ months
- 1019 What was the response of the baby's father to your pregnancy?
 ____ happy/positive (1)
 ____ bad/sad/mad/negative (2)
 ____ don't care/neutral (3)
- 1020 Did you want to become pregnant?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1021 Did you plan to get pregnant when you did?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1022 Are you happy about your pregnancy?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1023 If no or I don't know: Why not: _____
- 1024 Is there anyone who is not happy about your pregnancy?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1025 If yes: Who: _____
- 1026 Are you a member of a women's group that provides support and information about birth and family planning? ____ Yes (1) ____ No (0)

- 1317 What was the response of the baby's father to your pregnancy?
 ____ happy/positive (1)
 ____ bad/sad/mad/negative (2)
 ____ don't care/neutral (3)
- 1318 Did you want to become pregnant?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1319 Did you plan to get pregnant when you did?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1320 Are you happy about your pregnancy?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1321 If no or I don't know: Why not: _____
- 1322 Is there anyone who is not happy about your pregnancy?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1323 If yes: Who: _____
- 1324 Are you a member of a women's group that provides support and information about birth and family planning?
 ____ Yes (1) ____ No (0)

III. Cultural Practices/Beliefs: Thank you for participating in our study. Next we would like to learn about your cultural practices and beliefs regarding pregnancy.

- 1027 Have you been tested for HIV?
 ____ No (0)
 ____ Yes (1)
 1028 If no: Why not: _____
- 1029 If yes: Do you have HIV/AIDS? ____ Yes (1) ____ No (0)
- 1030 If yes: Are you getting treated?
 ____ Yes, before pregnancy (1)
 ____ Yes, during pregnancy (2)
 ____ No (0)
- 1031 If not a first time mother: Have your children been tested for HIV?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1032 If no: Why not?
 ____ cultural practice/belief/tradition (1)
 ____ afraid (2)
 ____ husband/family disagrees (3)
 ____ other (4): _____
- 1033 Do you plan on getting your baby tested for HIV?
 ____ Yes (1) ____ No (0) ____ I don't know (99)

How does your community feel about...

- 1034 Pregnancy in general?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1035 A pregnant woman who is not married?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1036 A pregnant woman who does not know who the father is?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1037 A pregnant woman who was forced to have sex by a stranger?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1038 Getting tested for HIV/AIDS?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1039 A person having HIV/AIDS?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1040 A pregnant woman who is HIV positive?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1041 When an unmarried woman gets pregnant, does the baby's father usually help take care of his child?
 ____ Yes (1)
 ____ No (0)
 1042 If yes: In what way? _____
- 1043 If no: Why not? _____
- 1044 What does your community think about a pregnant woman going to the clinic several times during her pregnancy, even if she is not sick, just to see if the pregnancy is going well? (mark all that apply)
 ____ It is good (1) ____ It is necessary (2)
 ____ It is bad (3) ____ It is unnecessary (4)

- 1325 Have you been tested for HIV?
 ____ No (0)
 ____ Yes (1)
 1326 If no: Why not: _____
- 1327 If yes: Do you have HIV/AIDS? ____ Yes (1) ____ No (0)
- 1328 If yes: Are you getting treated?
 ____ Yes, before pregnancy (1)
 ____ Yes, during pregnancy (2)
 ____ Yes, after pregnancy (3)
 ____ No (0)
- 1329 Have your children been tested for HIV?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1330 If no: Why not?
 ____ cultural practice/belief/tradition (1)
 ____ afraid (2)
 ____ husband/family disagrees (3)
 ____ other (4): _____

How does your community feel about...

- 1331 Pregnancy in general?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1332 A pregnant woman who is not married?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1333 A pregnant woman who does not know who the father is?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1334 A pregnant woman who was forced to have sex by a stranger?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1335 Getting tested for HIV/AIDS?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1336 A person having HIV/AIDS?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1337 A pregnant woman who is HIV positive?
 ____ Positive (1) ____ Negative (2) ____ Neutral (3)
- 1338 When an unmarried woman gets pregnant, does the baby's father usually help take care of his child?
 ____ Yes (1)
 ____ No (0)
 1339 If yes: In what way? _____
- 1340 If no: Why not? _____
- 1341 What does your community think about a pregnant woman going to the clinic several times during her pregnancy, even if she is not sick, just to see if the pregnancy is going well? (mark all that apply)
 ____ It is good (1) ____ It is necessary (2)
 ____ It is bad (3) ____ It is unnecessary (4)

PREGNANT WOMAN:

NON-PREGNANT MOTHER:

Patient ID: _____

- 1045 How are pregnant women treated in the Luo culture? _____
- 1046 What are special rituals or customs for pregnant women? _____
- 1047 Is it preferred to have a boy or a girl?
 _____ boy (1) _____ girl (2) _____ does not matter (3)
- 1048 Would you rather give birth to a boy or a girl?
 _____ boy (1) _____ girl (2) _____ does not matter (3)
- 1049 Does the baby's father want you to give birth to a boy or a girl?
 _____ boy (1) _____ girl (2) _____ does not matter (3)

- 1342 How are pregnant women treated in the Luo culture? _____
- 1343 What are special rituals or customs for pregnant women? _____
- 1344 Is it preferred to have a boy or a girl?
 _____ boy (1) _____ girl (2) _____ does not matter (3)
- 1345 Would you rather give birth to a boy or a girl?
 _____ boy (1) _____ girl (2) _____ does not matter (3)
- 1346 Does the baby's father want you to give birth to a boy or a girl?
 _____ boy (1) _____ girl (2) _____ does not matter (3)

IV. PNC Utilization: Now I will ask you several questions about your use of PNC. You may choose to skip questions or stop at any time.

- 1050 Do you have health insurance?
 _____ Yes (1) _____ No (0) _____ I don't know (99)
- 1051 Do you have access to a cell phone? _____ Yes (1) _____ No (0)
- 1052 What is the distance between your house and the nearest clinic or hospital? _____ km
- 1053 What is the distance between your house and the nearest TBA? _____ km
- 1054 Does the nearest clinic have PNC services?
 _____ Yes (1) _____ No (0) _____ I don't know (99)
- 1055 How do you get to your PNC services? (mark all that apply)
 _____ walk (1) _____ bicycle (2)
 _____ motorcycle (3) _____ car (4)
 _____ public transport (bus) (5) _____ other (6): _____
- 1056 Do you have the money for PNC?
 _____ Yes (1) _____ No (0)
- 1057 If yes: Do you spend it on PNC?
 _____ Yes (1)
 _____ No (0)
- 1058 If no: What do you spend the money on instead of PNC?
 _____ food (1) _____ alcohol (2) _____ other (3): _____
- 1059 How useful are prenatal care services?
 _____ very useful (1) _____ somewhat useful (2) _____ not at all (3)
- 1060 What could the clinic provide for you that would help you get prenatal care? (mark all that apply)
 _____ more maternal services (1) _____ more health professionals (2)
 _____ less expensive services (3) _____ transportation services (4)
 _____ other (5): _____
- 1061 Do you plan to get PNC?
 _____ No (0)
- 1062 If no: What stops you from getting PNC?
 _____ afraid of medical procedure (1)
 _____ transport obstacle (2)
 _____ inadequate income (3)
 _____ baby's father doesn't approve (4)
 _____ no health problem (5)
 _____ too busy (6)
 _____ unrelated to pregnancy (7): _____
- 1063 If yes: How many total visits do you plan to make to the clinic during your pregnancy? _____ visits
- 1064 Will the baby's father go with you? _____ Yes (1) _____ No (0)
- 1065 Have you had your first PNC visit? _____ Yes (1) _____ No (0)
- 1066 If yes: When? _____ early pregnancy (1)
 _____ mid-pregnancy (2)
 _____ late pregnancy (3)
 _____ don't remember (98)

- 1347 Do you have health insurance?
 _____ Yes (1) _____ No (0) _____ I don't know (99)
- 1348 Do you have access to a cell phone? _____ Yes (1) _____ No (0)
- 1349 What is the distance between your house and the nearest clinic or hospital? _____ km
- 1350 What is the distance between your house and the nearest TBA? _____ km
- 1351 Does the nearest clinic have PNC services?
 _____ Yes (1) _____ No (0) _____ I don't know (99)
- 1352 How do you get to your PNC services? (mark all that apply)
 _____ walk (1) _____ bicycle (2)
 _____ motorcycle (3) _____ car (4)
 _____ public transport (bus) (5) _____ other (6): _____
- 1353 Do you have the money for PNC?
 _____ Yes (1) _____ No (0)
- 1354 If yes: Do you spend it on PNC?
 _____ Yes (1)
 _____ No (0)
- 1355 If no: What do you spend the money on instead of PNC?
 _____ food (1) _____ alcohol (2) _____ other (3): _____
- 1356 How useful are prenatal care services?
 _____ very useful (1) _____ somewhat useful (2) _____ not at all (3)
- 1357 What could the clinic provide for you that would help you get prenatal care? (mark all that apply)
 _____ more maternal services (1) _____ more health professionals (2)
 _____ less expensive services (3) _____ transportation services (4)
 _____ other (5): _____
- 1358 Did you get PNC?
 _____ Yes (1) _____ No (0)
- 1359 If no: What stopped you from getting PNC?
 _____ afraid of medical procedure (1)
 _____ transport obstacle (2)
 _____ inadequate income (3)
 _____ baby's father doesn't approve (4)
 _____ no health problem (5)
 _____ too busy (6)
 _____ unrelated to pregnancy (7): _____
- 1360 If yes: How many total visits did you make to the clinic during your pregnancy? _____ visits
 _____ don't remember (98)
- 1361 Did the baby's father go with you? _____ Yes (1) _____ No (0)
- 1362 When was your first PNC visit?
 _____ early pregnancy (1)
 _____ mid-pregnancy (2)
 _____ late pregnancy (3)
 _____ don't remember (98)

PREGNANT WOMAN:

- 1067 Who is your PNC provider?
 ___ medical assistant (1) ___ nurse (2)
 ___ midwife (3) ___ TBA (4)
 ___ no provider (5) ___ don't remember (98)
 ___ other village health provider (6): _____
- 1068 What is the skill level of your PNC provider?
 ___ skilled (1) ___ unskilled (2)
 ___ no provider (3) ___ don't remember (98)
- 1069 Who is your delivery provider?
 ___ medical assistant (1) ___ nurse (2)
 ___ midwife (3) ___ TBA (4)
 ___ no provider (5) ___ don't remember (98)
 ___ other village health provider (6): _____
- 1070 What is the skill level of your delivery provider?
 ___ skilled (1) ___ unskilled (2)
 ___ no provider (3) ___ don't remember (98)
- 1071 Were you advised to take iron supplements or vitamins?
 ___ Yes (1) ___ No (0) ___ don't remember (98)
- 1072 If yes: When were you advised to take them?
 ___ before pregnancy (1) ___ during pregnancy (2)
 ___ after pregnancy (3) ___ don't remember (98)
- 1073 Are you taking iron supplements or vitamins?
 ___ Yes (1) ___ No (0)
- 1074 If yes: What are you taking?
 ___ iron supplements (1) ___ vitamins (2)
- 1075 When did you start taking them?
 ___ before pregnancy (1)
 ___ during pregnancy (2)
 ___ don't remember (98)
- 1076 Did someone at the clinic test your urine?
 ___ Yes (1) ___ No (0) ___ I don't remember (98)
- 1077 Did someone at the clinic test your blood?
 ___ Yes (1) ___ No (0) ___ I don't remember (98)
- 1078 Was your weight recorded?
 ___ Yes (1) ___ No (0) ___ I don't remember (98)
- 1079 Was your height recorded?
 ___ Yes (1) ___ No (0) ___ I don't remember (98)
- 1080 Was your blood pressure recorded?
 ___ Yes (1) ___ No (0) ___ I don't remember (98)
- 1081 Were you advised to get any immunizations before birth?
 ___ Yes (1) ___ No (0) ___ I don't remember (98)
- 1082 If yes: Which immunizations?
 ___ tetanus toxoid (1) ___ other (2): _____
 ___ don't remember (98)
- 1083 Which immunizations did you get?
 ___ tetanus toxoid (1) ___ other (2): _____
 ___ didn't get any (3) ___ don't remember (98)
- 1084 Were you told about possible pregnancy complications?
 ___ Yes (1) ___ No (0) ___ I don't remember (98)
- 1085 If yes: Which pregnancy complications?

 ___ I don't remember (98)
- 1086 Were you told that you have any problems with your pregnancy?
 ___ Yes (1) ___ No (0) ___ I don't remember (98)
- 1087 If yes: What problems?

 ___ I don't remember (98)

NON-PREGNANT MOTHER:

Patient ID: _____

- 1363 Who was your PNC provider?
 ___; ___ medical assistant (1) ___; ___ nurse (2)
 ___; ___ midwife (3) ___; ___ TBA (4)
 ___; ___ no provider (5) ___; ___ don't remember (98)
 ___; ___ other village health provider (6): _____; _____
- 1364 What was the skill level of your PNC provider?
 ___; ___ skilled (1) ___; ___ unskilled (2)
 ___; ___ no provider (3) ___; ___ don't remember (98)
- 1365 Who was your delivery provider?
 ___; ___ medical assistant (1) ___; ___ nurse (2)
 ___; ___ midwife (3) ___; ___ TBA (4)
 ___; ___ no provider (5) ___; ___ don't remember (98)
 ___; ___ other village health provider (6): _____; _____
- 1366 What was the skill level of your delivery provider?
 ___; ___ skilled (1) ___; ___ unskilled (2)
 ___; ___ no provider (3) ___; ___ don't remember (98)
- 1367 Were you advised to take iron supplements or vitamins?
 ___; ___ Yes (1) ___; ___ No (0)
 ___; ___ don't remember (98)
- 1368 If yes: When were you advised to take them?
 ___; ___ before pregnancy (1)
 ___; ___ during pregnancy (2)
 ___; ___ after pregnancy (3)
 ___; ___ don't remember (98)
- 1369 Did you take iron supplements or vitamins?
 ___; ___ Yes (1) ___; ___ No (0) ___; ___ don't remember (98)
- 1370 If yes: What did you take?
 ___; ___ iron supplements (1)
 ___; ___ vitamins (2)
- 1371 When did you take them?
 ___; ___ before pregnancy (1)
 ___; ___ during pregnancy (2)
 ___; ___ don't remember (98)
- 1372 Did someone at the clinic test your urine?
 ___; ___ Yes (1) ___; ___ No (0) ___; ___ don't remember (98)
- 1373 Did someone at the clinic test your blood?
 ___; ___ Yes (1) ___; ___ No (0) ___; ___ don't remember (98)
- 1374 Was your weight recorded?
 ___; ___ Yes (1) ___; ___ No (0) ___; ___ don't remember (98)
- 1375 Was your height recorded?
 ___; ___ Yes (1) ___; ___ No (0) ___; ___ don't remember (98)
- 1376 Was your blood pressure recorded?
 ___; ___ Yes (1) ___; ___ No (0) ___; ___ don't remember (98)
- 1377 Were you advised to get any immunizations before birth?
 ___; ___ Yes (1) ___; ___ No (0) ___; ___ don't remember (98)
- 1378 If yes: Which immunizations?
 ___; ___ tetanus toxoid (1)
 ___; ___ other (2): _____; _____
 ___; ___ don't remember (98)
- 1379 Which immunizations did you get?
 ___; ___ tetanus toxoid (1)
 ___; ___ other (2): _____; _____
 ___; ___ didn't get any immunizations (3)
 ___; ___ don't remember (98)
- 1380 Were you told about possible pregnancy complications?
 ___; ___ Yes (1) ___; ___ No (0) ___; ___ don't remember (98)
- 1381 If yes: Which pregnancy complications?

 ___; ___ I don't remember (98)
- 1382 Were you told that you had any problems with your pregnancy?
 ___; ___ Yes (1) ___; ___ No (0) ___; ___ don't remember (98)
- 1383 If yes: What problems?

 ___; ___ I don't remember (98)

V. Behavior during Pregnancy: Now I would like to ask you some questions about your health during pregnancy. You may choose to skip questions or stop at any time.

- 1088 How is your health during your pregnancy?
 _____ excellent (1) _____ good (2) _____ fair (3) _____ poor (4)
- 1089 Do you eat more or less than usual during your pregnancy?
 _____ more (1) _____ less (2) _____ no change (3)
- 1090 Do you eat healthier food or less healthy during your pregnancy?
 _____ more healthy (1) _____ less healthy (2) _____ no change (3)
- 1091 What foods do you eat the most during your pregnancy?
 _____ protein meat/fish/poultry/dagaa/omena/eggs (1)
 _____ other protein (beans) (2)
 _____ milk (3) _____ (mark all that apply)
 _____ green vegetable/tomatoes (4)
 _____ fruit (5)
 _____ starch bread/porridge/ugali/maize/rice/chapati/pots/sweet pots/cassava ...
 _____ added sugar (7) _____ (6)
 _____ soft drinks (8)
 _____ other (9): _____
- 1092 What do you eat on a typical day while you are pregnant?
 Morning: _____
 Afternoon: _____
 Evening: _____
- 1093 Do you carry smaller loads or stop carrying things on your head when you are pregnant? _____ Yes (1) _____ No (0)
- 1094 Do you reduce your amount of physical activity when you are pregnant? _____ Yes (1) _____ No (0)
- 1095 Do you smoke? _____ Yes (1) _____ No (0)
 1096 If yes: Do you smoke more, less, or the same amount during your pregnancy?
 _____ more (1) _____ less (2) _____ the same amount (3)
 _____ don't smoke when pregnant (4)
- 1097 Do you drink alcohol? _____ Yes (1) _____ No (0)
 1098 If yes: Do you drink more, less, or the same amount of alcohol during your pregnancy?
 _____ more (1) _____ less (2) _____ the same amount (3)
 _____ don't drink alcohol when pregnant (4)
- 1099 Do you use any nonprescription drugs? _____ Yes (1) _____ No (0)
 1100 If yes: Which nonprescription drugs? _____
 1101 How often?
 _____ every day (1) _____ once a week (2)
 _____ once a month (3) _____ other (4): _____
- 1102 Do you use nonprescription drugs more, less, or the same amount during your pregnancy?
 _____ more (1) _____ less (2) _____ the same amount (3)
 _____ don't use nonprescription drugs when pregnant (4)
- 1103 Does your community treat you better, worse, or the same when you are pregnant than when you are not pregnant?
 _____ better (1) _____ worse (2) _____ the same (3)
- 1104 Do your family and friends help you more, less, or the same amount when you are pregnant than when you are not pregnant?
 _____ more (1) _____ less (2) _____ the same amount (3)
- 1105 Is the baby's father... (mark all that apply)
 _____ paying more positive attention to you because you are pregnant? (1)
 _____ helping with housework because you are pregnant? (2)
 _____ going places for you so that you don't have to make trips because you are pregnant? (3)
 _____ working harder to get more money because you are pregnant? (4)
 _____ giving you extra food and water because you are pregnant? (5)
 _____ going to the clinic with you for PNC visits? (6)
 _____ if applicable, helping with your other children because you are pregnant? (7)

- 1384 How was your health during your pregnancy?
 _____; _____ excellent (1) _____; _____ good (2)
 _____; _____ fair (3) _____; _____ poor (4)
- 1385 Did you eat more or less than usual during your pregnancy?
 _____; _____ more (1) _____; _____ less (2) _____; _____ no change (3)
- 1386 Did you eat healthier food or less healthy during your pregnancy?
 _____; _____ more healthy (1) _____; _____ less healthy (2)
 _____; _____ no change (3)
- 1387 What foods did you eat the most during your pregnancy?
 _____; _____ protein meat/fish/poultry/dagaa/omena/eggs (1)
 _____; _____ other protein (beans) (2)
 _____; _____ milk (3) _____ (mark all that apply)
 _____; _____ green vegetable/tomatoes (4)
 _____; _____ fruit (5)
 _____; _____ starch bread/porridge/ugali/maize/rice/chapati/pots/sweet pots ...
 _____; _____ added sugar (7) _____; _____ /cassava (6)
 _____; _____ soft drinks (8)
 _____; _____ other (9): _____
- 1388 What did you eat on a typical day while you were pregnant?
 Morning: _____
 Afternoon: _____
 Evening: _____
- 1389 Did you carry smaller loads or stop carrying things on your head when you were pregnant? _____; _____ Yes (1) _____; _____ No (0)
- 1390 Did you reduce your amount of physical activity when you were pregnant? _____; _____ Yes (1) _____; _____ No (0)
- 1391 Do you smoke? _____; _____ Yes (1) _____; _____ No (0)
 1392 If yes: Do you smoke more, less, or the same amount when you are pregnant?
 _____; _____ more (1) _____; _____ less (2) _____; _____ the same amount (3)
 _____; _____ don't smoke when pregnant (4)
- 1393 Do you drink alcohol? _____; _____ Yes (1) _____; _____ No (0)
 1394 If yes: Do you drink more, less, or the same amount of alcohol when you are pregnant?
 _____; _____ more (1) _____; _____ less (2) _____; _____ the same amount (3)
 _____; _____ don't drink alcohol when pregnant (4)
- 1395 Do you use any nonprescription drugs? _____; _____ Yes (1) _____; _____ No (0)
 1396 If yes: Which nonprescription drugs? _____
 1397 How often?
 _____; _____ every day (1) _____; _____ once a week (2)
 _____; _____ once a month (3) _____; _____ other (4): _____
- 1398 Do you use nonprescription drugs more, less, or the same amount when you are pregnant?
 _____; _____ more (1) _____; _____ less (2) _____; _____ the same amount (3)
 _____; _____ don't use nonprescription drugs when pregnant (4)
- 1399 Does your community treat you better, worse, or the same when you are pregnant than when you are not pregnant?
 _____; _____ better (1) _____; _____ worse (2) _____; _____ the same (3)
- 1400 Do your family and friends help you more, less, or the same amount when you are pregnant than when you are not pregnant?
 _____; _____ more (1) _____; _____ less (2) _____; _____ the same amount (3)
- 1401 Does the baby's father... (mark all that apply)
 _____; _____ pay more positive attention to you when you are pregnant? (1)
 _____; _____ help with housework when you are pregnant? (2)
 _____; _____ go places for you so that you don't have to make trips when you are pregnant? (3)
 _____; _____ work harder to get more money when you are pregnant? (4)
 _____; _____ give you extra food & water when you are pregnant? (5)
 _____; _____ go to the clinic with you for PNC visits? (6)
 _____; _____ help with your other children when you're pregnant? (7)

PREGNANT WOMAN:

NON-PREGNANT MOTHER:

Patient ID: _____

- 1106 Does the baby's father want you to go to the clinic for PNC?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1107 Does the baby's father want you to go to the clinic for the delivery?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1108 Does the baby's father ever hurt you physically?
 ____ Yes (1) ____ No (0)
- 1109 If yes: Does he hurt you more, less, or the same amount during your pregnancy?
 ____ more (1) ____ less (2) ____ the same amount (3)
 ____ doesn't hurt me when pregnant (4)
- 1110 Who is the most important adult member of your family to you besides the baby's father?
 ____ mother (1) ____ father (2)
 ____ sister (3) ____ brother (4)
 ____ female friend (5) ____ male friend (6)
 ____ other (7): _____
- 1111 Is this person... (mark all that apply)
 ____ paying more positive attention to you because you are pregnant? (1)
 ____ helping with housework because you are pregnant? (2)
 ____ going places for you so that you don't have to make trips because you are pregnant? (3)
 ____ working harder to get more money because you are pregnant? (4)
 ____ giving you extra food and water because you are pregnant? (5)
 ____ going to the clinic with you for PNC visits? (6)
 ____ if applicable, helping with your other children because you are pregnant? (7)
- 1112 If not a first time mother: Since you have experienced pregnancy before, is your behavior different this time? ____ Yes (1) ____ No (0)
- 1113 If yes: How are things different?
 ____ using PNC services (1)
 ____ taking iron supplements and/or vitamins (2)
 ____ being more careful (3)
 ____ other (4): _____

- 1401 Did the baby's father want you to go to the clinic for PNC?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1402 Did the baby's father want you to go to the clinic for the delivery?
 ____ Yes (1) ____ No (0) ____ I don't know (99)
- 1403 Does the baby's father ever hurt you physically?
 ____ Yes (1) ____ No (0)
- 1404 If yes: Did he hurt you more, less, or the same amount during your pregnancy?
 ____ more (1) ____ less (2)
 ____ the same amount (3)
 ____ didn't hurt me when pregnant (4)
- 1405 Who is the most important adult member of your family to you besides the baby's father?
 ____ mother (1) ____ father (2)
 ____ sister (3) ____ brother (4)
 ____ female friend (5) ____ male friend (6)
 ____ other (7): _____
- 1406 Does this person... (mark all that apply)
 ____ pay more positive attention to you when you are pregnant? (1)
 ____ help with housework when you are pregnant? (2)
 ____ go places for you so that you don't have to make trips when you are pregnant? (3)
 ____ work harder to get more money when you are pregnant? (4)
 ____ give you extra food & water when you are pregnant? (5)
 ____ go to the clinic with you for PNC visits? (6)
 ____ help with your other children when you're pregnant? (7)
- 1407 Was your behavior during your last pregnancy different from your behavior during your first pregnancy? ____ Yes (1) ____ No (0)
- 1408 If yes: How were things different?
 ____ using PNC services (1)
 ____ taking iron supplements and/or vitamins (2)
 ____ being more careful (3)
 ____ other (4): _____

VI. Delivery: We would like to learn more about how babies are delivered in your village.

- 1114 Do you prefer to deliver your baby at home or at the clinic?
 ____ home (1) ____ clinic (2) ____ no preference (3)
- 1115 If at home: Why do you prefer to deliver your baby at home?
 ____ afraid of clinic (1) ____ transport obstacle (2)
 ____ inadequate income (3) ____ baby's father prefers this (4)
 ____ unrelated to pregnancy (5): _____
- 1116 Who will help deliver your baby at home? (mark all that apply)
 ____ mother (1) ____ mother-in-law (2)
 ____ sister (3) ____ friend (4)
 ____ TBA (5) ____ baby's father (6)
 ____ no one (7) ____ other (8): _____
- 1117 Where will you deliver at home?
 ____ in bed (1) ____ on the floor (2)
 ____ other (3): _____
- 1118 What tools will you use during the delivery? _____
- 1119 What will you do to help with the pain? _____
- 1120 Will you take prescription medicine or herbal medicine?
 ____ Yes (1) ____ No (0) ____ I don't know yet (99)
- 1121 If yes: What prescription medicine or herbal medicine? _____
- 1122 What will you do immediately after the baby is born? _____

- 1410 Did you deliver your baby at home or at the clinic?
 ____ home (1) ____ clinic (2)
 ____ other (3): _____
- 1411 If at home: Why did you deliver your baby at home?
 ____ afraid of clinic (1) ____ transport obstacle (2)
 ____ inadequate income (3) ____ baby's father prefers this (4)
 ____ unrelated to pregnancy (5): _____
- 1412 Who helped deliver your baby at home? (mark all that apply)
 ____ mother (1) ____ mother-in-law (2)
 ____ sister (3) ____ friend (4)
 ____ TBA (5) ____ baby's father (6)
 ____ no one (7) ____ other (8): _____
- 1413 Where did you deliver at home?
 ____ in bed (1) ____ on the floor (2)
 ____ other (3): _____
- 1414 What tools did you use during the delivery? _____
- 1415 What did you do to help with the pain? _____
- 1416 Did you take prescription medicine or herbal medicine?
 ____ Yes (1) ____ No (0) ____ I don't remember (98)
- 1417 If yes: What prescription medicine or herbal medicine? _____

PREGNANT WOMAN:

NON-PREGNANT MOTHER:

Patient ID: _____

1123 Who will cut the umbilical cord?
 _____ person helping me deliver my baby at home (1)
 _____ baby's father (2) _____ other (3): _____

1124 What tool will you use to cut the umbilical cord?
 _____ knife (1) _____ scissors (2) _____ other (3): _____

1125 Is the tool clean? _____ Yes (1) _____ No (0) _____ I don't know (99)

1126 What will you do to keep from getting ill after delivery? _____

1127 What will you do to keep your baby from getting ill after delivery? _____

1128 What will you do if you have delivery complications (for ex. if the baby gets stuck during the delivery)? _____

1129 What will you do if your baby is having problems (for ex. if the baby is not breathing after delivery)? _____

1130 Who will you go to for help?
 _____ family (1) _____ friends (2) _____ TBA (3)
 _____ clinic (4) _____ other (5): _____

1131 If necessary, would you get an emergency C-section?
 _____ Yes (1) _____ No (0) _____ I don't know (99)

1132 If no: Why would you not get an emergency C-section?
 _____ afraid of clinic (1) _____ transport obstacle (2)
 _____ inadequate income (3) _____ baby's father doesn't allow (4)
 _____ unrelated to pregnancy (5): _____

1133 If not a first time mother: How many babies have you delivered at home? _____ babies

1134 If not a first time mother: How many babies have you delivered at the clinic? _____ babies

1135 If not a first time mother: How many C-sections have you had? _____ C-sections

1136 If not a first time mother: What is the average number of months between your pregnancies? _____ months

1137 Will the baby's father be present during your upcoming delivery?
 _____ Yes (1) _____ No (0) _____ I don't know (99)

1138 If no: Why won't the baby's father be present?
 _____ cultural practice (1) _____ he doesn't want to (2)
 _____ other (3): _____

1418 What did you do immediately after the baby was born? _____

1419 Who cut the umbilical cord?
 _____ person helping me deliver my baby at home (1)
 _____ baby's father (2) _____ other (3): _____

1420 What tool did you use to cut the umbilical cord?
 _____ knife (1) _____ scissors (2)
 _____ other (3): _____

1421 Was the tool clean? _____ Yes (1) _____ No (0)
 _____ I don't know (99)

1422 What did you do to keep from getting ill after delivery? _____

1423 What did you do to keep your baby from getting ill after delivery? _____

1424 What would you have done if you had delivery complications (for ex. if the baby got stuck during the delivery)? _____

1425 What would you have done if your baby was having problems (for ex. if the baby was not breathing after delivery)? _____

1426 Who would you have gone to for help?
 _____ family (1) _____ friends (2) _____ TBA (3)
 _____ clinic (4) _____ other (5): _____

1427 If necessary, would you get an emergency C-section?
 _____ Yes (1) _____ No (0) _____ I don't know (99)

1428 If no: Why would you not get an emergency C-section?
 _____ afraid of clinic (1) _____ transport obstacle (2)
 _____ inadequate income (3) _____ baby's father doesn't allow (4)
 _____ unrelated to pregnancy (5): _____

1429 How many babies have you delivered at home? _____ babies

1430 How many babies have you delivered at the clinic? _____ babies

1431 How many C-sections have you had? _____ C-sections

1432 What is the average number of months between your pregnancies? _____ months

1433 Was the baby's father present during the delivery?
 _____ Yes (1) _____ No (0) _____ I don't remember (98)

1434 If no: Why wasn't the baby's father present?
 _____ cultural practice (1)
 _____ he didn't want to (2)
 _____ other (3): _____

VII. Pregnancy Outcome: Now I have a few questions about your childbirth experience and outcome.

1139 Will you get a birth certificate for your baby?
 _____ Yes (1) _____ No (0) _____ I don't know (99)

1140 If not a first time mother: How many healthy children have you delivered? _____ children

1141 If not a first time mother: Did you get birth certificates for your children? _____ Yes (1) _____ No (0) _____ I don't remember (98)

1142 If not a first time mother: Have you delivered any sick children?
 _____ Yes (1) _____ No (0) _____ I don't remember (98)

1143 If yes: How many sick children? _____ children

1144 Why were they sick? _____ no PNC (1) _____ bad spirit (2)
 _____ other (3): _____

1145 If not a first time mother: Have any of your children died at an age <5 years? _____ Yes (1) _____ No (0) _____ I don't remember (98)

1146 If yes: How many children have died? _____ children

1147 Why did he/she/they die? _____ no PNC (1) _____ bad spirit (2)
 _____ other (3): _____

1148 Did their death change your view of PNC?
 _____ Yes, in a good way (1) _____ Yes, in a bad way (2)
 _____ No, did not change (0)

1149 Are you currently enduring any pain or problems from your pregnancy? _____ Yes (1) _____ No (0) _____ I don't know (99)

1435 How many healthy children have you delivered? _____ children

1436 Did you get birth certificate for your children?
 _____ Yes (1) _____ No (0) _____ I don't remember (98)

1437 Have you delivered any sick children?
 _____ Yes (1) _____ No (0) _____ I don't remember (98)

1438 If yes: How many sick children? _____ children

1439 Why were they sick? _____ no PNC (1) _____ bad spirit (2)
 _____ other (3): _____

1440 Have any of your children died at an age <5 years?
 _____ Yes (1) _____ No (0) _____ I don't remember (98)

1441 If yes: How many children have died? _____ children

1442 Why did he/she/they die? _____ no PNC (1) _____ bad spirit (2)
 _____ other (3): _____

1443 Did their death change your view of PNC?
 _____ Yes, in a good way (1)
 _____ Yes, in a bad way (2)
 _____ No, did not change (0)

1444 Did you experience any problems during your pregnancy?
 _____ Yes (1) _____ No (0) _____ I don't remember (98)

1445 If yes: What problems? _____

If not a first time mother: Some women have very difficult deliveries that leave them unable to control their urination or defecation.

1151 Do you have such a problem with urination? ____ Yes (1) ____ No (0)

1152 Do you have such a problem with defecation? ____ Yes (1) ____ No (0)

1153 Have you experienced any other physical problems during your pregnancy? ____ Yes (1) ____ No (0) ____ I don't know (99)

1154 If yes: What problems? _____

Some women have very difficult deliveries that leave them unable to control their urination or defecation.

1446 Do you have such a problem with urination? ____ Yes (1) ____ No (0)

1447 Do you have such a problem with defecation? ____ Yes (1) ____ No (0)

1448 Are you currently enduring any other pain or problems from your previous pregnancy(s)? ____ Yes (1) ____ No (0) ____ I don't know (99)

1449 If yes: What problems? _____

VIII. Knowledge Assessment:

Lastly, I would like to learn more about the things you know about health. If you don't know the answer, it is okay to say "I don't know". We hope to find ways to help people in your community know more about this information in the future.

1500 Is it important to drink a lot of water during pregnancy? ____ Yes (1) ____ No (0) ____ I don't know (99)

1501 Is it important to take multivitamins or prenatal vitamins during pregnancy? ____ Yes (1) ____ No (0) ____ I don't know (99)

1502 Is it bad for the baby if a pregnant woman smokes during pregnancy? ____ Yes (1) ____ No (0) ____ I don't know (99)

1503 Is it bad for the baby if a pregnant woman drinks alcohol during pregnancy? ____ Yes (1) ____ No (0) ____ I don't know (99)

1504 Is it bad for the baby if a pregnant woman uses non-prescription drugs during pregnancy? ____ Yes (1) ____ No (0) ____ I don't know (99)

1505 Are chemicals such as insecticides, lead, and mercury bad for the baby? ____ Yes (1) ____ No (0) ____ I don't know (99)

1506 Should you avoid heavy exercise and activities during pregnancy? ____ Yes (1) ____ No (0) ____ I don't know (99)

1507 Do you need to stop having sex when you are pregnant? ____ Yes (1) ____ No (0) ____ I don't know (99)

1508 How long does a normal pregnancy usually last? ____ months

1509 How often should you see a doctor during pregnancy? ____ times

1510 How much weight should you gain during pregnancy? ____ kg

1511 What is PNC? _____

1512 Is PNC important? ____ Yes (1) ____ No (0) ____ I don't know (99)

1513 If yes: Why do people need PNC? _____

1514 If no: Why do people not need PNC? _____

1515 Are there problems that PNC can prevent? ____ Yes (1) ____ No (0) ____ I don't know (99)

1516 If yes: What problems? _____

1517 Are there any bad consequences of little or no PNC? ____ Yes (1) ____ No (0) ____ I don't know (99)

1518 If yes: What bad consequences? _____

1519 If you plan on getting pregnant, is there anything you should do before becoming pregnant? _____

1520 What nutrients do you and your baby need while you are pregnant? _____

1521 What foods contain these nutrients? _____

1522 What are possible complications that can happen during pregnancy? _____

1523 What is a premature baby? _____

1524 How much does a premature baby weigh? ____ kg

1525 Are pregnant women who are older than 35 at a higher risk of unfavorable birth outcomes? ____ Yes (1) ____ No (0) ____ I don't know (99)

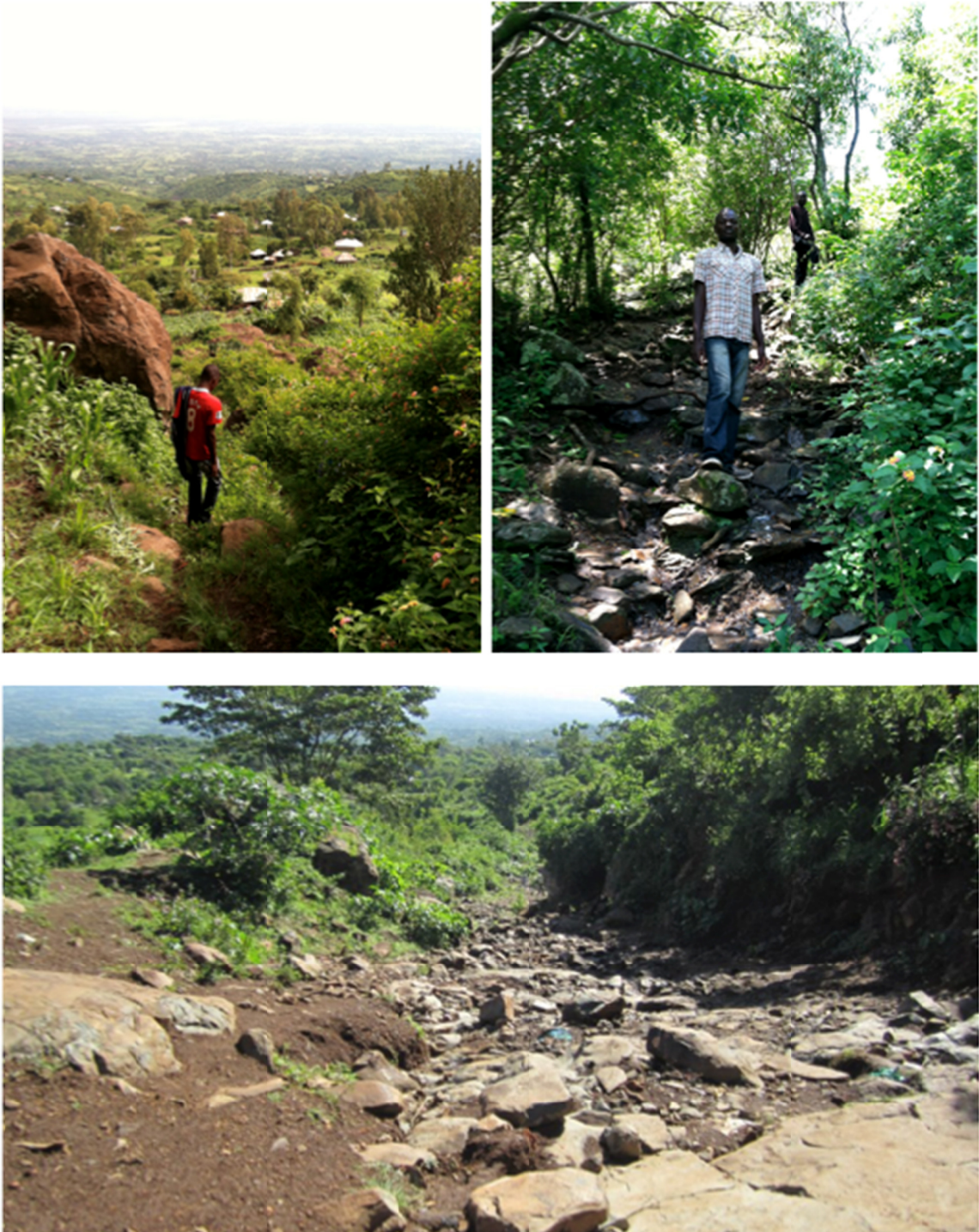
1526 What are possible complications that can happen during delivery? _____

1527 How can you safely deliver a healthy child? _____

That's all the questions I have for you today. Thank you very much for participating in this study. Your participation is very important to our research efforts, and the answers you provided will help to improve the overall health of your community. We look forward to learning more about the health of pregnant women in your village, and we really appreciate your help. Please come visit us at the clinic if you have any questions or concerns.

APPENDIX E

Images of Nyakach Plateau Terrain



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