

**WHAT PAVES THE ROAD TO MATERNAL HEALTH CARE USE?
INVESTIGATING EDUCATION, URBAN-RURAL RESIDENCE,
SOCIAL NETWORKS AND SUPERNATURAL BELIEFS IN THE
FAR-NORTH PROVINCE OF CAMEROON**

by

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Abstract

Every day, 1500 women die in pregnancy or due to childbirth related complications worldwide. Sub-Saharan Africa has the highest rates of maternal mortality. Maternal health care use is critical in reducing maternal mortality worldwide. Cameroon has one of the highest maternal mortality rates worldwide (over 1000 deaths per 100,000 live births), but there is little knowledge about maternal health care use in the Far-North province. The purpose of this study was to examine the role of education, urban and rural residence, social networks, and cultural beliefs on the use of maternal health care use in the Far-North province. A maternal health questionnaire was completed by 110 Cameroonian women between the ages of 18-45. Participants were recruited door-to-door in the urban town of Maroua and rural village of Moutourwa in the Far-North province. Questionnaires assessed maternal health care history, social networks and demographics. Follow-up interviews were conducted with nine questionnaire participants to gain a greater understanding of how daily activities, food consumption and beliefs in the supernatural impact maternal health care use. Poisson regression analyses were used to determine the association among education, social network characteristics, urban and rural residence, and maternal health care service use in Maroua and Moutourwa. Thematic analysis of semi-structured interviews revealed themes of witchcraft, diet and social ties. Women in the rural sample had a greater risk of failing to seek prenatal consultations than women in the urban sample (RR: 0.73; 95% CI: 0.61-0.88). When stratified by urban/rural location, education played a greater role in women's use of prenatal services in Moutourwa (RR: 0.69; 95% CI: 0.50-0.94) compared to Maroua (RR:

0.66; 95% CI: 0.41-1.06). Qualitative analyses suggested that beliefs in witchcraft may deter women from speaking about pregnancy, and that mothers often believe that envious women can cause harm to mother and child through the use of witchcraft. Social network analysis revealed that women who belonged to a women's organization were more like to use prenatal services (RR: 1.31; 95% CI: 1.07-1.62). Both qualitative and quantitative findings have implications for maternal health interventions in the Far-North province of Cameroon.

Co-Authorship

This thesis presents the original work of Sarah McTavish in collaboration with her advisor, Dr. Spencer Moore.

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Chapter 1

General Introduction

In 1987, the United Nations Fund for Population Activities, the World Health Organization (WHO) and the World Bank gathered in Kenya for the Safe Motherhood Initiative Convention. This marked the first global effort to address high levels of maternal mortality (Mahler, 1987). However, high rates of maternal mortality remain. In 2002, the eight Millennium Development Goals (MDGs), which include halving extreme poverty, halting the spread of HIV/AIDS, and reducing infant and maternal mortality, were established. The most unsuccessful of these targets is MDG -5, which aims to reduce maternal mortality by 75% by 2015. The World Health Organization (WHO) states that worldwide 1500 women die each day, or one a minute, in pregnancy or due to childbirth related complications. It is estimated that over half of these deaths are in sub-Saharan Africa, with a maternal mortality ratio of 910 deaths per 100,000 live births (WHO, 2006). The under-5 years of age mortality rate is also a devastating rate of 170 deaths per 1000 live births in Africa (WHO, 2006).

Utilization of maternal health care services has been acknowledged by health agencies as a major factor in maternal and child mortality in countries in the global South (Raghupathy, 1996). Maternal health care services are crucial for women to avoid pregnancy-related complications like hemorrhaging, infection, eclampsia, toxemia and mortality (Smith & Sulzbach, 2008). Access can be restricted by social, cultural and

economic factors that influence the perceived benefits of using prenatal and postpartum care (Smith et al., 2008). More specifically, the economic status of a family, women's education and access to finances, proximity to services and the overall health-related beliefs of the household can all affect medical decisions. Issues of transportation, user fees, and loss of labour in the household can also be deterrents to seeking health care, specifically maternal health services (Smith et al., 2008). Adequate maternal care is also less likely to be pursued if the pregnancy is unplanned or unwanted (Magadi, Madise & Rodrigues, 2000). Furthermore, shortages of skilled medical workers and insufficient and unequal allocation of resources create obstacles for women accessing care. In general, access to trained medical professionals, family planning services, clean water and a nutritional diet are crucial to maternal health. Previous studies in West Africa have suggested that education, income, and urban and rural differences all play a crucial role in access to maternal health care (Obermeyer and Potter, 1991; Gyimah, Takyi & Addai, 2006). The economic status of a family, women's access to finances, as well as geographic location can all affect use of maternal health care services (Magadi, et al., 2000; Magadi, Agwanda & Obare, 2007).

1.1 Cameroonian Context

Cameroon is one of the fourteen countries in the world that in 2005 had a maternal mortality ratio of over 1000 deaths per 10 000 live births (WHO 2006). There are considerable health disparities between provinces in Cameroon. In the Far-North province for example, the under 5 years mortality rate is more than 184 deaths per 1000

live births, compared to the North- West province which has between 99-110 deaths per 100 000 live births (WHO, 2004). The WHO states that in Cameroon, 25% of child deaths under five are due to neonatal cases (WHO, 2003).

Cameroon has a population of approximately 18.8 million people (UNFPA, 2009). It lies in what is commonly referred to as the “armpit” of Africa; bordering Nigeria and Chad to the north, Central African Republic to the east, Congo, Gabon and Equatorial Guinea to the south and the Atlantic Ocean to the west. Cameroon has earned the nickname “the miniature Africa” because of its geographical, linguistic and cultural diversity. The climate ranges from tropical rain forest along the coast to arid, desert- like conditions in the Far-North. Despite these extremes, Cameroon also has fertile, volcanic soils, vast savannas and cool plateaus in the west and northwest. This diversity has allowed the production of many different kinds of export crops, primarily: cocoa, coffee, groundnuts, cotton, palm products, bananas, tobacco and rubber (DeLancey, 1986). The production of these food crops has meant that despite a growing population, Cameroon has remained largely food self-sufficient (DeLancey, 1986). Continued agricultural growth has supported the development of industries like textiles and processed foods, which use domestically raw materials and created a market for these products. The growth of the agricultural sector has greatly supported the development of the Cameroonian economy (DeLancey, 1986).

Cameroon was established as a German protectorate in July 1884 (Gros, 2003). Between 1884 and 1914 there were several violent outbreaks between Cameroonians and

Germans troops over German attempts to expropriate land around Douala, conscripted labour, taxes Despite having over 250 ethno-linguistic groups (Gros, 2003). German control over *Kamerun* ended with the start of World War I in 1914. In 1916, England took charge of approximately 10 percent of the former *Kamerun*, while France occupied the remaining 90 percent (Gros, 2003). It is speculated that the British were more interested in securing colonies in eastern and southern Africa, specially the take-over of Tanzania, than controlling a larger piece of Cameroon. Unlike Britain, which maintained limited and indirect involvement in Cameroon, France developed commercial agriculture and livestock cooperatives in the 1920s (Gros, 2003). The French invested 80 million French francs in Cameroon from 1947-1953, which was more than was spent in all of their central Africa colonies (Chad, Congo-Brazzaville, Gabon and Central Africa Republic) combined (Gros, 2003). However, most of this investment was in extending the railroads and in establishing the port in Douala. It was not until the end of the colonial rule in the late 1950s that the French began investing in education and health care (Gros, 2003).

Cameroon has maintained relative stability since gaining independence from France in 1960 and Britain in 1961 (West, 2004). However, opposition to the current President Paul Biya exists from the Anglophone separatist movement in North-Western Cameroon. President Biya has held power since 1982 and was re-elected in 2004 for a seven-year term (West, 2004). It is speculated that if Biya runs for office in 2011, he will

be met with strong opposition from Anglophone communities who have had little-to-no representation in the current government.

There are many forms of health care that co-exist in the Far-North province: small rural clinics, spiritual healers, and traditional plant and herb vendors. It is common for people to use multiple treatments for the same condition, pregnancy and childbirth included. As part of understanding maternal health care use in the Far-North, informal discussions about birthing practices were conducted with traditional birth attendants (TBA) and midwives in public and private clinics in Maroua and Moutourwa. These examples of health care help to illustrate some of the different forms of maternal care available; however, not all forms are equally accessible to women in Maroua and Moutourwa.

1.2 Home Birthing Practices

Home deliveries usually take place at women's marital home or at the home of the TBA. Women are instructed to sit on a stool, bench or rock while the TBA massages oil on to the stomach. A female family or community member will also rub oil on the lower part of the back; this is done until the baby is born. Traditionally, the outer layer of sugar cane was used to cut the umbilical cord, but now a razor blade is used, and often reused, if one can be found. A piece of string is tied to the umbilical cord and alcohol is used to sterilize the area. Soon after birth, cold water is poured on the baby to make it cry soon. TBAs accept many forms of payment for their work including soap, fish, flour and beans. The most important form of payment is a clay-like mixture used to protect the birth

attendant from going blind. If the TBA sees too much blood during delivery, evil spirits can destroy her vision. After each delivery, the TBA throws a mixture of clay and ash over her shoulders - this is said to satisfy the spirits and avoid blindness. Monetary compensation for deliveries is rarely provided. Birthing practices are usually passed down from mothers and mother-in-laws to their daughters, but none of the current generation of TBAs had taught their daughters how to deliver a baby. While all alluded to increases in hospital deliveries, one TBA stated,

“More and more women are delivering at the hospital, but some still stay at home and give birth with a family member” (Traditional birth attendant, Moutourwa).

1.3 Hôpital de Moutourwa

The Moutourwa clinic services the entire district of Moutourwa which includes Moutourwa centre, Babjava, Ganaha and Mouda. The distance from Mouda to Ganaha is approximately 30km and the clinic is located in the centre of Moutourwa. Prenatal consultations are offered at the clinic for an initial fee of 1000 CFA or \$2.00 CND and all subsequent visits are free. To deliver in the clinic it costs 3000 CFA or \$6.00 CND. To contextualize, 33 percent of the Cameroonian population live on less than US \$1.25 a day, and this rate is likely much higher in the Far-North (UNICEF, 2007). On the first visit women are weighed, measured, and tested for HIV, malaria and iron levels. If supplies are available, women are also given anti-malarial medications, iron supplements and mosquito nets at their first visit. At the Moutourwa clinic, it is recommended that pregnant women return every two months for a prenatal check up, although the midwife

at the clinic said that very few women come for more than one prenatal visit. There is one formally trained doctor and three midwives on staff at the clinic in Moutourwa. The midwife at the clinic speculated that women are motivated to come to visit the clinic either at the beginning of their pregnancy to obtain medication or supplies, or towards the end to find out when they might deliver. There are, however, no ultrasounds at the clinic. There were no records of how many women came for prenatal consultations or who delivered at the facility. Women who deliver at the clinic are required to provide their own medical supplies, which include: gauze, bandages, five pairs of rubber gloves, antiseptic ointment, rubbing alcohol and a litre of bleach. If the expectant mother does not arrive with these supplies, the family is asked to purchase them either from the hospital, if available, or from the nearest vendor. It was estimated that there is a stillbirth rate of 10% although no record was kept of maternal mortality. The main complications for women were severe bleeding during childbirth or shortly thereafter. It was also noted that women leave quickly after delivery instead of waiting the recommended six hours, and often the whole family congregates at the hospital.

“When women deliver here it’s like market day - the whole family is present. So many people at the clinic cause problems!” (Midwife, Hôpital de Moutourwa).

1.4 Hôpital Central de Maroua

The provincial hospital of Maroua is centrally located in town and is the only government-run health facility in the region. It is a large hospital with several wards, but not all function regularly. Other smaller private facilities in Maroua often refer

complicated cases to Hôpital Central, because it is known to have more available resources and supplies. There are teams of 2-3 midwives who work in the maternity ward 24 hours a day. There is one doctor affiliated with the ward who can be contacted if complications arise. Despite being a public facility, it costs 6000 CFA or \$12.00 CND to deliver at the clinic. Women and their families are required to provide the same medical supplies as at the Moutourwa clinic, but they can stay at the hospital as long as they wish after delivery. However, as in Moutourwa, women were reluctant to stay in the Hôpital Central after giving birth. The head nurse stated that women often leave the hospital within an hour after giving birth and that this is a major problem for maternal health. She elaborated by saying

“Women are still on the table and already the husband has brought the motorbike around to pick them up” (Hôpital Central de Maroua).

Women who know about the complications of childbirth or those who have had problems with previous pregnancies will stay, but those cases are rare. Unlike the clinic in Moutourwa, there were records kept of still births, maternal mortality and cesarean sections. At Hôpital Central there is an average of over one hundred births per month and there were 34 reported for the week preceding my visit (August 17th-23rd/09). The following table outlines stillbirths, maternal deaths and delivery by cesarean section from January to July 2009.

Table 1. Maternal health at Hôpital Central

Hôpital Central	Stillbirths	Maternal Deaths	Delivery by
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de Maroua 2009			Cesarean section
January	6	1	10
February	4	0	5
March	7	0	9
April	12	1	7
May	11	2	7
June	9	1	13
July	10	0	8
August	n/a	n/a	13
Total	59	5	62

Complications during delivery were attributed to hemorrhaging and a long labour, usually due to unusual positioning of the baby, and the lack of prenatal consultations were the main cause of stillbirths.

1.5 Centre de santé Catholique de Maroua

The Catholic missionary hospital of Maroua is a small facility with a private maternal health clinic. Prenatal consultations and delivery services are available, however they are relatively underused compared to services at the Hôpital Central. From January to July 2009, only 294 women sought prenatal consultations at the clinic. There is a staff of seven midwives who offer prenatal consultations for 2,500 CFA (\$5.00) and delivery services which cost 7,500 CFA (\$15.00). The first prenatal consultation includes tests for

HIV, malaria, and iron deficiencies, weight and circumference measurements. The midwife at the clinic believed that fewer women use their clinic because the services are more expensive than at the provincial hospital, and it is a Catholic-run facility in a predominately Muslim city.

1.6 Primary Thesis Objectives and Hypotheses

The objective is to understand how education, urban and rural residence, social networks and cultural beliefs about the supernatural affect use of maternal health care services in the Far-North province of Cameroon.

Three hypotheses guided the proposed research. First, it was hypothesized that use of maternal health services will be higher in urban areas, due to ease of access and proximity to health facilities and higher levels of female education. Second, since health care services are more limited in rural areas, it was hypothesized that education would play a greater role in women's use of maternal services in rural areas compared to those in urban areas. Third, it was hypothesized that women with larger and more active social networks would have increased use of maternal health services, especially in rural locations. Yet, my field interviews and observations led me to think more critically on how social networks might play a role in the Cameroonian cultural context. Cultural beliefs in the supernatural and witchcraft seemed to implicate not only women's willingness to use maternal health care services but also who they were willing to speak to about their pregnancies. Rather than network size being more important, it may be that the composition of a woman's social networks is important in their use of maternal health

care services. As such, it is therefore hypothesized that women with more educated social networks will have an increased use of prenatal services.

1.7 Research Assistants

This research was conducted with the help of three Cameroonian research assistants. Doudou Bakari is a former colleague and close friend in Maroua. She has lived in Maroua for many years and knows the city well. During the school year, (September-May), Mme Doudou teaches French at a local secondary school, but because the research took place in August, she was eager to help with the proposed study and earn some extra income. Asta Beatrice was the second research assistant in Maroua. She is a close friend of Mme Doudou's whom I had met on several occasions in 2006/2007. Mme Asta is a primary school teacher and has experience working as a research assistant for a local NGO. When she heard of my research and return to Cameroon she offered to help. Mme Doudou had to travel for several weeks and Mme Asta assisted with the questionnaires, interviews and accompanied me on all the hospital visits in Maroua. My third research assistant was Didja Adama. Mme Didja is a national volunteer with Canadian University Services Overseas - Voluntary Service Overseas CUSO-VSO and is the counterpart of the international volunteer who is currently working in Moutourwa. Mme Didja is from Moutourwa and speaks Guiziga (the local language in Moutourwa). Her work with CUSO-VSO is mainly conducted in schools, so like Mme Doudou, she was be unemployed in August. I had not met Mme Didja before my fieldwork began, but she

came highly recommended and praised for her facilitation skills. Her knowledge of Moutourwa and understanding of maternal health was a tremendous asset to my research.

1.8 Reflexivity

When conducting field-research, it is important to consider the position of the researcher in regards to their work. I was in a privileged position to be able to return to Cameroon to conduct fieldwork. My previous experience in Cameroon undoubtedly influences my current research. It has been crucial for me to reflect upon previous and current experiences and perceptions. My choice of topic, location, methods and research assistants are all influenced by my year and a half's work experience with VSO Cameroon in the Far-North province of Cameroon. My work as Reproductive Health Outreach Officer and Mainstreaming Coordinator heightened my awareness of how inequalities of resource distribution, lack of education and corruption all affect the stability and health of the region. My friends, colleagues and neighbours all played a role in shaping my experience and understanding of Cameroonian cultural traditions and lifestyle. I have maintained contact with VSO Cameroon since my departure in December 2007. I also acknowledge that being a Caucasian woman with a Western upbringing and education has influenced the questions I posed and research focus I chose. The decision to study use of maternal health care services was in part due to conversations with Cameroonian women about their health and the health of their children and in consultation with my research assistants. A common concern is that by the time women arrange enough money to pay hospital fees and transportation, complications have

already arisen for the mother, child or both. I was also made aware of the lack of prenatal services available when a close colleague was pregnant. I am grateful for these influences and shared experiences; however, it is important to acknowledge my biases. This awareness will help me separate or bracket previous perceptions from new experiences, informants and research settings.

1.9 Thesis organization

This thesis conforms to the regulations outlined in the Queen's School of Graduate Studies and Research "General Forms of Theses." Chapter two contains the first manuscript which quantitatively explores the relationship between education, urban and rural residence and maternal health care use. Chapter three qualitatively explores how cultural beliefs about witchcraft, diet and behaviour changes during pregnancy. Chapter four explores social networks and maternal health care use using a mixed methods approach. Chapter five contains a general discussion of the findings followed by future research directions and intervention strategies.

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Chapter 2

Reading, writing and rurality: maternal health care use and education in an urban and rural context in the Far-North of Cameroon

2.1 Introduction

Sub-Saharan Africa has the highest level of maternal mortality of any world region with 920 deaths per 100,000 live births (UNICEF, 2009). Maternal mortality rates in Canada are 7 deaths per 100,000 live births compared to Cameroon where maternal mortality rates in the year 2005 were 1000 per 100,000 live births (UNICEF, UNFPA, & WHO, 2005). The 1987 Safe Motherhood Convention marked the beginning of the global effort to decrease maternal mortality rates (Mahler, 1987). The fifth Millennium Development Goal (MDG) aims to reduce maternal mortality by 75% by 2015, but unfortunately, this goal will not be achieved (Hogan, Foreman, Naghavi, Ahn, Wang, Makela, Lopez, Lozano, & Murray, 2010). Access and use of maternal health care services, both prenatal and at delivery, is crucial in reducing the likelihood of infection, hemorrhage, hypertensive disorders and obstructed labour that are the main causes of maternal mortality (Nour, 2008). There are many factors that hinder women's use of maternal health services. Some of the most influential factors are women's education, the economic status of the family, women's access to finances and proximity to health services (Gyimah, Takyi, & Addai, 2006; Magadi, Madise & Rodrigues, 2000; Magadi, Agwanda & Obare, 2007; Obermeyer & Potter, 1991).

Studies have also examined the correlation between accessing maternal health care services and proximity to health services. The closer a family is to a maternal health clinic, the more likely it is they will access maternal health services (Magadi et al., 2000). Rural areas, specifically in Africa, lack health care facilities and services. This is because most major hospitals and employment opportunities are located in urban centres and consume large amounts of the overall health budget (Kwast, 1989). Inadequate national health budgets have forced many African countries to introduce user fees in public or government-run facilities, regardless of location (Smith & Shulzbach, 2008). In cases like Nairobi, Kenya, individuals who live in urban areas are increasingly less likely to access care, despite being closer to services (Magadi, 2003). The urban poor in cities like Nairobi are increasingly marginalized into informal settlements on the periphery of the city where health services are sparse and often restricted by local governments. Magadi (2003) reports that Nairobi slum residents are significantly less likely than residents living outside informal settlements to access maternal health services. Rural residents often face greater obstacles in accessing health care. The cost of transportation, increased time spent away from the family home, and the level of safety and cultural appropriateness for women traveling alone can deter women from seeking care (McCray, 2004). In rural areas, it is likely that these challenges exist for educated and non-educated women alike. The urban/rural comparison is complex in Africa. In many African countries, rural inhabitants are increasingly migrating to urban centres in search of employment, education and health care.

Studies conducted in southern Cameroon and in other West African countries have shown that education tends to increase a woman's income, confidence and willingness to pursue health care services outside the home and community (Defo, 1997; Gyimah et al., 2006). Maternal mortality and child health are inextricably linked, and education has been shown to have a positive effect on both. Analyses using data from the World Fertility Survey indicated that there was a linear relationship between maternal education and childhood mortality, with a 7-9% decrease in child mortality ratios with every year of increment in maternal education (Cleland & van Ginneken, 1988). Maternal mortality has generally been difficult to measure. Recent efforts have included sibling histories in the Demographic and Health Survey (DHS) and incorporating questions about maternal health in local censuses (Hogan et al., 2010). There has been little documented research on maternal mortality or service use in the in the Far-North province; however, the WHO estimates that the under 5 years mortality rate is more than 184 deaths per 1000 live births compared to the North- West province of between 99-110 deaths per 100 000 live births (WHO, 2004). This disparity among provinces is likely due to the lack of health care facilities, resources and education in the northern parts of the country. At least 25% of child deaths under five are due to neonatal cases in Cameroon. Increasing the use of maternal health care services is therefore crucial for the health and survival of Cameroonian women and children (WHO, 2003).

2.2 The Cameroonian Education System

In 2000, the Cameroonian government publicly declared primary education compulsory for all. The Constitution says that “the State shall guarantee the child’s right to education” and that “primary education shall be compulsory” (Tomasevski, 2006). While the government has avoided stating overtly that education is free, it maintains that there is equal opportunity for access to education (Tomasevski, 2006). Unfortunately, there is little enforcement of this policy and no repercussions for non-abiding families (Fonkeng, 2006). Cameroon has a public expenditure rate per primary school student of 8% of the GDP per capita and a primary school completion rate of 55% (World Bank, 2009). In comparison, 72% of children in Nigeria complete primary school (World Bank, 2009). These rates are presumably much lower in the Far-North province. The Cameroonian education system was reworked in 2005, and the National Ministry of Education was divided into three separate ministries: the Ministries of Basic Education, Secondary Education and Superior Education. There is a provincial delegate for each of the three ministries located in the respective province. There are also educational inspectors for each *arrondissement*, and the inspectors act as the direct link between the schools and the ministry. In the three *arrondissements* in Maroua, there are a total of 47 inspectors, only one is female.

Provincial primary schools are entitled to qualified, state-funded staff, including the school principal. However, due to shortages and high levels of corruption, it is very rare, especially in the Far-North, to find a school with a full range of qualified, state-

funded teachers. As a result, schools are forced to find extra teachers themselves. These individuals are known as *vacataires* and may be trained teachers who are unable to find work or untrained members of the community. They have no fixed contract and often change schools from year to year depending on available positions. This leads to instability, lack of continuity and, in part, explains inconsistencies in quality of education (VSO Education brief, 2007). Trained teachers who have been recognized within the state system usually work unpaid for the first year, often more, of service. Teachers must travel to Yaoundé after a year and present themselves to have their pay recognized and allocated. This tradition means that teachers are often absent for months at a time, and schools must spend a part of their budget on supplying substitute teachers.

Despite the Cameroonian government's repeated claims that all children have access to primary education, this is not the case in practice (Tomasevski, 2006). Schools are not provided with enough funds to operate and are forced to charge fees for each student. In theory, these fees go towards paying the salaries of *vacataires* and new teachers who have not begun receiving their government cheques; however, corruption and lack of accountability often result in missing funds, unpaid teachers, dilapidated buildings, and poor quality teaching and learning. At the secondary level, parents must pay school fees and inscription fees; the government does not provide, nor claims to provide free secondary education. The Cameroonian school system also experiences large inefficiencies due to high repetition of classes, poor pass rates in official examinations and disparities in performance between urban and rural schools.

Female literacy is approximately 14% in the Far-North province compared to the national female literacy rate of 59% (UNDP, 2007 and GIC Avenir Femme, 2003). Early and arranged marriages as well as polygamy are widely practiced, and it is estimated that in the Far-North between 30-40% of girls drop out of school to get married (GIC Avenir Femme, 2003). This is reflected in secondary school enrolment rates, with an estimated 39% of girls' and 71% of boys' attendance in the Far-North (VSO annual education report, 2006). Considering local marriage practices, high repetition rate for primary school students and little enforcement of school attendance, especially in rural areas, it is not surprising that female education rates in the Far-North are low.

2.3 Setting - The Far-North

The Far-North province is approximately 500km from the administrative capital of Yaoundé and the financial capital of Douala (appendix A). This isolated and hard to reach corner of the country does not have the human or physical resources of the southern provinces. Items coming from the south often suffer lengthy delays and many medical professionals are unwilling to work in the north because of its isolation, lack of resources and extreme temperatures. Due to disproportionate and alarmingly low levels of female education, organizations like CUSO-VSO are working with schools and local ministries of education to encourage mothers' involvement in parent-teacher associations and the promotion of education and delay of marriage for young women.

Currently, however, there is no active community organization in the Far-North that researches or promotes maternal health. Small missionary hospitals do provide

educational sessions for expectant mothers, and the United Nations Population Fund did have maternal health initiatives in the Far-North, but these efforts are either not widespread or have ceased to exist. For local and international organizations to address maternal health care challenges in the Far-North, more research is needed on the role that urban and rural residence, education and social networks play in women's use of maternal health care. Two research questions guide this research. First, it is hypothesized that use of maternal health services will be higher in urban areas, due to ease of access and proximity to health facilities and higher levels of female education. Second, since health care services are more limited in rural areas, it is hypothesized that education will play a greater role in women's use of maternal services in rural areas compared to those in urban areas.

2.4 Study Design and Methods

Participants

This study used convenience sampling to obtain a sample size of 110 women between 18-45 years old who had given birth in the past five years (M age = 28.5 years, $SD = 6.3$). The author carried out two months of intensive fieldwork in the Far-North province of Cameroon during August and September 2009. Two fieldwork sites were used for this study: Maroua, the provincial capital of the Far-North, and Moutourwa, a rural community approximately 50 kilometres south of Maroua. Participants were recruited door-to-door in six different neighbourhoods in Maroua ($n= 50$) and five in Moutourwa ($n=60$). To be included in the study, women had to be residents of Maroua or

Moutourwa and have given birth in the area. These locations were selected due to available logistic and research support and accessibility during the time of fieldwork (rainy season). Maroua has an estimated population of 200, 000. It is the only city of its size in the province and the closest urban area to the Chadian capital, N'djamena. It has numerous secular, government-run primary and secondary schools as well as private Islamic schools. Moutourwa centre has a population of approximately 3,000 inhabitants which encompasses smaller villages like Ganaha and Badjava that were also included in the sample. Only one woman per household participated in the study in order to maintain consistency and variability.

2.5 Procedure

In each field site, questionnaires were administered to participants to elicit detailed information on participant's socio-demographic background and maternal health care practices. Doudou Bakari and Asta Beatrice were my research assistants and translators in Maroua and Didja Adam in Moutourwa. Before questionnaires were initiated, women were provided with information about the aims of the research and their rights as potential study participants; they were also asked to sign a consent form or verbally agree if they chose to participate. All information was read aloud to potential participants in French, Fulfulde or Guiziga. The questionnaires were administered wherever the participant felt most comfortable, usually in the home or just outside but within the family compound. The questionnaires were administered in the participant's preferred language. Typically, French and Fulfulde are spoken in Maroua and French,

Fulfulde or Guiziga in Moutourwa. Ethics approval was obtained from Queen's General Research Ethics Board (GREB) before this research began.

Women in the Far-North, especially those with children, tend to stay close to home, so recruiting door-to-door was the most appropriate way to reach participants. Due to the high levels of illiteracy in the Far-North, recruitment information, consent forms, and the questionnaire were read aloud in the language of the participant's choosing. In each neighbourhood in Maroua, with the exception of Dougoy, there was an initial point of contact or gatekeeper. Usually a friend or relative of Mme. Doudou's or Mme. Asta's living in the area would introduce us to potential participants. Often one participant would refer us to other women in the neighbourhood who were eligible to participate. Depending on the neighbourhood in Moutourwa, some women knew Mme Didja, but many did not. Working in Moutourwa was facilitated by the presence of CUSO-VSO. The community has established a pattern of working with CUSO-VSO volunteers for the past eight years and has been successful in their school development plans, work with the communes and Moutourwa secondary school. By recruiting in different neighbourhoods, a more diverse sample of women was obtained. Women in the study were from ten different ethno-linguistic groups with education levels ranging from no formal schooling to university educated.

2.6 Maternal health Questionnaire

The maternal health care questionnaire had 35 items and contained three main sections: (1) personal history of maternal health care practices, satisfaction and perceived

importance of using these services, (2) social support networks relevant to maternal health care, and (3) socio-demographic background. The maternal-care section was based on questions from World Health Survey (WHS) 2002 individual questionnaire (WHO, 2002). The questionnaire assessed number of live births, the most recent child born in the past five years, the type of care given during pregnancy and delivery, location and the mother's perceived importance of maternal health care. Finally, the demographic section of the questionnaire assessed participants' age, marital status, ethnic group affiliation, employment status and education. Levels of education were categorized as 1) no formal education, 2) some primary education, 3) primary school completed, 4) some secondary school, 5) secondary school complete and 6) college or university attended. The questionnaire took approximately twenty minutes to complete.

2.7 Measures

The independent variables used in this analysis were urban and rural residence, educational level, with adjustment for a woman's age category. Marouan participants were classified as from an urban setting; Moutourwan participants were classified as residing in a rural setting. In the questionnaire, there were six categories of education. Given the skewed distribution of the education variable, it was dichotomized into no formal education or some formal education. Age range was used instead of the age variable because 34% of participants did not know their actual age.

2.8 Statistics Analysis

Before analyses began, all data were cleaned and checked for any missing values. Frequencies were conducted to check for missing data and errors. The outcome variable was the number of times a woman reported having seen a health care provider during her last pregnancy. Given that the outcome was a count, Poisson regression was used to examine the association among education, urban/rural residence, age, and maternal health care use. First, using the full sample, the association among urban and rural setting (i.e., Maroua and Moutourwa respectively), education, and maternal health care use was examined, while adjusting for age range. Second, the sample was stratified by urban/rural setting. The overall sample was then stratified by urban/rural residence. Poisson regression analysis was then conducted in the stratified sample to examine the association of education with use, while adjusting for age range. Relative risks (RRs) were computed and reported along with 95% confidence intervals (CIs). All data were analyzed using Statistical Package for the Social Sciences (SPSS) version 17.

2.9 Results

Table 2 provides descriptive information on the demographics and maternal health care use of the sample. There were 60 participants in Moutourwa and 50 in Maroua. Among the 110 participants, 13 percent reported not seeing a health care provider during their last pregnancy – 19 percent of the women sampled in Moutourwa and only 6 percent in Maroua. Of the women sampled, in Moutourwa 37 percent had no formal education, whereas in Maroua only 10 percent of women had never been to

school. However, only 47 percent of the sample reported being able to read and understand a newspaper article. In Moutourwa, 53 percent of the women sampled gave birth at the local hospital and 47 percent gave birth either at their own or their parents' home. In Maroua, 88 percent gave birth at a hospital, clinic, or other health facility. Regardless of the location of delivery, 62 percent of women stayed less than an hour at the place where they gave birth. On average, women in Moutourwa had 3.4 prenatal visits and 5.4 in Maroua.

In analysis one, women in the rural area of Moutourwa had a greater risk of not seeking prenatal consultations than women in the urban area of Maroua (RR: 0.73; 95% CI: 0.61-0.88). Women with no formal education (RR: 0.67; 95% CI: 0.52-0.87) compared to those with some education were more at risk of not seeking maternal health care services. Age range was not associated with maternal health care use. In the stratified analysis, education was shown to be associated with women's use of prenatal services in Moutourwa (RR: 0.69; 95% CI: 0.50-0.94) but not in Maroua (RR: 0.66; 95% CI: 0.41-1.06). Age range was not significant in Maroua or Moutourwa

2.10 Discussion

The main objective of this study was threefold: 1) examine the frequency of use of maternal health care services in Maroua and in Moutourwa, 2) assess the role of maternal education in the use of prenatal services and 3) assess whether the role of maternal education varied according to the urban or rural residence of study participants. Both the quality and quantity of the pedagogy in schools in the Far-North is largely

unpredictable. In a system where schooling is not mandatory, pupils begin school at a variety of ages. With high class repetition rates and inconsistencies in schools fees, parents are often not willing to send all of their children to school, and will chose only to send some, sporadically. Furthermore, because of widespread corruption, there is an overall distrust and hesitation to pay school tuition when the federal government preaches “universal education for all” (Tomasevski, 2006). Many schools lack washroom facilities and it is common for young women, especially Islamic women, to quit school before puberty for fear of immodesty and embarrassing the family.

Results from both Maroua and Moutourwa showed, as other studies in Africa have demonstrated, that women with some levels of education are more likely to use maternal health care services more frequently than those with no formal schooling (Beegle, Frenkenberg & Thomas 2001; Gyimah et al., 2006; Magadi, et al., 2000; Magadi et al., 2007; Obermeyer et al., 1991). It is unlikely that many young women are being taught about the importance of prenatal services in school in the Far-North. From the author’s previous research conducted with CUSO-VSO in schools in the Far-North, reproductive health, if taught at all, is only included in the upper secondary school curriculum and often focuses largely on HIV/AIDS education and not on family planning or maternal health. Maternal education can shift family power dynamics away from the kin group or male head of household and allow women greater responsibility for their health and health of their children. Female education increases women’s potential in the labour market, access to, and negotiation of financial resources; it also increases self-

awareness and acceptance of modern medical practices and overall social-economic status (Gyimah et al., 2006; Magadi, et al., 2000; Magadi et al., 2007; Obermeyer et al., 1991; Raghupathy, 1996). Female education is also used as a measure of power within the household. More powerful women often assert their choices for birth control and use of prenatal health care services (Beegle, et al., 2001).

There are many factors which explain why women in Moutourwa are less likely to use maternal health care services than women in Maroua. Their distance from the Moutourwa clinic is a deterring factor for many pregnant women in the Moutourwa area. While the clinic is centrally located, for women who live in surrounding areas, accessing the clinic would take several hours on foot. Women may be unable to take extended periods of time away from domestic responsibilities, such as cooking, fetching water, fieldwork and child care, and may lack the physical strength required to walk several hours in adverse conditions during pregnancy. Transportation is not easily accessible except in the centre of Moutourwa and even a short trip is quite costly. Issues of transportation are further complicated if an infant or child also requires medical care, is too young to be left alone, or if there is no one capable of providing childcare for an extended period of time. Whereas in Maroua, there are several health care facilities that offer maternal health services, and public motorbike transportation is easily accessible. To seek prenatal services, women in Maroua have to spend less time away from home, thus ensuing less cost and loss of household labour. While proximity to health services may largely account for increased use of maternal health care services in urban areas like

Maroua, there can, however, be wide variability in use of maternal health services in urban areas, despite more evenly accessible resources. Reasons such as self-efficacy, beliefs in witchcraft and disease etiology can explain the variation in maternal health care service use in urban areas (Das Gupta, 1990).

Proximity to maternal health services also contributes to the finding that education plays a greater role in women's use of services in Moutourwa than in Maroua. Because services are more easily accessible in Maroua, it is likely that women with lower levels of education are still accessing services. Maroua does not have large informal settlements of large cities like Yaoundé or Nairobi where women often lack access to health care. All clinics and hospitals are no more than a ten minute motorbike ride away in Maroua, and the majority of roads are paved and accessible throughout the year. Educated women in Moutourwa likely have greater access to financial resources, options for childcare, means of public or private transportation and increased negotiation power within the household compared to women with little or no formal education. It is not surprising then that education levels have a greater impact on maternal health care in use Moutourwa compared to Maroua. Pregnancy, delivery and early childhood health usually fall within the female domain, and knowledge about and access to western medical services is associated with the male domain (Beegle, et al., 2001; Hampshire, 2002). Evidence suggests that women stand to benefit more from investments in education than men, although husbands' education is a determinant of maternal health care service use (Beegle, et al., 2001; Raghupathy, 1996).

Local and international organizations are working to increase female education, encourage women to stay in school longer and involve parents in the schooling system in the Far-North province. However, for large-scale change to take place, the national education structure in Cameroon would need to improve transparency about how money is spent, allocate funds appropriately and evenly throughout the country, and ensure that educational exams are fair and appropriate for all students. Maternal health services need to be made more accessible to women in rural areas like Moutourwa. Mobile health clinics have been implemented in rural areas of KwaZulu Natal South Africa in an attempt to increase prenatal consultations. These clinics were placed between 5 and 10 km from established clinics and offered a range of prenatal services (McCray, 2004). This kind of initiative would work well in Moutourwa if community health workers were trained to work in conjunction with the mobile clinics. Community health workers would visit homes, markets, mosques, churches and other public meeting areas to inform local residents about the importance of using prenatal services and the services available at the mobile clinics. While initial training and start-up procedures would be expensive, mobile clinics may also be more cost effective than establishing permanent clinics in remote areas (Fox-Rushby and Foord, 1996). Hospitals and clinics in the Far-North recommend that women go for prenatal checkups once every two months during pregnancy.

2.11 Limitations

The limitations of this study are that this is a convenience sample of women in Maroua and Moutourwa. Therefore, results are not necessarily applicable to other

populations in Cameroon. While women were selected from a variety of neighbourhoods in both sites, in Moutourwa much of the sample lived within a one-two hour walking distance of the Moutourwa health clinic. This might account for the relatively high proportion of maternal health care use (81%) in Moutourwa. Many of the questionnaires were carried out in Fulfulde and Guiziga, and while I was always present during the questionnaires, it was difficult to assess whether all questions were being asked and interpreted according to the research design. Finally, all data such as education levels, age and number of maternal health care visits were self-reported by participants. With limited research time, there was no means of cross checking to ensure accuracy of the self-reported information.

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Table 2. Descriptive statistics of maternal health care use convenient sample of participants in Maroua and Moutourwa, Cameroon

	Maroua		Moutourwa	
	N	%	N	%
	50		60	
AGE				
18-19	2	4%	6	10%
20-29	31	62%	23	38%
30-39	15	30%	25	42%
40-49	2	4%	6	10%
EDUCATION				
1(No formal education)	5	10%	22	37%
2 (Some primary)	20	40%	25	42%
3(primary complete)	1	.02	0	0%
4(some secondary)	20	40%	13	21%
5(Secondary complete and more)	4	8%	0	0%
Can read and understand newspaper article	37	74%	15	25%
Health professional seen during pregnancy				
Yes	47	94%	49	81%
No	3	6%	11	19%
Number of times services used	5.46 mean		3.46 mean	
Assistance during delivery				
1 (Doctor/specialist)	6	12%	1	1.6%

2 (Nurse/midwife)	40	80%	32	53%
3 (traditional midwife)	0	0	23	38%
4 (parent/friend)	1	2%	1	1.6%
5 (other)	3	6%	1	1.6%
6 (alone)	0	0	3	5%
Location of delivery				
1 (hospital/clinic)	36	72%	32	53%
2 (other health facility)	8	16%	1	1.6%
3 (at home)	4	8%	24	40%
4 (parents' house)	0	0	2	3%
5 (Outside)	2	4%	1	1.6%

Table 3. Poisson regression analysis of setting, education and age range on maternal Health care use.

n=110	Variables	Relative Risk (95%CI)	P-values
Setting	Rural	0.73 (0.61-0.88)	0.001
	Urban	1.00	---
Education	No Education	0.67 (0.52-0.87)	0.003
	Some Education	1.00	---
Age range		1.039 (0.91-1.19)	0.58

Table 4. Poisson regression of maternal health care use on education and age range, stratified by urban/rural residence.

n=110	Variables	Relative Risk (95%CI)	P-values
Urban n=50	No Education	0.66 (0.41-1.06)	0.09
	Some Education	1.00	---
	Age Range	0.94 (0.79-1.12)	0.48
Rural n=60	No Education	0.69 (0.50-0.94)	0.02
	Some Education	1.00	---
	Age Range	1.19 (0.97-1.45)	0.09

Chapter 3

Which witch is which? Maternal health care use and beliefs in the supernatural in the Far-North province of Cameroon

3.1 Introduction

Despite ongoing efforts to improve maternal health care, the Millennium Development Goals-5, which aims to reduce maternal mortality by 75% by 2015, will not be achieved. It is generally acknowledged that limited or no access to maternal health care services is a major barrier in reducing high levels of infant and maternal mortality. The economic status of a family, women's education, access to finances, geographic location and household beliefs and practices around health can all affect use of maternal health care services (Magadi, et al., 2000; Magadi et al., 2007). Cameroon is one of fourteen countries worldwide that has a maternal mortality rate that exceeds 1000 deaths per 100 000 live births, and 25% of child deaths under five are due to neonatal cases in Cameroon (WHO, 2004). While maternal mortality rates in Cameroon are among the highest worldwide, there is little documented data on maternal health care use in the Far-North province. However, the province has an under 5 years mortality rate of more than 184 deaths per 1000 live births compared to the Northwest province of between 99-110 deaths per 100 000 live births (WHO, 2004). This disparity between provinces could be due to different standards and quality of health care facilities, proximity to services, lower levels of education and different beliefs in the negatives outcomes of sorcery.

In many African countries including Cameroon, the discourse on witchcraft is present in all sectors of society including health care, education, sports and politics (Fisiy and Geschiere, 1996). *La sorcellerie* has become a common theme in the Cameroonian media and the topic of much public debate. Even local authorities and government officials, who may be cautious of occult beliefs, engage in discussion about the meaning and influence of witchcraft and are often compelled to intervene in dynamics of sorcery. According to Geschiere, discourses of witchcraft are linked to power and inequality around tension between state control and individual ambition (1996). Witchcraft in Cameroon is commonly used as a cultural framework to understand and gain control over new power relations and inequalities in society (Fisiy and Geschiere, 1996). While beliefs and practices of the occult may seem ‘traditional’, Fisiy and Geschiere argue that witchcraft is often used as a way of making sense of foreign objects and new technologies and can, in fact, work in conjunction with developments like wage labour and consumer goods (1996). If witchcraft is a mechanism used to explain peculiar events in many aspects of society, as well as new and foreign ideas, it is likely to play a role in maternal health care practices in urban and rural areas of Cameroon.

Misfortune or unfortunate circumstances like illness are common topics of conversation in Cameroon. (Feldman-Savelsberg, 1999). The Bangangté of North-Western Cameroon and the Zande of Sudan understand the distinction between natural events and those due to tradition as fluid, and illness and biological change can occur because of breaking taboos, witchcraft, or ancestral conflict (Evans-Pritchard, 1976 and

Feldman-Savelsberg, 1999). It is common in the Far-North province for unfortunate events like sickness and death to be attributed to God. The saying, “it is the will of God” or “God willing” is explanation for a wide range of events from simple inconveniences like arriving late to work, to tragic events of someone’s child dying suddenly of an unknown illness. Many ethnic groups in Africa seek to explain misfortune through witchcraft and the presence of supernatural forces (Fisiy and Geschiere, 1996).

3.2 Setting - The Far-North

The Far-North province of Cameroon is home to many ethno-linguistic groups. The Muslim practicing Fulbe are the majority. Heritage in the Far-North is usually distinguished between Muslim and pagan. Generally, Muslims are Fulbe and all non-Muslim ethnicities, Mundang, Tupuri and Guiziga, are grouped together as pagans (Regis, 2003). Female literacy is approximately 14% in the Far-North compared to the national female literacy rate of 59% (UNDP, 2007 and GIC Avenir Femme, 2003). Arranged marriages as well as polygamy are widely practiced irrespective of religious or ethnic group, and it is estimated that between 30-40% of girls drop out of school to get married (GIC Avenir Femme, 2003). Many forms of health care co-exist in the province: small rural clinics, spiritual healers, and traditional plant and herb vendors. It is common for people to use multiple remedies, both traditional and western, to treat the same illness; this notion is often referred to as medical pluralism (Kleinman, 1980). Pharmaceuticals sold at roadside stands, herbalists, Koranic healers, provincial and missionary-run dispensaries as well as home remedies can all be found in Maroua, the capital city of the

Far-North province. Maroua has an estimated population of 200,000, and is the economic hub of the province and the only city with multiple religious orders, health clinics, schools and shops. It is the only city of its size in the province. Moutourwa is a rural area located about 50 kilometres along a tarmac road from Maroua and home to the Animist Guiziga. Maroua and Moutourwa are the main sites of this comparative study which aims to understand the social and cultural factors that affect maternal health care use and, specifically how beliefs of witchcraft influence maternal health care practices in the Far-North province.

In Cameroon, cultural norms and perception of health care needs vary depending on location, gender, religious beliefs, education, and social status. One of the major challenges of maternal health care use in the Far-North province is the belief in sorcery. A woman who speaks openly about her pregnancy is seen as immodest, and boasting can cause resentment from other women. Therefore, pregnant women strategically guard their condition to avoid unwanted attention from envious woman who may use witchcraft to harm mother and child (Hampshire, 2002). Furthermore, announcing one's pregnancy is pointless; in time the body speaks for itself. Local beliefs restrict the foods women ingest and where they travel during pregnancy. For example, consuming bush meats like rabbit and monkey are believed to negatively affect children's health and behaviour. My findings corroborate those of other researchers, which demonstrate that women's perceived risks of pregnancy and childbirth stem from beliefs in the supernatural, and not out of fear of delivering alone or in unhygienic conditions with no medical assistance

(Nikièma et al., 2008 & Regis, 2003). In general, women in the Far-North perceive the risk of witchcraft to be far greater than the absence of biomedical care.

Another important element in maternal health in northern Cameroon is the cultural belief in the detachment of the mother from the child. According to Regis (2003), spirits and envious women will be less likely to harm a child if the mother shows indifference and even dislike of her offspring. It is common for a mother to sing about finding her child in a garbage heap and she will refer to him/her as a “big ugly dog” (Regis, 2003). In Fulbe culture, a woman who thinks she is pregnant will conceal her state as long as possible. She must avoid taboo foods such as ribs, and seeing wild animals, like rabbits. It is believed that even an envious gaze from another woman is enough to cause a miscarriage (Regis, 2003). It is important to note that wild animals are present not only in rural areas but also in smaller urban areas like Maroua. Leaving home to seek medical attention may be difficult for women who believe in the harmful effects of wild animals or the powers of envious women. Inevitably, maternal health services, unless brought to the home, may represent challenges for women to access frequently. Furthermore, a traditional Fulbe woman will return to her parent’s home to give birth to her first child and can remain there for six months or more (Regis, 2003). This time away from domestic responsibilities will allow the new mother to recover. This is a luxury not always available at her marital home. Absence from home also lessens the chance of another pregnancy soon after giving birth. Traditionally, two years is considered an appropriate spacing between births. Regis also notes that it is common for

women to give birth alone, but to have assistance right after the infant is born. Showing overt signs of pain is seen as a weakness and openly admitting to illness or pain is seen as a loss of self-control and self-mastery. Showing too much affection for one's child not only draws unwanted attention, but is considered bad form (Regis, 2003). Cultural understandings and explanations of maternal health have implications for preventing and treating pregnancy complications.

3.3 Methods

Field Methods

I carried out two months of intensive fieldwork in Maroua and Moutourwa during August and September 2009. Two fieldwork sites were used for this study, Maroua an urban city and the provincial capital of the Far-North and Moutourwa, a rural village 50 kilometres from Maroua. These locations were selected due to available logistic and research support and accessibility during the time of fieldwork (rainy season). In each field site, quantitative questionnaires were administered to women between the ages of 18-45 who had given birth in the past five years to elicit detailed information on demographic, maternal health care practices and information sharing of maternal health care through social networks. Women had to be residents of either Maroua or Moutourwa and have given birth in the area. In order to gain a deeper understanding of maternal health service use and non-use, structured and semi-structured interviews and participant observation took place with questionnaire participants, traditional birth attendants and hospital staff in both Moutourwa and Maroua. All recruitment, questionnaires and

interviews were conducted with at least one of three female Cameroonian research assistants. Questionnaires and interviews were conducted in the preferred language of the participant with the help of research assistants. Typically, French and Fulfulde are spoken in Maroua and French, Fulfulde or Guiziga in Moutourwa.

Questionnaire participants were recruited door-to-door in six different neighbourhoods in Maroua and five in Moutourwa. Women in the Far-North, especially those with children, tend to stay close to home, so recruiting door-to-door was the most appropriate way to reach participants. In each neighbourhood in Maroua, with the exception of Dougoy, there was an initial point of contact or gatekeeper. Usually a friend or relative of Mme. Doudou's or Mme. Asta's living in the area would introduce us to potential participants. Often one participant would refer us to other women in the neighbourhood who were eligible to participate. Depending on the neighbourhood in Moutourwa, some women knew Mme Didja, but many did not. Working in Moutourwa was facilitated by the presence of Canadian Universities Services Overseas –Voluntary Service Overseas (CUSO-VSO). The community has established a pattern of working with VSO volunteers for the past eight years. By sampling from different neighbours, women from ten different ethno-linguistic groups with education levels ranging from no formal schooling to university educated were included in the study.

Questionnaire participants were asked at the end of the questionnaire if they would be willing to participate in an interview. All 110 questionnaire participants were willing to be interviewed, but in Maroua only those that had given birth at home or who

had a disproportionate number of prenatal visits, e.g., 20, were contacted for an interview. These participants were contacted by me and a research assistant two weeks after completing the questionnaire. A total of nine interviews were conducted with the participants of the questionnaires, four in Maroua and five in Moutourwa. To understand the social and cultural factors that affect maternal health care use, five broad areas were examined: 1) food consumed during pregnancy; 2) who is informed about the pregnancy and when, 3) any encouraged or discouraged activities during pregnancy 4) how pregnant women are viewed in the community and 5) the experience of delivering at home or in clinic. Interviews took place at the participants' home at a time convenient for them and in the language of their choice. These interviews ranged from ten to 45 minutes depending on the participant's availability and openness about the topic. These interviews provided good background on participants' feelings, motives and interpretations of maternal health care practices and daily routines (Singleton and Straits, 2010). The interviews complemented the questionnaires and contextualized the demographic and maternal health information that was provided in the questionnaires.

Finally, one in-depth interview was conducted with a former male VSO colleague about the different forms of traditional healing and witchcraft that exist in the region. He is originally from Moutourwa but is a student in Maroua. His mother practiced midwifery at the Moutourwa hospital; his father was known in the village for his traditional remedies that cured stomach and joint pain, headaches and malaria. This interview provided unique and valuable insight into the history of witchcraft and the different forms

that exist in the region. It also helped to contextualize some of my observations and interviews about witchcraft and the supernatural.

For all interviews oral or written informed consent was obtained before the interview began. Confidentiality for all study participants was assured and participant names have been coded. Interviews were recorded using a digital voice recorder and after each interview handwritten notes were reviewed with a research assistant while listening to the voice recording.

Informal participant observation work was conducted primarily in Moutourwa in the village centre. The participant observation was unstructured to the extent that it was unplanned, emergent and implicit (McCall, 1984). Unstructured observation allowed behavioural and social patterns to emerge which were necessary in both the hospital and the village environment in order to gain a general understanding of the people in these locations. Observations were carried out with a research assistant in Moutourwa and the *lamido* (village chief) of Moutourwa was aware of my research and presence in the village. In Maroua, participant observation at the hospital was sometimes done with a research assistant. Participant observation lasted between ten minutes and several hours depending on the circumstances.

3.4 Data Analysis

Interviews conducted in French were translated into English and transcribed using Microsoft Word. Interviews done in Fulfulde or Guiziga were first orally translated into

French by one of the research assistants while I transcribed verbatim what was said using Microsoft Word. Inductive content analysis is a process where general patterns are derived from specific observations and findings derive from the researcher's interactions with the data (Patton, 2002). In qualitative research, inductive analysis is usually the first stage when developing a set of codes for content analysis or establishing patterns and themes (Patton, 2002). Inductive content analysis was conducted on all transcripts in order to discover patterns, themes and categories in the data. Data was managed with NVivo 3 software. Content analysis included both pattern and thematic analysis. Usually re-occurring descriptive findings or patterns are used to identify themes (Patton, 2002). Open or initial coding was used to identify actions, feelings and events in the data. If a word, topic or phrase was reoccurring, a new node was created. The name of the node usually reflected the most commonly mentioned phrase or word, (e.g. eating bush meat). All related transcripts were analyzed for each node created. After inductive analysis was complete, initial tree nodes were further categorized as parent and child nodes. Then nodes were expanded to discover patterns and themes. The following patterns are from the nine participant interviews.

Table 5. Patterns from initial coding

Patterns	Related data
Consumption of meat	Any comments relating to eating or not eating meat
Food intake	Any comments about diet during pregnancy

Health and/or behaviour of the child	Any comments relating to the health or behaviour of the child
Complications of pregnancy	Any comments about complications during pregnancy, delivery or post partum
Health of mother	Any comments relating to the health of the mother
External dangers	Any comments relating to dangers outside the home
Encounters animals	Any comments regarding the presence of animals
Family and friends	Any comments about interactions with family or friends
Restricted activities or chores	Any comment relating to restricted activities or chores
Encouraged activities or chores	Any comment relating to encouraged or suggested activities or chores

These patterns were further paired down to reveal themes in the interview data. Many of the patterns were connected and overlapping, but three themes were identified: diet, witchcraft/supernatural, and social ties. Consumption of meat and food intake was combined to form the theme of diet. Health and/or behaviour of the child were always described in relation to the presence of witchcraft or of the mother consuming bush meat; therefore, depending on the data provided, comments about health or behaviour of the child were categorized as either diet or witchcraft. Any activities or chores described as restricted were avoided because the location or time of day was considered dangerous. Evil spirits are present near rivers, under certain trees and at central meetings places at

sunrise and sunset; therefore, fetching water, collecting firewood and socializing or shopping at specific locations or times of day were labelled as restricted activities. Family member and friends were also mentioned as helping with daily activities around the household, these comments were categorized as social ties. Patterns initially coded as daily activities were categorized as diet, social interactions or witchcraft. Complications of pregnancy, illness of the foetus or child and illness of mother all related to the theme of witchcraft. External dangers were associated with witchcraft and the supernatural. Finally, the patterns of witchcraft, sorcery and supernatural forces became an overarching theme of witchcraft that applied to many comments.

3.5 Results

The results are broadly categorized into three themes: witchcraft and the supernatural, diet and social ties. The development of these themes was influenced by my experience in Cameroon and my literature review about the Far-North. In formulating the interview guide, I was aware that beliefs in witchcraft might influence maternal health care use. Although these themes will be discussed separately, they are nevertheless interlinked. The following sections will focus primarily on how witchcraft and diet affect maternal health, but also on how beliefs in witchcraft and the supernatural affect who women talk to about their pregnancy. A more in-depth analysis on social networks is in chapter four.

Table 6. Themes, patterns and supporting comments for qualitative data

Themes	Patterns	Verbatim comments
Witchcraft/supernatural	Complications of pregnancy	“Witchcraft can make cause you to be unable to deliver. One woman in the village was pregnant for 23 months. She was so big, but the baby would not come out.”
	Health of the mother	“Pregnant women are very fragile and susceptible to witchcraft. They have to take care of themselves by staying in the house and not doing heavy chores.”
	External dangers	“Bad spirits gather near large trees like the Baobab and if pregnant women get too close they can catch something and become very ill.”
	Encounters with animals	“Pregnant women should not walk on the path of a snake because her child will be born unable to walk with its legs.” If you step on a donkey’s cord you will be pregnant for a year, just like the donkey.”
Diet	Food intake	“You should not eat peanuts when you are pregnant, they make the baby very big and then you have a difficult delivery.”
	Consumption of meat	“You must not eat bush meat, like squirrels when you are pregnant, it will cause the child to be born with epilepsy.”
	Health and behaviour of the child	Touching a frog during pregnancy will cause the frog to jump and urinate. The child will do the same when it is born.”
Social Ties	Family and friends	“You can’t trust everyone, but you can trust your family and your in-laws. They will take care of you when you are sick or during pregnancy.”

	Envious women	“Sometimes pregnant women will die because of sorcery, but the baby will remain alive. They may be jealous of you because you have something they don’t.”
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3.6 Witchcraft

The beliefs and practices of witchcraft are present in many aspects of social life in the Far-North. Health, employment, government, commerce, marriage and death can all be affected by differing forms of witchcraft. In-depth interview data about witchcraft did not differ in Maroua and Moutourwa, except when it came to differences in environmental features. For example, there are animals that do not live in the city of Maroua and there is no seasonal river in Moutourwa, as there is in Maroua. A former VSO colleague and Cameroonian friend described three main types of witchcraft that exist in the Far-North province. First, these are sorcerers who can predict the future, usually with the help of an animal or crab. Second, there are the traditional healers who have and make remedies to help cure the sick. Third, there are sorcerers who cause harm. They do not use remedies, but they have the ability to kill people through sorcery. There are many ways of becoming a sorcerer. It is hereditary from mother to daughter and from father to son. One can also become a sorcerer by approaching someone of the same gender that practices the trade. Befriending them by providing tobacco and a child is crucial to the process. If the sorcerer accepts the child then the transaction is complete, if not, the sorcerer will turn against you. During pregnancy women’s bodies are particularly fragile and more susceptible to the evils of witchcraft. The blood becomes sugary which

is attractive to sorcerers. A woman who believes she is pregnant must guard herself from envious women who could cause harm to mother and child; to do so, she must conceal her pregnancy as long as possible. It is not shameful to talk about pregnancy, in fact, children and large families are highly regarded, but overtly speaking about pregnancy can be interpreted as boasting and immodest (Regis, 2003). Early in one's pregnancy a woman may be unsure if she is pregnant, especially if she has not been to a clinic; therefore, concealing one's condition will prolong unwanted attention and the harmful effects of envy (Regis, 2003).

“There is no point in telling people you are pregnant – in time the body will speak for itself” (In-depth interview, Maroua).

Some women in Moutourwa even felt it was useless telling their husbands about a pregnancy if there was no money for hospital visits or medicines. During pregnancy, women must be wary of what they see and consume. The power of witchcraft during pregnancy can manifest in many ways. A harmful gaze is enough to cause miscarriage or prolong pregnancy and delay delivery for many months. Women must be strategic about who they talk to about their pregnancy even when it becomes physically apparent. Misunderstandings between families and neighbours can cause a woman to bewitch another, and quarrels within a family can result in harmful outcomes such as sickness or even death.

“In our village sometimes pregnant women will die because of witchcraft, but the baby will remain alive. Someone will be jealous because you have something they don't. If you broadcast pregnancy the sorcerers will benefit and you will suffer. It can be very challenging to avoid witchcraft;

God created jealousy and that's the problem" (In-depth interview, Moutourwa).

In polygamous families, older co-wives may be especially envious of younger wives who elicit more attention from the husband. Many women will chose to deliver their first child at their parents' home and subsequent deliveries with the help of their mother-in-law in the family compound. It is easier to recover away from the marital home where there are pressures to fulfill domestic responsibilities. For women who deliver alone at home or in the fields, if the baby arrives unexpectedly, they will call someone when the child is born to cut the umbilical cord. Pregnant women must not only restrict who they talk to about pregnancy, but also their activities during this period. Many women stressed the importance of limiting certain activities and remaining vigilant about where you walk or travel during pregnancy. It is believed that if a pregnant woman lies on her back the unborn child will be strangled by the umbilical cord. Women in both Moutourwa and Maroua said that when a woman was pregnant, she must never cross the river and it is best not even to go near it, although this is difficult if there is no one else to collect water. Women in both Maroua and Moutourwa stated that during pregnancy it is best to never go near the river, and certainly never to cross it, however, exceptions are made if there no one else to fetch water. Crossing the river can cause miscarriages and severe illness. Walking in the path of a snake while pregnant is believed to have severe repercussions on a child's ability to walk; they will move like a snake, and not walk with their legs. The baobab tree is also infamous for housing evil spirits that harm pregnant

women. In general, cool wet environments are dangerous for expectant mothers and going out after dusk is usually forbidden. The food consumed during pregnancy is also vital to the health of mother, and child and there are many taboo foods for pregnant women in the Far-North.

3.7 Diet

What women eat during pregnancy can cause severe outcomes for the child. My findings were consistent with Regis, who notes that women in the Far-North are generally not supposed to eat or stare at wild animals during pregnancy (2003). All taboo foods seem to have a corresponding negative behavioural or physical outcome for the child. If a woman consumes a frog, her child will be born with spots all over its body. Eating monkey meat will result in a child that is excitable and cannot pay attention and generally exhibits signs of monkey.

“There are many things you should not eat when you are pregnant. I was pregnant with my third child I was in a remote village and I ate monkey meat. Now, this child is always agitated and never sits still. I say to myself, it must be true there are certain things you must not eat during pregnancy”.

Consuming squirrels or similarly small animals can cause epilepsy. Scaring a donkey will cause it to urinate, and after the child is born every time it is frightened it will urinate like the donkey. Other meats, beef, goat or lamb were considered harmless during pregnancy, but most families would only be able to afford the luxury of meat on a daily or even weekly basis. At the end of Ramadan often large amounts of meat are consumed and pregnant woman are included in this feast. While women in Maroua thought it was

important to consume fruit and vegetables during pregnancy, women in Moutourwa felt that fruit, vegetables and peanut-based sauces should be avoided during pregnancy. If one consumes these foods, the child will be large and cause a difficult delivery. Several women explained that it is favourable to have a small baby.

Many women in both locations had delivered some of their children in the hospital and some at home. Easy and fast deliveries with little pain or hassle were desirable. Several women described giving birth in the fields or while going to the washroom. They described no pain and were not aware of being in labour. Regardless of where they delivered, women preferred to recover in the comfort of their own home and not at a clinic or a hospital.

3.8 Discussion

While 94% of women in Maroua and 81% in Moutourwa saw a health care provider at least once during pregnancy, only 55% of women in Moutourwa delivered at the clinic, whereas 92% gave birth at a hospital or clinic in Maroua (see chapter 1, table 1). There are several possible explanations for these differences. Women in Maroua who saw a health care provider had an average of 5.46 visits and 3.46 visits in Moutourwa (see chapter 1, table 1). It is not surprising that women in Moutourwa had lower levels of prenatal visits. Proximity to the clinic, lack of transportation, clinic fees and ability to leave the home all contribute to women's use of maternal health care services. In Maroua there are many small health clinics and the Hôpital Central is located in the heart of town. Public transportation is always available, so women do not have to be away from home

for long periods of time. For women in Moutourwa, there was a tendency to visit the clinic only if there was a problem, it was otherwise difficult to leave the household chores and work in the fields for extended periods. The diet is also more varied in Maroua. Seasonal fruit, vegetable, meat and spices can be purchased on a daily basis, whereas in Moutourwa the market is once a week. If women in Moutourwa are hesitant to consume high nutrient and protein-dense foods for fear of a large baby and a difficult delivery, then it is possible that home deliveries are easier and more common. Unfortunately however, if complications do arise, by the time they are recognized it is often too late to seek medical assistance, especially if the clinic is far away. Beliefs in witchcraft and supernatural forces often deter women from talking about pregnancy which can affect their social support, information they receive about pregnancy and childbirth, and access to prenatal and delivery services.

Notions of witchcraft are present in Maroua and Moutourwa, but the full extent of its role in maternal health care use still requires more investigation. Beliefs in witchcraft and western biomedical explanations are not mutually exclusive. In the case of maternal health, witchcraft is often used to explain unfortunate events, like miscarriages, stillbirths and even death, when no other explanation is available. It is not that “common sense” is lacking or that natural causes or human action cannot cause or prevent misfortune or death, rather that the death of a mother or child is a physical and social event (Evans-Pritchard, 1976). There is the physical loss of life if a woman hemorrhages during delivery, but also the social loss of a community member, mother, caregiver, wife,

daughter, sister and so on. In the Far-North there is not only ethno-medical plurality of treatment, but also plurality of cause for explaining unfortunate events. Similar to Evans-Pritchard's work among the Zande, witchcraft is not used as the sole explanation of causation in the Far-North. If a woman is bewitched and her pregnancy ends in miscarriage, witchcraft will be stated as the cause because it is the most socially relevant cause and allows for intervention and an explanation of social behaviour; it is not that natural or medical causes are neglected (Evans-Pritchard, 1976). Among the Zande, there are cases where a social situation requires an explanation other than a mystical one. The Zande cannot blame witchcraft if caught telling lies, dishonouring the community, or committing adultery (Evans-Pritchard, 1976). This is likely also the case in the Far-North although further research is required. When I asked if I could be susceptible to the evils of witchcraft, I was told that no, only those who truly believe in witchcraft can be affected. Undoubtedly, witchcraft is a narrative used to understand social events where no other explanation is available. Health and maternal mortality are examples of how people in the Far-North justify misfortune and attribute cause to otherwise unexplainable events.

3.9 Conclusion

In light of this study, there are cultural factors that affect women's maternal health care practices. The quantitative results indicated that while the majority of women in the sample did see a health care provider at least once during their pregnancy, issues of proximity to services and education limit women's use. Cultural beliefs in the powers of the supernatural and witchcraft and can place certain constraints on how information is

shared, and ultimately, what resources are used. However, social practices, like participation in women's groups, can provide a forum for, and facilitate discussions of, health care practices. A challenge of this chapter has been applying a qualitative method of inquiry to a quantitative thesis format. This chapter highlights important cultural beliefs that resonate throughout many aspects of Cameroonian society. It is important that these results, both quantitative and qualitative, be considered simultaneously and that interventions and future research initiatives of maternal health care in the Far-North consider social and cultural aspects of the environment.

3.10 References

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Chapter 4

On est ensemble: Social networks and use of maternal health care services in Maroua and Moutourwa, Cameroon

4.1 Introduction

Support social networks can improve healthy behaviour among mothers by providing advice and information (Ingram, 2005). Social networks can be defined as the pattern of social ties existing among a set of actors. Actors may be individuals, organizations, or other types of entities. Ties may consist of social relationships that revolve around friendship, kinship, sexual behaviour or monetary exchange (Balaji, 2007). These relationships enable the exchange of physical, emotional and material resources and can exist between individuals, organizations, communities or even countries. Positive health behaviours like exercise, healthy eating habits, attending regular medical check-ups, or health-risk behaviours like smoking, drinking and drug use, can all be influenced by social networks (Balaji, 2007). Besides health behaviours, research has also examined how social networks can influence maternal and child health, specifically in high-risk American families (Zachman, 1994).

Social networks can also enable the sharing of information and advice about care during pregnancy and childbirth (Gage, 2007). Social networks characterized by high levels of education can help women to access information about health services and minimize uncertainty about medical systems (Gage, 2007). Supportive social networks

can help mothers obtain health and parenting information, offer resources for childcare and provide support for stressful family and parenting situations. The quality of social relationships, rather than the quantity of ties, is often a better indication of the positive benefits of social networks among low-income populations (Balaji, 2007). This innermost layer of the social network is usually composed of individuals with whom we solicit advice on important matters and is typically the most supportive (Dunbar and Spoor, 1995). Usually there is an average of five people in the inner layer of a person's support network (Milardo, 1992).

Previous studies have also shown a relationship between supportive social networks and the ability to manage stressful situations and use adaptive parenting behaviours (Balaji, 2007). There are many types of support a mother might access in a social network. Members of a social network can offer support by providing health advice, providing childcare, giving parenting guidance or showing sympathy and offering encouragement (Green and Rodgers, 2001). Furthermore, breaking of social ties, especially in a small community or village setting can be a stressful situation for Cameroonian women. Throughout the country, single and childless women are often stigmatized (Defo, 1997). While studies have addressed improving maternal health by strengthening social support networks (Balaji, 2007), none have explicitly investigated the importance of social networks and support in the Cameroonian context. Due to Cameroon's geographical, linguistic, religious and historical diversity, social relationships and health care practices likely vary across the country. In the

predominantly rural Far-North province, community support, polygamy and early and arranged marriage are common; the influence of social networks on maternal health may be different in purpose and structure than networks in other parts of Cameroon. Research has shown that marriage in Cameroon ensures a sense of social support and security which is likely linked to better female health (Defo, 1997).

While the community structure and power dynamics within the household impact what health services women access, differences can exist between women in the same environment in the services they command and receive (Hampshire, 2002). For Fulbe women in Chad, health, information, treatment and care are gendered, meaning that recourses and information about western bio-medical health tend to be known by men, more than women (Hampshire, 2002). In order for women to have access to health care resources, their social networks must comprise men who are willing to support them in seeking care. Similarly, women rely on their female sources of support for information and help with home remedies, family care, and support and treatment of some reproductive health problems (Hampshire, 2002). In the Far-North province, there is a hesitation to speak openly about pregnancy, especially in the first trimester, before the pregnancy becomes visually obvious (Regis, 2003). Women avoid drawing attention to their pregnancy because envious women, including co-wives can cause harm to mother and child (Regis, 2003). Polygamy can restrict women's access to health services because competition increases when women rely directly on their husband for access to resources (Rove and Valaggia, 2009). Furthermore, competition between wives is most severe

when a husband's investment in the health or education of their children, particularly sons, is at stake. Conversely, when there is cooperation in polygamous families, women may be better able to pursue income generating activities outside the household, securing some of their own financial resources to provide for themselves and their children (Rove and Valaggia, 2009).

In the Far-North, polygamous families exist in both urban and rural environments. In urban areas, however, if it is financially viable, the second wife will chose to live in a separate compound from the first wife. Findings from rural Mali indicate that it is not only the location where you live that matters for the utilization of maternal health services, but also who your neighbours are (Gage, 2007). A woman's odds of receiving prenatal care, seeking four or more prenatal visits and delivering in a medical institution with the presence of a trained medical professional are all significantly increased by living in close proximity to other women who have used maternal health care services (Gage, 2007). In rural Côte d'Ivoire, as the level of perceived severity of the illness increases, so does the financial solidarity afforded to the ill person (Ayé, Champagne & Contandriopoulos, 2002). Women in the Far-North, especially Fulbe women, go to great lengths to mask physical pain (Regis, 2003). The more women are able to contribute to the household as caregivers, cooks and water providers, the more negotiation power they have within the household. When illness prevents them from performing these roles, their merit decreases within the household (Regis, 2003). The composition of social networks and means of support are likely to be different in urban and rural areas of the

Far-North. For example, in the provincial capital and urban area of Maroua, family homes are close together and there may be more than one home in a compound, whereas in Moutourwa, there is normally one family per compound and family homesteads can be quite spread out.

There is a need to incorporate different forms of understanding social networks and its outcomes on health. In the positivist paradigm, theory stems from an empirical focus of inquiry, whereas the naturalism paradigm emphasises knowledge as socially constructed, and theory is derived from understanding thoughts and feelings of the population being studied (Hodgkin, 2008). Using multiple methods allows for triangulation, complementarily and expansion (Hodgkin, 2008). Quantitative methods facilitate the incorporation of many variables and large sample sizes, but qualitative approaches provide the rich contextual data and insider interpretations that bring depth to the study (Epstein, T., Jayaratne, S., & Stewart, A, 1991). Questionnaires are a commonly used quantitative method of identifying the number of people in a social network, their demographic characteristics and relationships, while qualitative research can provide detail, insight and explanation of complex multi-layered social networks (Hodgkin, 2008). For this study, questionnaires will be used to access size and demographic characteristics of the social networks and interviews to understand the composition of these social groups.

4.2 Setting

The Far-North province is approximately 500km from the administrative capital of Yaoundé and the financial capital of Douala (Appendix A). This isolated, hard to reach corner of the country does not have the human or physical resources of the southern provinces. Items coming from the south are often delayed for lengthy periods and many medical professionals are unwilling to work in the north due to its isolation, lack of resources and extreme temperatures. Many villages in the Far-North are built near rivers, which are known, according to local inhabitants, to be the sources of spirit attacks. Many women will make between ten to twelve trips daily to the river to wash clothes and fetch water for cooking (Regis, 2003). The task of fetching water is a large part of women's domestic labour, forming a significant component of their social lives; women will often call on each other and go to the river in small groups at sunrise and sunset (Regis, 2003). A community of women is formed around those who get water from the same watering hole or part of the river, and this companionship is maintained as women stop to exchange information and help one another lift buckets of water. Regis notes that the social environment around the wells or at the river is different from more formal gatherings at weddings, naming ceremonies and deaths or even social visits in the home (Regis, 2003). Interactions at watering holes are casual but for the purpose of work, not socializing, and so take on a tougher, strenuous nature (Regis, 2003). It is here, according to Regis (2003), that women are free to discuss marital and family issues and seek advice for any domestic challenges or health problems.

Currently, there is no active community organization in the Far-North that researches or promotes maternal health. Small missionary hospitals do provide educational sessions for expectant mothers and the United Nations Population Fund had maternal health initiatives in the Far-North, but these efforts are either not widespread or have ceased to exist. For local and international organizations to address maternal health care challenges in the Far-North, more research is needed on how existing social networks influence use of maternal health care services in urban and rural locations, and how social networks might be leveraged to support women in accessing the health services they need. It is hypothesized that women with larger and more active social networks will more likely use maternal health services, especially in rural locations, because these social ties will allow women the freedom to pursue health care services outside the home if they so desire.

One of the main themes derived from my qualitative research was around witchcraft. Beliefs in witchcraft and the occult transcend government, education, sports, health and local healing in Cameroon. In the Far-North of Cameroon there is a fear that envious women can cause harm to pregnant women through witchcraft. Expectant mothers will conceal their condition as long as possible to avoid the negative outcomes of witchcraft, such as miscarriage and stillbirth (Regis, 2003). Because of the hesitation to speak about pregnancy, women are selective about whom they talk to and tend to discuss their health during pregnancy with very few people. Talking openly about pregnancy is also seen as immodest and could cause resentment amongst other women (Regis, 2003).

Considering my previous findings about the effect of witchcraft on how and to whom women speak about maternal health, it is possible that the composition of the networks, as opposed to the size, will contribute to the likelihood of women seeking more prenatal consultations. Studies have shown that the level of household education, including the educational level of the husband, significantly increases women's use of prenatal services and delivery in a health care facility (Obermeyer et al., 1991; Obermeyer, 1993). Also, taking into consideration my quantitative findings that a woman's level of education contributes to her use of maternal health services in both Maroua and Moutourwa, it is hypothesized that women who are embedded in social networks with higher levels of education will tend to have an increased use of prenatal services.

4.3 Study Design and Methods

Participants

This study used convenience sampling to obtain a sample size of 110 women between 18-45 years old who had given birth in the past five years (M age = 28.5 years, $SD = 6.3$). The author carried out two months of intensive fieldwork in the Far-North province of Cameroon during August and September 2009. Two fieldwork sites were used for this study: Maroua, the provincial capital of the Far-North and Moutourwa, a rural community approximately 50 kilometres south of Maroua. Participants were recruited door-to-door in six different neighbourhoods in Maroua ($n= 50$) and five in Moutourwa ($n=60$). Open-ended follow-up interviews were conducted with the same sample of participants in both locations. In Maroua, ($n=4$) and in Moutourwa ($n=5$). To

be included in the study, women had to be residents of Maroua or Moutourwa and have given birth in the area. These locations were selected due to available logistic and research support and accessibility during the time of fieldwork (rainy season). Maroua has an estimated population of 200,000. It is the only city of its size in the province and the closest urban area to the Chadian capital, N'djamena. It has numerous secular, government-run primary and secondary schools as well as private Islamic schools. Moutourwa centre has a population of approximately 3,000 inhabitants which encompasses smaller villages like Ganaha and Badjava that were also included in the sample. Only one woman per household participated in the study in order to maintain consistency and variability.

4.4 Procedure

In each field site, questionnaires were administered to participants to elicit detailed information on their socio-demographic background, maternal health care practices and social networks. Participants in both locations were asked if they could be contacted for a follow-up interview to better understand local practices associated with maternal health. Doudou Bakari and Asta Beatrice were my research assistants and translators in Maroua and Didja Adam in Moutourwa. Before questionnaires and interviews were initiated, women were provided with information about the aims of the research and their rights as potential study participants; they were also asked to sign a consent form or verbally agree to participate. All information was read aloud to potential participants in French, Fulfulde or Guiziga. The questionnaires and interviews were

administered wherever the participant felt most comfortable, usually in the home or just outside but within the family compound. There were usually two weeks between administering the questionnaire and conducting the interviews. The research was conducted in the participant's preferred language. Typically French and Fulfulde are spoken in Maroua, and French, Fulfulde or Guiziga in Moutourwa. Ethics approval was obtained from Queen's General Research Ethics Board (GREB) before this research began.

Women in the Far-North, especially those with children, tend to stay close to home, so recruiting door-to-door was the most appropriate way to reach participants. Due to the high levels of illiteracy in the Far-North, recruitment information, consent forms, questionnaires and interviews were read aloud in the language of the participant's choosing. In each neighbourhood in Maroua, with the exception of Dougoy, there was an initial point of contact or gatekeeper. Usually a friend or relative of Mme. Doudou's or Mme. Asta's living in the area would introduce us to potential participants. Often one participant would refer us to other women in the neighbourhood who were eligible to participate. Depending on the neighbourhood in Moutourwa, some women knew Mme Didja, but many did not. Working in Moutourwa was facilitated by the presence of the Canadian University Service Overseas and Voluntary Service Overseas (CUSO-VSO). The community has established a pattern of working with CUSO-VSO volunteers for the past eight years and has been successful in their school development plans, work with the communes and in the Moutourwa secondary school. By recruiting in different

neighbourhoods, a more diverse sample of women was obtained because neighbourhoods in Maroua tend to be divided along ethnic lines. Women in the study were from ten different ethno-linguistic groups with education levels ranging from no formal schooling to university educated.

4.5 Maternal health questionnaire

The maternal health care questionnaire had 35 items and contained three main sections: (1) personal history of maternal health care practices, satisfaction and perceived importance of using these services, (2) social support networks relevant to maternal health care, and (3) socio-demographic background. The questionnaire assessed number of live births, information about the most recent child born in the past five years, the location and type of care given during pregnancy and delivery, and the perceived importance that a mother placed on maternal health care. The section on social support networks consisted of three name generator questions and eight follow-up name interpreter questions. Name generator questions asked participants: 1) to name those with whom they discuss health and pregnancy information, 2) to name who they spoke to about job information or work, and 3) to name who would watch the household and or children if they had to leave the home. These name generator questions were designed to elicit the closest ties in each network, as these were the people with whom maternal health information is likely shared (Dunbar and Spoors, 1995). These name generating questions were followed by name interpreter questions that assessed relationship type (e.g., family/kin or friend), age, level of education, type of employment, number of

children, use of maternal health care services, whether maternal health advice was reciprocally shared, and how useful they found this information. These questions helped characterize the composition of the respondent's support networks. The demographic section of the questionnaire asked participants' level of formal educational attainment. Levels of education were categorized as 1) no formal education, 2) some primary education, 3) primary school completed, 4) some secondary school, 5) secondary school complete and 6) college or university attended. Participants were asked to identify their age or age range if they did not know their specific age. Urban and rural residence was based on whether the participants lived in Maroua or Moutourwa. Only the first question which asked participants to name those with whom they discuss health and pregnancy information and its related name interpreter questions, were used for this study.

4.6 Measures

Urban and rural residence, individual education level, age range, network size and education of the alter and whether women belonged to a women's organization was adjusted for in the analysis. Marouan participants were classified as from an urban setting; Moutourwan participants were classified as residing in a rural setting. In the questionnaire, there were six categories of education, but given the skewed distribution of the individual education variable, it was dichotomized into no formal education or some formal education. Age range was used instead of the age variable, because 34% of participants did not know their actual age. Network size was the total number of people named in the name generator question. Alter education was determined by the average

education of all the alters named. Social participation was based on women's involvement in women's groups such as mother's associations or church groups.

4.7 Statistical analysis

Before analyses began, all data were cleaned and checked for any missing values. Frequencies were conducted to check for missing data and errors. The outcome variable was the number of times a woman reported having seen a health care provider during her last pregnancy. Given that the outcome was a count, Poisson regression was used to examine the association among education, urban/rural residence, network size, alter education, social participation and maternal health care use. First, the association between network size and maternal health care use was examined, while adjusting for urban/rural setting, age range, and education. Second, Poisson regression analysis was conducted to examine the association among maternal health care use, social participation, and network levels of education while adjusting for urban/rural setting, education, and age range. Relative risks (RRs) were computed and reported along with 95% confidence intervals (CIs). All social network data was first cleaned and analyzed in E-Net (ego network analysis) version 6. E-Net is a software program for organizing and analyzing ego-network data (Analytic Tech, 2010). Regression analyses were conducted using Statistical Package for the Social Sciences (SPSS) version 17.

4.8 Results

Table 1 provides descriptive information on the demographic, social network and maternal health care use characteristics of the sample. There were 60 participants in

Moutourwa and 50 in Maroua. Among the 110 participants, 13 percent reported not seeing a health care provider during their last pregnancy – 19 percent of the women sampled in Moutourwa and only 6 percent in Maroua. Of the women sampled, 37 percent had no formal education in Moutourwa, whereas in Maroua only 10 percent of women had never been to school. However, only 47 percent of the sample reported being able to read and understand a newspaper article. In Moutourwa, 53 percent of the women sampled gave birth at the local hospital and 47 percent gave birth either at their own home or at their parent’s home. Of the 110 participants, 10 percent reported not speaking to anyone about their health or pregnancy during their last pregnancy – 13 percent in Moutourwa and 6 percent in Maroua. Based on the name generator question used in this analysis, on average, women in Maroua spoke to 2.16 people about their pregnancy and 2.03 people in Moutourwa, with no statistically significant difference. Of those named, 32 percent in Moutourwa had no formal education compared to 6 percent in Maroua. The majority of women in both locations spoke to their husbands and one other person about their pregnancy – 50 percent in Maroua and 55 percent in Moutourwa. In Maroua, only 44 percent of women belonged to a women’s group, whereas 53 percent did in Moutourwa.

In the first analysis, network size did not play a significant difference in the number of times women saw a health care provider, while adjusting for urban-rural difference, education and age range. In the second analysis, belonging to a women’s organization was associated with use of maternal health care services (RR: 1.31; 95% CI:

1.07-1.62) and network levels of education (RR: 1.08; 95% CI: 1.00-1.16) were associated with the numbers of times women saw a health care provider during their last pregnancy. Age range and education were not significant.

Data from qualitative interviews can help explain why women in the Far-North speak to very few people about their pregnancies. Women in the sample spoke to an average of ($M = 2.09$) people about their pregnancy. Although women in Maroua and Moutourwa may leave the house primarily to collect water or buy food staples, they are not socially isolated. However, women who think they might be pregnant refrain from discussion of their condition. A false claim would cause embarrassment and talk in the community. Is it not taboo to speak about pregnancy or childbirth, but it can be interpreted as immodest and cause jealousy or resentment from other women (Regis, 2003). Talking about one's pregnancy can result in unwanted attention that in some cases can cause harm to mother and child.

“You can't tell just anyone that you are pregnant. There is a worry that if you tell too many people the baby will be born prematurely. The whole village will be saying 'you are pregnant, when are you delivering?' It is tiring.” (In-depth interview, Maroua).

There are many stories of miscarriages, still births and children being born with crippling illnesses because the mother was bewitched. Witchcraft can take place between strangers or women from the same family. Disagreement between families can lead to resentment and acts of vengeance in the form of witchcraft. To protect themselves, some women will often tell only their husbands if they suspect that they are pregnant.

“There is no point in telling people you are pregnant – in time the body will speak for itself” (In-depth interview, Maroua).

However, some women felt that even telling one’s husband was useless if he did not have money to pay for clinic or hospital visits.

4.9 Discussion

The main objective of this study was twofold: 1) to assess the role of social network size and composition in women’s use of maternal health care services in Maroua and in Moutourwa, and 2) to examine whether social participation was associated with use of prenatal services. Social networks can provide women access to information about maternal health care services and contacts to formal health care centres (Gage, 2007). In the Far-North province, where polygamy is commonly practiced and families and extended families live together in compounds, information can circulate quickly due to proximity of living situations. Some studies have shown that family social support networks tend to be greater in rural areas compared to large urban centres due to larger family support for childcare and to obtain maternal health care services (Magadi et al., 2003). Large urban areas are often segregated by ethnicity, occupation, place of origin and neighbourhood which can lead to inadequate services and selective service delivery in certain communities (Magadi et al., 2003). This is not the case, however, in Maroua and Moutourwa. Network size did not have a significant association with the number of times women saw a health care provider in either Maroua or Moutourwa. Yet, women’s social participation and the average educational level of those in their social network

were significant. The Far-North is a patrilineal society where women work mainly as agriculturalists and caretakers of the family homestead and have small social networks of people who live in close proximity. In this environment, it does not appear to be the size of the network that might facilitate women using prenatal services, but the level of education of those in the network.

Earlier results indicated that some education is associated with prenatal service use of in Maroua and Moutourwa (see chapter 2). As noted by Obermeyer et al., a woman's education and the average level of education of the household have a significant effect on prenatal care (1991). If women are discussing their health and pregnancy with educated friends or family, then they are more likely to use services themselves because the likelihood of their network members having used maternal health care services, or knowing the value, may be greater. Female education increases women's potential in the labour market; access to, and negotiation of financial resources increases self-awareness and acceptance of modern medical practices and overall social-economic status (Gyimah et al., 2006; Magadi, et al., 2000; Magadi et al., 2007; Obermeyer et al., 1991; Raghupathy, 1996). Even a small network of women who understand the value of maternal health care services, may be more likely to assist one another with childcare, provide financial assistance for transportation or medical costs (Giblin, Poland & Ager, 1990). Interestingly, the association of individual education was no longer significant when average network education was taken into account. The small network sizes in relation to who women speak to about their pregnancies in Maroua and Moutourwa, are

likely a reflection of the cultural belief in witchcraft. Women who fear the negative outcomes of witchcraft will limit who they speak to about their pregnancy. Women in the Far-North will sometimes sing songs comparing their children to ugly dogs in an attempt to make their children seem unappealing and thus undesirable to evil spirits (Regis, 2003).

Little has been reported on women's level of social participation within their social networks and their use of prenatal services, specifically in an African context (Gayen & Raeside, 2007). While social networks enable sharing of information and can increase knowledge about and access to maternal health services, according to Gayen and Raeside, women who are centrally located and well connected were better informed about professional health care compared to less connected women (2007). When women belong to a social group such as a church group, community activist group or mother-teacher association, the perceptions of what is normative are often shaped by the attitude and behaviour of the dominant members of the group (Gayen et al., 2007), and in Cameroon women tend to belong to groups or networks with others like themselves (Valente, Watkins, Jato, Van Der Straten & Tritsol, 1997). It is likely that if prenatal services are used by the dominant members of the women's groups, then other members will likely do the same. It was observed during fieldwork that in areas like Moutourwa where CUSO-VSO is present, an increasing number of women are joining community women's groups and mother-teacher associations. Many women who join such groups have never publicly expressed their opinions, been asked for input or belonged to any

social unit outside the home. These kinds of social groups provide a forum for women to share information, socialize and perhaps gain confidence to ask questions about their health, education and social rights. For women who do not belong to women's groups, the social environment of the daily trips to the river could be a way of contacting women for initiatives to promote maternal health and information sharing.

4.10 Implications

Women's groups are an ideal environment in which other community or health organizations like CUSO-VSO to conduct workshops and information sessions about access to and the importance of using maternal health services. Moutourwa has had great success with the development and growth of women's groups and mother-teachers associations and some have even begun small income generating projects. Social networks and, specifically social participation in the form of women's groups, can increase the opportunity for women in the Far-North to interact with others outside the family home and gain knowledge and financial or social support for obtaining health care services.

4.11 Limitations

The limitations of this study are that this is a convenience sample of women in Maroua and Moutourwa. Results, therefore, may not be generalizable to other populations in Cameroon. While women were selected from a variety of neighbourhoods in both sites, in Moutourwa much of the sample lived within a one-two hour walking distance of the Moutourwa health clinic. Many of the questionnaires were carried out in

Fulfulde and Guiziga, and while I was always present during the questionnaires, it was difficult to assess whether all questions were being asked and interpreted according to the research design. Finally, all data such as demographics, number of maternal health care visits, social network characteristics and women's group participation were self-reported by participants. Interviews were also limited to women who were accessible when we contacted them a second time. Due to time constraints, questionnaire data was not analysed before the interviews took place, so the social network data did not inform the interview guide. With limited research time, there was no means of cross checking to ensure accuracy of the self-reported information.

4.12 References

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Table 7. Descriptive statistics of maternal health care use and social networks convenience sample of participants in Maroua and Moutourwa, Cameroon.

	Maroua		Moutourwa	
	N	%	N	%
	50		60	
AGE				
18-19	2	4%	6	10%
20-29	31	62%	23	38%
30-39	15	30%	25	42%
40-49	2	4%	6	10%
Education				
1(No formal education)	5	10%	22	37%
2 (Some primary)	20	40%	25	42%
3(primary complete)	1	.02	0	0%
4(some secondary)	20	40%	13	21%
5(Secondary complete and more)	4	8%	0	0%
Can read and understand newspaper article	37	74%	15	25%
Health professional seen during pregnancy				
Yes	47	94%	49	81%
No	3	6%	11	19%
Number of times services used	<i>M</i> = 5.46		<i>M</i> = 3.46	
Location of delivery				
1 (hospital/clinic)	36	72%	32	53%

2 (other health facility)	8	16%	1	1.6%
3 (at home)	4	8%	24	40%
4 (parents' house)	0	0	2	3%
5 (Outside)	2	4%	1	1.6%
Social network size based on name generator questions	M= 2.16	SD= 1.37	M= 2.03	SD= 1.40
Women's group member				
Yes	22	44%	32	53%
No	28	54%	28	47%
Alter Education				
1 (No formal education)	3	6%	19	37%
2 (Some primary)	13	28%	17	33%
3(primary complete)	1	2%	0	0
4(some secondary)	20	43%	10	19%
5(Secondary complete and more)	9	19%	6	11%
Spoke to no one about pregnancy	3	6%	8	13%
Spoke to husband only	13	26%	15	25%
Spoke to husband and others	25	50%	33	55%
Spoke to others only, no husband	9	18%	4	7%

Table 8. Poisson regression analysis of number of maternal health care visits on social network size, urban-rural difference, education, age range and women's group.

n=110	Variables	Relative Risk (95%CI)	p-values
Social network size		1.05 (0.96-1.34)	0.29
Setting	Rural	0.71 (0.59-0.86)	0.00
	Urban	1.00	---
Education	No education	0.76 (0.58-1.01)	0.05
	Some education	1.00	---
Age range		0.94 (0.81-1.10)	0.46
Women's group member	Non-member	1.31 (1.06-1.62)	0.01
	Member	1.00	---

Table 9. Poisson regression analysis of number of maternal health care visits on alter education, urban-rural setting, education, age range and social participation.

n=110	Variables	Relative Risk (95%CI)	p-values
Alter education		1.08 (1.00-1.15)	0.05
Setting	Rural	0.76 (0.62-0.94)	0.01
	Urban	1.00	---
Education	No education	0.78 (0.57-1.06)	0.11
	Some education	1.00	---
Age range		0.99 (0.83-1.17)	0.88
Women's group member	Non-member	1.26 (1.01-1.58)	0.04
	Member	1.00	---

Chapter 5

General Discussion

5.1 Summary of key Findings

This thesis applied a mixed methods approach to the study of maternal health care use in the Far-North province of Cameroon. The overarching themes were education, urban-rural residence, beliefs in witchcraft and the use of maternal health care services. In the first manuscript, women in Moutourwa, the rural location, used maternal health care services less often than did women in Maroua. Women with some education used prenatal services more often than women with no formal education, and finally, education was associated with women's use of services in Moutourwa, but not in Maroua. Findings from this study add to the growing body of literature that suggests that female education is crucial to increasing maternal health service use and reducing maternal mortality in Africa. It is likely that proximity to services allows women in urban areas better access to services, regardless of their level of education. Very little health research has been conducted in the Far-North province of Cameroon and the urban-rural comparison is unique.

The second study examined how traditional beliefs in the supernatural and witchcraft affect maternal health care service use. The study findings suggest that women avoid talking openly about pregnancy for fear that envious women will cause harm to them or the child. Themes of diet and social ties also influence what women eat, where

they go and who they interact with during pregnancy. Witchcraft and the supernatural provide a cultural framework in the Far-North for explaining complications in pregnancy, miscarriages, still births and undesired physical and behavioural features of the child.

The third study explored how social network size and composition influence maternal health care use. Quantitative results indicate that it is not the size of the network that was associated with the number of times women saw a health care provider, but the level of education of those in the network. Women who have more educated people in their social networks, use maternal health care services more often than those lower levels of education in their networks. Also, women who were members of a women's group were more likely to use maternal health care services. The findings from the mixed analysis suggest that it is not how many people women might speak to about their pregnancy but more generally how educated their close support networks are influencing women's use of maternal health care. Fear of witchcraft frames women's choices of who they may speak to about their pregnancy, and as a result may reduce the influence of network size on use.

5.2 Strengths of the Thesis

Data for this study were collected in Cameroon in August and September 2009 by the author and in collaboration with three female Cameroonian research assistants. This study was a built on the author's previous experience in the Far-North province of Cameroon and addressed a gap, articulated by VSO Cameroon, about use of maternal health care services in the province. This research could not have been conducted without

the large network of contacts established during the author's previous experience in Cameroon. This research incorporated qualitative and quantitative methods and analysis in order to gain deeper understanding of maternal health care use in the Far-North. All participants responded to every item in the questionnaire and the purposed sample size of $N = 60$ was extended to $N=110$, due to the success in recruiting women in Maroua and in Moutourwa. All the participants were willing to be contacted for a follow-up interview. All three of the studies contain strengths. In the first study, Poisson regression analysis was used to predict the relative risk of women not using maternal health care services. This was an appropriate analysis because the outcome variable was a count of the number of times women used prenatal services. The questionnaire accessed demographics, maternal health care use and social networks. Women were of varying ages, ethnic backgrounds, education levels and maternal health practices. The second study looked qualitatively at some of the cultural factors affecting maternal health care use. Belief in the supernatural and witchcraft can restrict women's use of prenatal services and limit what health information is acquired. In the third study, it was useful to use a mixed methods approach to examine the size and composition of the network. Qualitative analysis helped to explain the finding that social network size did not contribute to the number of times women use maternal health care services.

5.3 Limitations of the Thesis

While the findings from these studies are interesting, there are limitations. The sample size for both the qualitative and quantitative studies was small due to time

constraints in the field. Another limitation is because it was a convenience sample, it is not necessarily applicable to other communities in Cameroon. The maternal health questionnaire has not been used in other locations, therefore there are no formal measure of reliability. There is, however, face-validity of the maternal health questionnaire. It was reviewed by Dr. Marie-José Essi at the University of Yaoundé and the three research assistants who all agreed that the questions were an accurate measure of the research hypotheses. While the fieldwork was conducted with local research assistants, they were not involved in the data analysis. Their interpretations and insight would have added depth to the analysis. Many of the questionnaires and interviews were carried out in Fulfulde and Guiziga, and while I was always present, it was difficult to assess whether all questions were being asked and interpreted according to the research design. The largest selection bias of this study was that only women who had survived pregnancy and childbirth were included in the sample. It is possible that many women who did not use maternal health care services have passed away; however, this sample did not include those women. Finally, all data such as education levels, age and number of maternal health care visits were self-reported by participants. With limited research time, there was no means of cross checking to ensure accuracy of the self-reported information.

5.4 Future Research Directions

Considering the research findings, it would be interesting to investigate how multiple, and possibly contradictory understandings and perceptions of maternal health practice inform, and are informed by household negotiations of resources for maternal

health care needs in the Far-North province. I am interested in the link between women's social networks and negotiation power of household resources. More specifically, however, for maternal health care interventions to be successful, it is necessary to understand how men and women perceive maternal health risks and how cultural norms and social networks influence domestic negotiations in seeking maternal health care. Given that men are traditionally the breadwinners and household decision makers, it is necessary to investigate their potential role in prenatal health care routines in the Far-North province of Cameroon. It would be interesting to build on my social network data by examining how social capital, specifically within the family network, affects women's ability to negotiate for maternal health care in the Far-North province.

5.5 Implications

Over the past few months, maternal health has been the topic of public debate and a key priority at several international forums, including the Women Deliver conference in Washington DC and the GB summit in Huntsville Ontario. The G8's commitment of \$5 billion to maternal and child health over the next five years is an indication that maternal mortality is urgent, dire and in need of global support. The thesis findings support previous research that individual female education and the education of close confidants is crucial to increasing use of maternal health care services and consequently reducing maternal mortality. The promotion of female education, gender empowerment and training of local health care workers need to be supported. Governments and organizations need to be accountable to their citizens and donors to

maximize transparency of how initiatives are managed, funded and implemented and sustained. Research, monitoring and evaluation need to be participatory, collaborative, systematic and ongoing.

Appendix

Appendix A: Map of Cameroon



Appendix B: Information sheet and consent form for interview participants

Information Sheet and Consent Form for Interview Participants

I am writing to ask if you would like to participate in my research project “Use of Maternal Health Care in the Far-North province of Cameroon”. I am a graduate student in Health Studies at Queen’s University in Kingston, Canada. I am doing this research as part of my Master’s thesis in Health Promotion.

You are invited to take part in an interview about your experience with pregnancy, maternal health care, and the social support that you receive from people in the community. You must be over 18 to participate in the study. This information will be used in my Master’s thesis to understand maternal health care use in Maroua and Moutourwa. The research will also help local and international organizations better understand maternal health care in the Far-North province. The questions will be asked in your choice of French or Fulfulde. You can respond in either language. You will be asked about 11 questions which should take around 45 minutes. With your permission the interview will be audio-taped. You will be given 1000 CFA for your time and participation.

I do not think there are any risks if you do the interview. But, if you find talking about maternal or child health upsetting, then you may not wish to participate. I can also give you information on who to contact. Your participation in the study is completely your choice. You do not need to answer any questions you do not like. You can stop the interview without giving a reason at any time. You can ask for your answers to be removed. I will provide you with information on how to request this removal. I will delete the audio file on your request and destroy any notes. Even if you don’t finish the questionnaire you will be given 1000 CFA. In Cameroon, all notes and audiotapes will be kept in a locked filing cabinet at the CUSO-VSO office in Maroua. And in Kingston, Canada, your answers will be kept at the Physical Education Centre at Queen’s University in a password protected electronic file. A made-up

name will replace your name on all information to protect your identity. When the information is shared with other researchers, your identity will never be known. Your information will not be connected to your name in any publication. I will not reveal who is taking part in the study. I cannot guarantee that your participation will not be known to other people in your community.

If you have any questions about this project, please contact Sarah McTavish (local number) For questions, concerns or complaints about the research ethics of this study, please contact Aisatou Ngong (VSO Cameroon acting country director) at telephone +237 7706412. Mme Ngong will contact the acting director the School of Kinesiology and health Studies Dr. Patrick Costigan at 1-613 533- 6601 or the Chair of the Queen's University General Research Ethics Board, Dr. Joan Stevenson, 613- 533-6081, email chair.GREB@queensu.ca.

I understand that I will be asked questions about my experience with pregnancy, maternal health care services and social support in the community. I understand that this information will be tape recorded. I understand that my participation in the study is completely voluntary and that I am free to stop at any time. I also understand that my information will be protected throughout the study, and that the information I provide will be available only to fellow researchers involved in the project.

I have had the information letter and consent form read to me. Do you give your consent to participate in the study?

YES [] I agree to participate.

NO [] I do not agree to participate.

_____ (Participant's signature)

_____ (Researcher's Signature)

Please retain your copy of the letter of information for future reference.

Date: _____

Sincerely,

Sarah McTavish

Appendix C: Maternal health questionnaire

Maternal Health Questionnaire

Maternal Health:

Q1) What is your name?

Q2) How many children have you given birth to? (entire number)

Q3) How many children are still alive? _____

Q4) Could you tell me the name of the youngest child born in the last five years:

Q4a) When was he or she born?

Q5) When you were pregnant with [NAME], did you see a health care professional to have your pregnancy checked?

1. Yes
2. No
3. DK

Q6) How many times during your pregnancy with [NAME] did you see a health care professional?

DK

.

Q7) Who did you see most of the time?

1. Doctor (including specialists such as gynaecologist, obstetrician, surgeon, etc.)
2. Nurse or midwife
3. Traditional birth attendant
4. Other
5. DK

Q8) Were you told about the signs of pregnancy complications and what you should do if they occur?

1. Yes
2. No

3. DK

Q9) When you gave birth to [NAME], who assisted in the delivery?

1. Doctor (including specialists such as gynaecologist, obstetrician, surgeon, etc.)
2. Nurse or midwife
3. Traditional birth attendant
4. Relative/friend with no medical training
5. Other
6. No one

Q 10) Where did you give birth to [NAME]?

1. Hospital or maternity house
2. Other type of health facility
3. At your home
4. At your parents' home
5. Outside (such as field, transport, street, market, etc.)

Q11) What is the name of the facility:

Q12) How did you reach this location:

1. On foot
2. Bicycle
3. Motorbike (private)
4. Motorbike (taxi)
5. Car
6. Bus (public)
7. DK

Q13) Do you know if the hospital or health facility was:

1. Government operated
2. Private
3. DK

Q14) How long did you stay at this location?

1. Less than a day
2. Overnight

3. 2 days
4. 3-5 days
5. 6-7 days
6. More than a week
7. DK

Q15) Why did you choose this location?

1. Close to home
2. Least expensive
3. Previous experience at the facility
4. It was the only option
5. Other
6. DK

Q16) How would you rate the care you received at this facility?

1. Excellent
2. Good
3. Neutral
4. Poor
5. Very poor
6. DK

For the following two questions, can you tell me how strongly you agree or disagree with the following statements?

Q17) Accessing maternal health services is important to me.

1. Strongly agree
2. Agree
3. Neutral
4. Disagree
5. Strongly disagree

Q18) The location of where I give birth is important?

1. Strongly agree

- 2. Agree
- 3. Neutral
- 4. Disagree
- 5. Strongly disagree

Social Networks:

For the following questions, I'd just like to know a little about the people who you turn to for support or information when you are pregnant.

Q19) With whom did you discuss matters of your health and pregnancy, when you were last pregnant? (Name and relationship)

DK

Name:	Relationship to you:
1.	
2.	
3.	
4.	
5.	
6.	

	1 (Name 1)	2 (Name 1)	3 (Name 1)	4 (Name 1)	5 (Name 1)	6 (Name 1)
Age						
Education in years						
Type of employment (if any)						
Number of children						
Use of MHC (y/n)						

Type of MHC						
Do you give advice to ___ about their health during their pregnancy?						
How helpful did you find this information? (on a scale of 1-5 with 5 being extremely helpful and 1 not all helpful)						

Q20) If you were seeking information about your job or work, who would you contact?

Name:	Relationship to you:
1.	
2.	
3.	
4.	
5.	
6.	

	1 (Name 1)	2 (Name 1)	3 (Name 1)	4 (Name 1)	5 (Name 1)	6 (Name 1)
Age						

Education in years						
Type of employment (if any)						
Number of children						
Use of MHC (y/n)						
Type of MHC						

Q21) If you had to be away from home, who would you ask to watch your children and /or household?

Name:	Relationship to you:
1.	
2.	
3.	
4.	
5.	
6.	

	1 (Name 1)	2 (Name 1)	3 (Name 1)	4 (Name 1)	5 (Name 1)	6 (Name 1)
Age						
Education in years						
Type of employment (if any)						
Number of children						
Use of MHC (y/n)						
Type of MHC						
Do you also watch over the						

children/household of _____?						
---------------------------------	--	--	--	--	--	--

Q22) Are you part of a women’s group? (this can include mothers’ associations at schools) Y/N

Q22a) If yes:

Name of group/organization:	Your role/title
1.	
2.	
3.	
4.	
5.	
6.	

Q22b) How often do you attend meetings?

Q23) What is your Mother Tongue:

Q24) What year were you born?

Q24a) If you don't know/don't want to say your age could you choose the age range if I read the different options to you (choose what is most appropriate) ?

- 1.** 18-19
- 2.** 20-29
- 3.** 30-39
- 4.** 40-49
- 5.** 50-59
- 6.** 60+

{ If under 18 or born since 1991, thank participant and STOP interview. }

Q25) What is your current marital status?

1. Never Married
2. Currently Married
3. Separated
4. Divorced
5. Widowed
6. Cohabiting
7. Don't know

Q26) If you are married, is it a polygamous marriage?

Q26a) If yes, how many co-wives do you have?

Q27) In which ethnic group do you consider yourself belonging?

1. Fulbe
2. Kirdi
3. Mundang
4. Tupuri
5. Guiziga
6. Guidar
7. Other

Q28) How long have you lived in Maroua? (Or Moutourwa for rural participants)?

1. Since birth
2. Since childhood
3. Since adolescence
4. Since marriage
5. Other
6. DK

Q29) What is the highest level of schooling you have completed?

1. No formal schooling
2. Some primary school
3. Primary school completed
4. Some secondary school
5. Secondary school (Lycée) completed
7. University post-graduate degree completed
8. DK

Q30) Can you read and understand a newspaper article?

1. Yes
2. No
3. DK

Q31) Do you have a paid job? (If yes, ask 31a and 31b)

Q31a) What is your profession?_____

Q31b) What is your title at work?_____

32) Would you be willing to participate in a follow-up interview?

Appendix D: Interview Protocol

Interview Protocol - Maternal health Care Use

- 1) At what point in your pregnancy did you tell others you were pregnant?
 - a) Who was the first to know?
 - b) Why?
- 2) Can you describe what you might do during a typical day when you are pregnant?
 - a) Is this different or the same as when you are not pregnant?
- 3) What are some of the things a woman must do as soon as she discovers she is pregnant?
- 4) How did others find out that you were pregnant?
- 5) In your community, can you tell me how pregnant women are viewed by others?
- 6) Do pregnant women carry a special duty or responsibility?
- 7) Are pregnant women exempt from specific duties?
 - a) If so, by whom?
- 8) You mentioned that you spoke with (names of people from questionnaire), what kind of support do they provide during pregnancy?
- 9) Now, can you tell me about your experience at (specific clinic or hospital)?
- 10) Can you tell me about your experience of delivering (name of child) at (home or name of clinic/ hospital)?

11) Who assisted you?

a) At what point did this assistance begin?