CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

The burden of maternal deaths occurring worldwide has been estimated at 358 000, a decline from the previous high of 529 000 in the recent past (WHO 2006; WHO 2010). However, the bulk of these deaths (99%) still come from developing countries and the sub-Saharan African region still accounts for the majority of deaths by region (640 per 100 000 live births) followed by south Asia which had an estimated 280 deaths per 100 000 live births in 2008 (WHO 2010). Maternal deaths have been shown to contribute to adverse perinatal outcomes such as stillbirths and interventions to reduce stillbirths are likely to reduce maternal mortality as well (Goldenberg, McClure and Belizán 2009)

Stillbirths have been attributed to the care provided at delivery and the place where delivery occurs. Furthermore, traditional birth attendants who largely assist deliveries in developing countries, mostly at home have been shown to be unable to contribute to the reduction of maternal mortality (WHO 2004; WHO 2006; The Lancet Maternal Survival Series Steering Group 2006; CSO, MOH, TDRC, IIPS and Macro International 2007; NIPS [Pakistan] and Macro International Inc. 2007; University of Zambia and Macro International Inc 2009).

On the global scale, home deliveries in the developed western countries constitute a very marginal share of total deliveries, being mainly below 2% with the exception of the Netherlands where home deliveries are above 30% (WHO 1991; Almeida and others 2005; Boucher et al 2009). On the other hand, in developing countries home deliveries

constitute a larger share of all deliveries with statistics usually above 50% (NIPS [Pakistan] and Macro International Inc 2008; NPC and ICF Macro 2009).

1.2 Statement of the Problem

Home deliveries in developing countries are largely unplanned and as such occur under conditions without the minimum recommended standards required for a safe delivery. They are often conducted without the care of professional assistants, such as trained midwives, a requirement by law in some developed and industrialized nations (Kukulu and Öncel 2007; Hutton, Reitsma and Kaufman 2009). Therefore, because of being mostly unplanned and accidental, these deliveries have been associated with increased fetal and early neonatal mortality (Almeida and others 2005), and have been shown to be unsafe and unhygienic in developing countries and may have implications on neonatal and maternal outcomes (Sreeramareddy and others 2006; Kukulu and Öncel 2007). Furthermore, home deliveries have not been shown to improve outcomes even when the women were later transferred to the hospital in the course of their labor, as adverse events still occurred (Sheiner and others 2004).

In Zambia, home deliveries accounted for 52 percent of all births in the five year period preceding the health survey of 2007. At the provincial level, 68.4% of the deliveries in Northern Province occurred at home followed by Central Province and Luapula Province at 66.1 percent and 64.3 percent respectively (CSO, MOH, TDRC, University of Zambia and Macro International Inc 2009). Births occurring outside the health facility in Zambia are more likely to have pregnancy complications that may result in maternal and fetal deaths due to lack of skilled attendance. In Luapula and Northern Provinces, 45

and 41 percent of births respectively, were more likely to be assisted by traditional birth attendants than other provinces in Zambia (CSO, MOH, TDRC, University of Zambia and Macro International Inc 2009). In 2008, traditional birth attendants in Nchelenge district in Luapula province assisted 1,946 births out of 3,449 deliveries, close to 57 percent of all deliveries recorded that year (Nchelenge MTEF action plan 2009). This, remains a major challenge, as reasons for this are still unclear since many areas in literature remain scanty and unexplored and hence this study.

1.2.1 Research Question

What is the burden of, and factors associated with deliveries that occur at home in Nchelenge, Zambia?

1.2.3 Definition of Key Terms

In the context of this study, the key concepts within were defined as follows:

1. *Home delivery:* Childbirth occurring after 28 weeks of gestation outside the confines of a hospital, rural health centre or birthing centre either in the woman's own home; the traditional birth attendant's home or the woman's relative's home or indeed any place that does not meet the above mentioned confinement.
2. *Traditional Birth Attendant:* A birth attendant who is not a health professional and is based in the community and may or may not have had basic orientation on delivering babies.
3. *Antenatal care:* Women attending a rural health centre or hospital during the course of their pregnancy and having had booked for an appointment and/or received one or more doses of Fansidar for Intermittent Presumptive Treatment.

4. *Parity:* The condition of a woman with respect to the number of viable children she has ever borne.
5. *Junior secondary:* Secondary level of education covering grades eight and nine.
6. *Upper secondary:* Secondary level of education covering grades ten, eleven and twelve.

CHAPTER TWO

2.0 LITERATURE REVIEW

Home delivery has to this date continued to be shrouded with much controversy and debate. Several studies have demonstrated different assertions about the effects that home births have, with regard to maternal and neonatal outcomes when compared to hospital conducted deliveries. Some show that home deliveries have harmful effects on fetal and maternal outcomes when compared to those conducted in the hospital setting; while other studies demonstrated no such observed differences but to the contrary reported that home delivered births had lower measurements of serious maternal morbidities when compared to those that took place in the hospital (Bastian, Keirse and Lancaster 1998; Pang and others 2002; Johnson and Daviss 2005; Hatt and others 2009; Hutton, Reitsma and Kaufman 2009; Janssen and others 2009; Kennare and others 2010).

The contention in the disputes over adverse effects on maternal and neonatal outcomes as a result of either a hospital or home delivery by some studies has been failure by them to account for whether the home or hospital settings allowed for the role of prior planning of the delivery either in the home or the hospital environment (Sørenson and others 2000; Janssen and others 2009).

2.1 Prevalence of Home Deliveries

The prevalence of home deliveries shows regional variations with South East Asia showing values reaching as high as 65%; Europe less than 2% and Africa with estimates reaching as high as 62% in some areas (Kukulu and Öncel 2007; IIPS and Macro

International 2007; NIPS [Pakistan] and Macro International Inc 2008; NPC and ICF Macro 2009).

In south central Africa where Zambia is situated, statistics on deliveries that occurred at home showed prevalence rates of 19% in Namibia, 43% in Malawi, 52% in Zambia and 53% in Tanzania (NBS [Tanzania] and ORC Macro 2005; National Statistical Office and ORC Macro 2005; ORC macro 2007; CSO, MOH, TDRC, University of Zambia and Macro International Inc 2009).

2.2 Risk Factors for Home Deliveries

Among the factors that have been associated with home deliveries in the literature are:

Education

Some studies have shown that women who are less educated or illiterate are associated with having home deliveries (Bolam and others 1998; Idris and others 2006; Mrisho and others 2007). Lukumar and Pathmeswaran (2006) showed that low maternal education of less than grade 5 was significantly associated to a home delivery.

Other studies were also able to illustrate that mother educational levels that were lower than primary or indeed of those that had not attended school at all, as being associated to delivering at home (Nuwaha and Amooti-Kaguna 1999; Wagle, Sabroe and Nielsen 2004). The odds of a home delivery was 3.2 times higher among women who were illiterate than those who were literate (Adhikari and Dahal 2008).

Parity

Women with home deliveries were more likely to be multiparous (Bolam and others 1998; Wagle, Sabroe and Nielsen 2004). This association was also shown by Lukumar and Pathmeswaran (2006) who found that women with more than three children delivered at home.

Thind and others (2008) also found home deliveries by women to be associated with a higher birth order, as did Adhikari and Dahal (2008) whose study showed that the odds for home deliveries was 2.5 times higher among multiparous women compared to primiparous women. On the other hand Nuwaha and Amooti-Kaguna (1999) found parity to be non-significant after multivariate analysis.

Ethnicity

Differences in the ethnicity of women in Uganda with respect to not belonging to the largest ethnic *Mugandan* group showed an association with delivering at home (Nuwaha and Amooti-Kaguna 1999). In Nepal, a study by Adhikari and Dahal (2008) where there were ethnic differences among the indigenous people, showed that other ethnic groups other than the *Tamang,* delivered at home with a higher odds of 3.7. The place of delivery was also found to be determined by ethnic group differences among indigenous people in Tanzania (Mrisho and others 2007). Though certain ethnicity differences were seen to influence place of delivery, they could not be statistically associated with home deliveries after adjusting for amenity scores (Wagle and others 2004).

Maternal Age

The age at first pregnancy of less than 18 years was associated with home deliveries in Nigeria (Idris and others 2006). However, Mrisho and others (2007) found that younger mothers were more likely to deliver at health institutions and not at home.

In two other studies, age was not found to be associated to women who delivered at home (Wagle and others 2004; Nuwaha and Amooti-Kaguna 1999).

Gender

The gender of the head of the household was significantly associated with place of delivery (Mrisho and others 2007). This was also demonstrated by Hodgkin (1996), who demonstrated that households that delivered in the formal (health facility) sector were less likely to be headed by a male.

Occupation

The findings with regard to occupation were dissimilar and not consistent between studies. Nuwaha and Amooti-Kaguna (1999) found the occupation of the father to be significantly associated with home delivery, where as this was not the case in the study done by Wagle and others (2004) where the occupation of the mother other than office work was insignificant after adjustment.

Distance

Living more than an hour's distance away from a health facility was associated with a higher prevalence proportion for home deliveries (Wagle and others 2004). In the study

by Nuwaha and Amooti-Kaguna (1999), distance was a non significant finding probably because other factors were not included.

Households that had home deliveries were on average further away from the nearest maternity bed when compared to those where a facility delivery took place. However, under a non-linear hypothesis the probability of using formal care was not shown to decrease by larger amounts with each successive mile to be travelled (Hodgkin 1996).

Income

Lower yearly income and being in low income families was associated with a higher risk for home deliveries (Bolam and others 1998; Wagle, Sabroe and Nielsen 2004; Lukumar and Pathmeswaran 2006). Homesteads that were not of high social class were found to favor delivery at home (Nuwaha and Amooti-Kaguna 1999).

In generating qualitative findings, Mrisho and others (2007) summarized that women delivered at home due to lack of money and that they found delivering at home to be cheaper. The lack of transport was also reported to be a contributing factor.

Hodgkin (1996) similarly attributed delivering at home to the cheaper cost and that those who delivered at a health facility were likely to have had a family member with health insurance.

Antenatal Care

Most of the studies were able to find a statistically significant association with the lack of antenatal care attendance and delivering at home (Nuwaha and Amooti-Kaguna 1999; Wagle, Sabroe and Nielsen 2004; Lukumar and Pathmeswaran 2006).

Many women still delivered at home even after they had attended antenatal care services at least once in the course of their pregnancy (Mpembeni and others 2007).

Idris and others (2006) reported that antenatal attendance in the preceding delivery did not influence the choice for a hospital delivery, as 46% of respondents still delivered at home despite having attended at least four ANC sessions.

2.3 Problem Analysis of Home Deliveries

From the literature review, the home as a choice of place for delivery is not the reason for the unending contentious debate affiliated to child birth but rather the conditions under which child delivery occurs and whether it guarantees safety for both the mother and baby. It is for this reason that arguments on this topic have become further complicated by the inclusion of criteria such as consideration of whether the delivery occurs under planned or unplanned home setups, since arrangements for a skilled attendant with necessary equipment and or an ambulance to the nearest referral center are usually available in planned setups unlike when it's unplanned. The availability of services to mothers in developed countries may not necessarily also be at the disposal of women in poor developing countries.

The World Health Organization has attached the condition of a skilled birth attendant among other things as a required prerequisite for a safe home birth. This factor alone may make it difficult for developing countries like Zambia to encourage home deliveries as most of these deliveries are still being done by traditional birth attendants. Therefore, the advocacy for home deliveries in developed countries though supported by research evidence as being comparable to deliveries done in health institutions may still fall short

of meeting the expectations of poor countries like Zambia that still lack equitable distribution of services which may only be more readily available in the urban as opposed to the rural areas.

2.4 Aim of the Study

To determine the proportion of home deliveries and factors that are associated with home deliveries in Nchelenge.

2.5 Objectives of the Study

- To determine the prevalence of deliveries occurring at home in Nchelenge district.
- To find out the determinants associated with home deliveries.
- To describe community perceptions associated with home deliveries.
- To describe individual perceptions that are associated with home deliveries

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Research setting and study population

The study was conducted in Nchelenge district, which is located in the northern part of Zambia in Luapula Province. It is a rural setting with a total surface area of 4,793 square kilometers of which 60% is main land, 10% swamps and 30% water and as such fishing and fish trading are the main economic activities. Nchelenge district has one first level hospital and 11 rural health centers and a population of approximately 155,510 people (Nchelenge DHO 2008). All medical, surgical and obstetric cases requiring further treatment and care are transported from the health centres to the referral hospital by ambulance at no cost to the public in a 24 hour period every day.

Nchelenge district has a road network stretching 260 kilometers to the Provincial centre of Mansa, while roads within it are all gravel and most become impassable in the rainy season. The water transport is very unreliable as there are no public water vessels for transporting people who usually depend on private canoes and boats when they have to travel to the islands.

3.2 Study design, sample size and sampling design

A cross sectional study design was used. The study population comprised of women of child bearing age from 18-49 years. The target population was women who had had a recent delivery in the past one year prior to the commencement of the study.

At the time of the study, women in the child bearing age group of 15-49 years in Nchelenge district were approximately 34, 212. Using Epi info Stat Calc. software and utilizing an expected frequency of 52 percent with the worst acceptable frequency of 47 percent, the sample size would be 379. Adjusting for 10% non response using the formula N=n+0.15n, gave a sample size of 436.

At the time of the study, a total of 79 outreach posts for immunization and weighing of under-five children were in existence in Nchelenge (Appendix E). Using a table of random numbers and simple random selection, a total of 43 immunization health posts were selected as points where eligible mothers for the survey would be sampled from. All the women attending those outreach points on the specified day were approached and those who met the criteria and agreed to participate were recruited. In total 479 women who consented to take part in the study, were interviewed.

3.3 Data collection methods and data analysis

A semi-structured questionnaire was developed and used as a personal interview guide to obtain information from the respondents on distance to the nearest health facility, household size, household income status, use of antenatal care and the place where delivery occurred among other areas of focus. The questionnaire was pre-tested on 10 non-participating women outside Nchelenge in the neighboring district of Kawambwa, located geographically within the limits of the study area and with similar ethnic and language characteristics as those in Nchelenge district. The questionnaire was administered in the local *Bemba* language to avoid misinterpretations of the questions.

Four focus group discussions were conducted in order to obtain community perspectives on the study topic. Informed consent was obtained from all individuals who participated in the focus group discussions. The focus group discussions were conducted in the common rooms of the rural health centres in the afternoons after patients had already been attended to in the mornings. Each discussion had a moderator, time keeper and a recorder. The focus groups comprised of eight to ten participants, being a mixture of married persons, traditional birth attendants, community headmen/headwomen, and political leaders at the community level. Others were teachers, pregnant women, community health volunteers and health workers in the rural health centres. For purposes of keeping confidentiality, the names of the participants were not required and thus, were allocated numbers. Both the moderator and the recorder took notes which were compared at the end of the focus group discussion.

Six women who had been recruited in the study were identified for in-depth interviews which were done following the focus group discussions. This allowed the investigator to get more information on some of the issues that were raised in the group discussions. All the qualitative components of the data set were grouped into themes and entered into Nvivo computer software for analysis.

Quantitative data was computer coded and entered into Epidata software and then exported for analysis to the statistical package for social sciences (SPSS version 17, Chicago, United States of America) for windows. The test for associations between variables was made with chi-square tests with the expected frequency for cells less than 5 set at 20% in order to get valid results and also with univariate and multivariate binary logistic regression. A 95% confidence interval and P values were used to test for

statistical significance of associations between the dependent variable, place of delivery and the independent variables namely: maternal age, distance, marital status, parity, household size, the educational level of mothers, the educational level of the child's father, the occupation of the child's father, household income and antenatal care attendance by the mothers.

3.4 Ethical consideration

The research was approved by the Biomedical Research Ethics Committee. The approval reference number is FWA00000338 (Appendix D). All participants in the study gave informed consent and no invasive procedures were ever carried out on the participants. As such there was no collection of any human specimens from the participants.

CHAPTER FOUR

4.0 RESULTS

4.1 Participation and socio-demographic characteristics

Out of the 499 eligible participants, 479 consented to take part in the study while 20 refused giving a response rate of 96% (table 1).

Of the 479 respondents who were interviewed 149 (31.1%), were aged 18-24 years while 93 (19.4%) were aged 35 years and above. The majority of the respondents were married 415 (86.6%), and only 20 (4.2%) were single. Out of the 479 respondents interviewed, 322 (67.2%) had three or more children, while 96 (20%) had only one child. The study revealed that, only 19 (4.0%) of the women who took part in the study reported to have attained secondary school education and reached the tenth or a higher grade. The majority (84.6%) of the mothers attained only primary level of education and some had no formal education at all (table 2).

4.2 Prevalence and general determinants of home deliveries in Nchelenge

Prevalence of home deliveries

Out of the 479 respondents who took part in the study, 206 reported that they had a home delivery a year prior to the time of the study, while 273 said that they delivered at a health facility. The prevalence of home deliveries was found to be 43%, 95% CI (38.62, 47.48), refer to table 3.

Determinants of home deliveries

Among the objectives of the study was to find out the determinants associated with home deliveries in Nchelenge. Cross-tabulations, univariate binary logistic regressions and multivariate binary logistic regressions were computed (table 4; table 5; table 6).

On cross tabulations; distance to the nearest health facility (p-value 0.001), educational level of mothers (p-value 0.005), school years for mothers (p-value <0.001), educational level of the child's father (p-value 0.005), school years for child's father (p-value 0.005) and the household income (p-value <0.001) showed significant statistical associations with the place of delivery (table 4).

On multivariate binary logistic regression analysis, women who had four years of schooling or less, were 63% (AOR=1.63, 95%CI [1.06, 2.51]) more likely to deliver at home than a health facility compared to those who had at least five years of schooling. Women coming from households that had a combined monthly income of less than 150,000ZMK were 73% (AOR=1.73, 95%CI [1.06, 2.81]) more likely to deliver at home than at a health facility when compared to those whose household income was greater or equal to 150,000ZMK. Women who lived within a radius of 5 kilometers to the nearest health facility providing maternal health and delivery services were 39% (AOR=0.61, 95%CI [0.41, 0.90]) less likely to deliver at home compared to those who lived more than 5 km away (table 6).

4.3 Qualitative findings

The study found that 71 percent of the respondents were agreeable to have a home delivery, while 25 percent said they wouldn't. On the home as a place of delivery, 73

percent of the respondents did not think delivering at home was safe, while 17 percent thought it was (table 7 and table 8).

The findings on perceptions about home delivery from the qualitative dataset were grouped into the following themes:

Long distances to health facilities

Most of the group discussions of the study revealed that the distance from the mother's homes to the health facilities was very far. This finding coupled with lack of transport, made it very difficult for women in labor to walk for very long distances in an effort to get to the health facility. Even with the few available transportation options, it was reported that sometimes it was just difficult to travel, as the geographical terrain in the area was bad. As for water transport, the situation was even worse during the rainy season when it gets windy and boats are usually not available, as they cannot be used during a storm. Some of the findings revealed that women were further hampered from reaching a health facility using water transport when labor started at night as most of the boats would have been taken away for fishing.

'My labor started at about 03:00 hours in the early morning and we called the traditional birth attendant to escort us to the clinic but then ended up delivering before reaching the hospital. There was no transport available and walking proved to be a big challenge' (In-depth interview, female 34 years, *Mantapala* village).

Lack of health workers in most health facilities

The lack of health personnel in most health facilities was another reason that the participants in the study identified for preference to deliver at home. Most of the women pointed out that there are no Health workers in the health facilities and as such; going to deliver from there was as good as delivering from home. Some women felt it was a better choice to deliver from home as there was no difference either way because even if they went to the health facilities, they were likely be delivered by non-medical staff (traditional birth attendants). At times, even when there are health workers at the facility, they complain about being tired and often mothers feel they would have rather remained and delivered at home.

'I delivered at home because the health worker is not usually found at the clinic and the traditional birth attendants do all the deliveries in the homes' (In-depth interview female 39 years, *Kapambwe* village).

'As at now, there are no deliveries being conducted at the clinic because the health worker has travelled and women therefore usually opt to be delivered by the traditional birth attendants' (Focus group discussion, female 49 years *Kafutuma* village).

Abrupt and unexpected labor

Some women reported that they delivered at home because their labor was quick and abrupt. They further mentioned that if this was the case, most women delivered as they were preparing to go to the health facility. *'If things happen like that, one as no option but to deliver wherever they are as you cannot prevent the baby from coming if it's on the way'*(Focus group discussion, female 33 years *Kambwali* village).

'My labor was quick and progressed to delivery as we prepared to go to the health facility' (Focus group discussion female 42 years, *Kalweo* village).

Lack of respect (actual or perceived)

Lack of respect was also another issue that made women to deliver away from health facilities because they were often ridiculed and told off for having too many children. *'In some circumstances, women are usually told that they still had a while before they would deliver and are therefore, made to go back home and come when they were closer to delivering. They are not told good encouraging words'* (Focus group discussion female 45 years, *Kafutuma* village).

'I went to deliver at the clinic but was turned away and told to come back later, but when I arrived home I delivered' (Focus group discussion female 36 years, *Kabuta* village).

'Women who are young with perhaps two or three children prefer to deliver at the clinic whereas women who are older like myself would rather want to deliver at home because most health workers at the clinic are young perhaps 30 years old and I would not want to be seen and delivered by them because I have children who are just as old as they are. And to make matters worse, it is more discouraging when it's a man who has to conduct the delivery' (Focus group discussion female 44 years, *Kabuta* village).

Advice and following Instruction

Some of the participants in the study reported having delivered at home simply because they were advised to do so or because they were instructed to do so by close relatives or

husbands. They further reported that the basis of this advice and instruction differed. In some cases it could be based on the inability to meet the requirements at the health facilities such as gloves, soap, nappies and other things that may be required at the time of delivery. In other cases women were advised to deliver at home for fear of operations at the health facility. This was true as evident by a woman who pointed out that, *'my grandmother advised me to deliver at home because I would have had an operation if I went to the health facility like she had when the hospital staff discovered that her pregnancy was imbedded outside the womb' (*Focus group discussion female 22 years*, Kabuta* village*).* In addition to this, some women were advised to deliver at home because there were some traditional birth attendants in the villages who were available. *'My husband told me to deliver in our village and that a traditional birth attendant would assist my delivery and I followed what I was told'* (In-depth interview female 20 years, *Lupili* village).

Circumstances beyond control

Some women who participated in the study reported having delivered from home due to circumstances beyond their control. Some women deliver at home because they have other responsibilities like taking care of their children or a sick relative. In some cases, women are turned away from the health facility because it has been turned into an epidemic control centre especially during the times of cholera outbreaks. *'I delivered at home because I had a three year old child whom I could not leave at home as no one was around to look after him and at the time people were being chased away from the clinic because of the cholera outbreak'*(In-depth interview female 29 years, *Kafwala* village).

'Women shun delivering at the clinic because it is shameful when after five or six months not a single piece of clothing or napkin has been prepared for the baby and so they feel ashamed and would rather deliver at home' (Focus group discussion female 43 years, *Kabuta village*).

Availability of Traditional Birth Attendants

Most women who took part in the study reported having delivered at home because of the availability of the traditional birth attendants. In one group discussion in *Kabuta* it was pointed out that traditional birth attendants who trained at the clinic were accorded great respect because of their work and as such, most women and their husbands preferred to use them for deliveries as opposed to going to the health facility. It was also pointed out that owing to the many challenges that women face with regards to delivering at the health facility, such as transport, the long distances they have to endure, requirements like gloves and soap, they end up using traditional birth attendants as with them, most of these things were not required. In one community, women reported that they are delivered at home because women in their community are allowed to be delivered by traditional birth attendants unless the traditional birth attendant decides to refer them to the health facility.

'There is a traditional birth attendant in the village who is allowed to conduct deliveries and it is less expensive delivering at home than at the rural health centre' (In-depth interview female 37 years, *Chiba* village).

Myths and Traditional Beliefs

Myths and traditional beliefs were another reason given to explain why women delivered at home. Most women decided to deliver at home because they needed their grandmothers to give them traditional medicines that could enable them deliver quickly without complications and also be treated for *incila*. *Incila*, according to the participants, was a situation where the partner or husband of the pregnant woman or indeed the pregnant woman herself engaged in sexual affairs with other people during the woman's pregnancy. This *incila* may cause the woman to have difficulties at delivery because of the man's extra marital affairs or her own extra marital affairs. *Incila* was a traditional belief that made most women to deliver at home because they believed that they could only be treated using traditional medicines/herbs for that condition and not the health facility, and thus had no alternative otherwise the baby or the mother may die at the time of delivery. In most cases, it was the elderly women, who were also traditional birth attendants who knew the medicines and hence the preference by most women to be delivered by them.

'The process of preventing death by "incila" requires the woman to divulge confidential information to the women assisting her delivery so that she delivers well in addition to taking the medication and so some women even go further away from their own villages to other villages for confidential reasons because some traditional birth attendants do not keep secrets. If there were too many men that the woman may have had extramarital affairs with while pregnant and they could not all be counted, then she is required to put maize meal into a bowl as a gift, for everything to end there and this cannot be done at the clinics'(Focus group discussion female 56 years, *Kabuta* village).

'The other reason why women prefer to deliver at home is to have their babies protected from "icifutato", which is a situation where the baby may die if the father of the child recommences sex with a different woman other than his spouse who has not even recovered and healed after delivery of the child. So the women will prefer to deliver at home so that the baby after being born is bathed in water that is medicated to prevent death by "icifutato"' (Focus group discussion male 59 years *Kambwali* village).

It was also further reported that women delivered at home because of the availability of medicines for situations such as *kamulengule*. *'This "Kamulengule" happens when both partners (husband and wife) were faithful to each other throughout the gestation of the pregnancy but when the time for delivery approaches the woman may fail to deliver because some people out of envy and malice would just want to wish doom on the couple by using sorcery at the spot where the woman may have urinated and thus she would fail to deliver. Therefore to avoid this misfortune from taking place, the woman would rather be delivered at home where the medicine can be found and not the health facility'* (Focus group discussion male 65 years *Kafutuma* village).

Religious beliefs and misconceptions

Some of the participants in the study noted that some women delivered at home due to their religious beliefs and those of their spouses. *'Sects such as "ba Milonda" or "ba Apostolo" will not go to the conventional health facilities such as clinics and hospitals. These congregants may even be delivered by their own husbands instead and that is the reason why the chief has even banished them from the village to the outskirts'* (Focus group discussion female 37 years, *Kabuta* village).

4.4 Core determinant of home delivery: distance and income

The findings of the study revealed that distance, number of years of schooling and household income emerged as the determinants of home deliveries from the quantitative data set. However, only the distance from the respondent's village to the health facilities and income were prominently captured as determinants for home deliveries in the focus group discussions and the in-depth interviews. The reflections on income from the qualitative findings revealed that it had a bearing on the ability to hire bicycles or vehicles especially when the distances to the nearest health facilities were appreciably too far for women who were in labor to cover on foot. The distances were reported to hamper the accessibility of health facilities and proved to be a major source of concern especially at night times. These two determinants therefore, emerged as core explanatory reasons for deliveries that took place at home.

Table 1: Participation rates among females who consented for the home delivery survey in Nchelenge, Zambia.

Eligible	499
Consented*	479
Refused	20
Not found	0
Response rate	96%

* Females in reproductive age 15-49 years in Nchelenge were 34,212. Fertility rate 5.2

Table 2: Socio-demographic characteristics of respondents

Description	**% n=479**
Age	
<=24 years	31.1%
25-29 years	28.4%
30-34 years	21.1%
>=35 years	19.4%
Marital status	
Single	4.2%
Married	86.6%
Other*	9.2%
Parity	
One child	20.0%
Two children	12.7%
>= Three children	67.2%
Educational level of mothers	
None/Primary level	84.6%
Junior Secondary level	11.5%
Upper Secondary/college level	4.0%

*Refers to separated/divorced and widowed

Table 3: Proportion of deliveries occurring at home in Nchelenge district, Zambia

Place of Delivery	**Frequency**	
	%	**(n/N)**
Home	43	206/479
Health Facility	57	273/479

Table 4: Determinants of home delivery in Nchelenge Zambia cross tabulations

Independent variable		Place of Delivery		p-value
		Home n=206	Health Facility n=273	
Age of mother	<=24 years	31.1%	31.1%	0.173
	25-29 years	32.5%	25.3%	
	30-34 years	20.9%	21.3%	
	>=35 years	15.5%	22.3%	
Distance	<=5 km	36.9%	49.8%	**0.001**
	6-10 km	23.8%	26.4%	
	>=11 km	39.3%	23.8%	
Current marital status of mother	Single	5.3%	6.6%	0.632
	Married	88.4%	85.3%	
	Other*	6.3%	8.1%	
Parity	One Child	17.5%	21.9%	0.476
	Two Children	13.1%	12.5%	
	>= Three Children	69.4%	65.6%	
Household size	<=3 members	14.1%	17.2%	0.604
	4 members	11.6%	13.9%	
	5 members	14.1%	14.3%	
	>=6 members	60.2%	54.6%	
Educational level of mother	Primary level/None	90.8%	79.9%	**0.005**
	Junior secondary	6.8%	15.0%	
	Upper secondary/college	2.4%	5.1%	
School years of mother	<= 4 years	44.2%	28.2%	**<0.001**
	5-7 years	46.1%	52.0%	
	>=8 years	9.7%	19.8%	
Educational level of child's father	Primary level/None	60.7%	54.2%	**0.005**
	Junior secondary	33.0%	29.7%	
	Upper secondary/college	6.3%	16.1%	
School years for child's father	<=4 years	15.0%	9.5%	**0.005**
	5-7 years	45.1%	43.6%	
	8-9 years	30.0%	30.0%	
	>=10 years	6.8%	16.9%	
Occupation child's father	No Trade/Skill	1.5%	1.8%	0.174
	Carpenter/Other trade	16.0%	22.7%	
	Peasant farmer/fisherman	82.5%	75.5%	
Household income	<150,000 ZMK	55.8%	43.2%	<0.001
	150,000-199,000 ZMK	15.1%	24.5%	
	200,000-249,000ZMK	10.7%	4.5%	
	>=259,000ZMK	18.4%	27.8%	
Antenatal care Attendance	None	3.9%	0.7%	0.017
	>= One Visit	96.1%	99.3%	

* Refers to separated/divorced and widowed.

Table 5: Determinants of home delivery in Nchelenge, Zambia; results of univariate binary logistic regression.

Factor	Prevalence (%)	Crude odds ratio (COR) 95% CI	P-value
Distance >=6 km	55.7	1	
<=5 km	44.3	0.59 (0.41, 0.85)	0.005
Educational level of mothers			
-secondary and higher	15.4	1	
-none/primary	84.6	2.48 (1.42, 4.33)	0.001
School years of mothers			
>= 5 years	64.9	1	
<= 4 years	35.1	2.01 (1.38, 2.95)	<0.001
Marital status			
married/other*	95.8	1	
single	4.2	1.09 (0.44, 2.68)	0.854
Educational level of child's father			
-secondary and higher	43	1	
-none/primary	57	1.30 (0.90, 1.88)	0.157
School years of child's father			
>= 5 years	88.1	1	
<= 4 years	11.9	1.68 (0.97, 2.93)	0.067
Occupation of child's father			
other**	98.3	1	
no trade/skill	1.7	0.79 (0.19, 3.35)	0.752
Age of mothers			
>= 25 years	68.9	1	
<= 24 years	31.1	1.00 (0.67, 1.47)	0.987
Parity of mothers			
>= 2 children	80	1	
1 child	20	0.75 (0.48, 1.19)	0.224
Household size			
>= 4 members	84.1	1	
<= 3 members	15.9	0.79 (0.48, 1.30)	0.353
School years of respondent***			
continuous variable		0.88 (0.83, 0.94)	<0.001
Household income			
>=150,000ZMK	23.2	1	
<150,000ZMK	76.8	1.79 (1.14, 2.80)	0.011
Antenatal care attendance			
>=One visit	97.9	1	
None	2.1	5.48 (1.15, 26.06)	0.033

*Refers to married, widowed and separated

**Refers to peasant farmer/fishermen

***Note: Effect measure was coefficient of association and not odds ratio. Reference was dummy variables in all other cases

Table 6: Determinants of home delivery in Nchelenge, Zambia; results of multivariate binary logistic regression.

Factor	Prevalence (%)	Adjusted odds ratio (AOR) 95% CI	P-value
Distance >=6 km	55.7	1	
<=5 km	44.3	0.61 (0.41, 0.90)	0.012
Educational level of mothers			
-secondary and higher	15.4	1	
-none/primary	84.6	1.70 (0.92, 3.14)	0.090
School years of mothers			
>= 5 years	64.9	1	
<= 4 years	35.1	1.63 (1.06, 2.51)	0.027
Marital status			
married/other*	95.8	1	
single	4.2	1.53 (0.54, 4.38)	0.430
Educational level of child's father			
-secondary and higher	43	1	
-none/primary	57	0.83 (0.54, 1.27)	0.381
School years of child's father			
>= 5 years	88.1	1	
<= 4 years	11.9	1.29 (0.69, 2.42)	0.430
Occupation of child's father			
other**	98.3	1	
no trade/skill	1.7	0.61 (0.12, 3.07)	0.547
Age of mothers			
>= 25 years	68.9	1	
<= 24 years	31.1	1.20 (0.73, 1.99)	0.468
Parity of mothers			
>= 2 children	80	1	
1 child	20	0.68 (0.30, 1.52)	0.348
Household size			
>= 4 members	84.1	1	
<= 3 members	15.9	0.98 (0.44, 2.19)	0.955
Household income			
>=150,000ZMK	23.2	1	
<150,000ZMK	76.8	1.73 (1.06, 2.81)	0.028
Antenatal care attendance			
>=One visit	97.9	1	
None	2.1	4.52 (0.91, 22.48)	0.065

Note: Reference was dummy variables in all cases

*Refers to married, widowed and separated

**Refers to peasant farmer/fishermen

Table 7: Perceptions about delivering at home

Individual Perception	Frequency n=479
Would deliver at Home	71.0%
Would not deliver at Home	25.0%
No Comment	4.0%

Table 8: Perceptions about safety of home deliveries

Individual Perception	Frequency n=479
Safe	16.9%
Not Safe	73.1%
No Comment	10.0%

Figure 1: Comparison of place of delivery by distance from the respondent's village to the health facility.

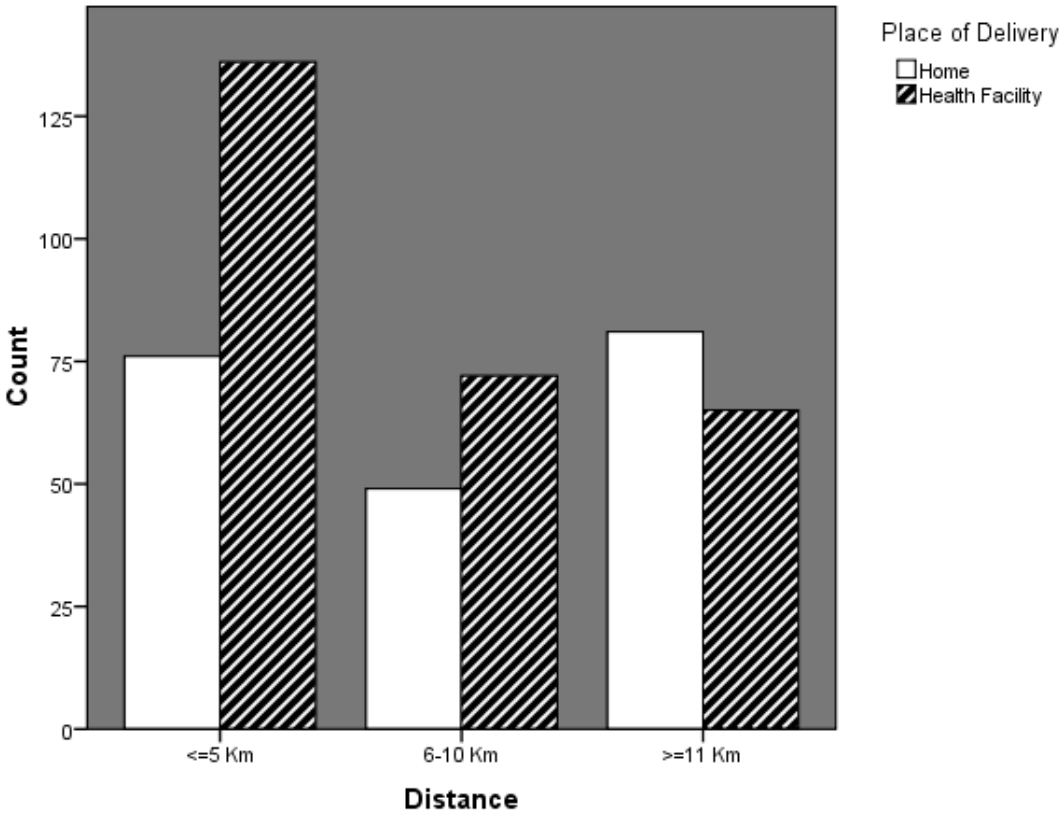


Figure 2: Comparison of place of delivery by educational level (school years) of respondents.

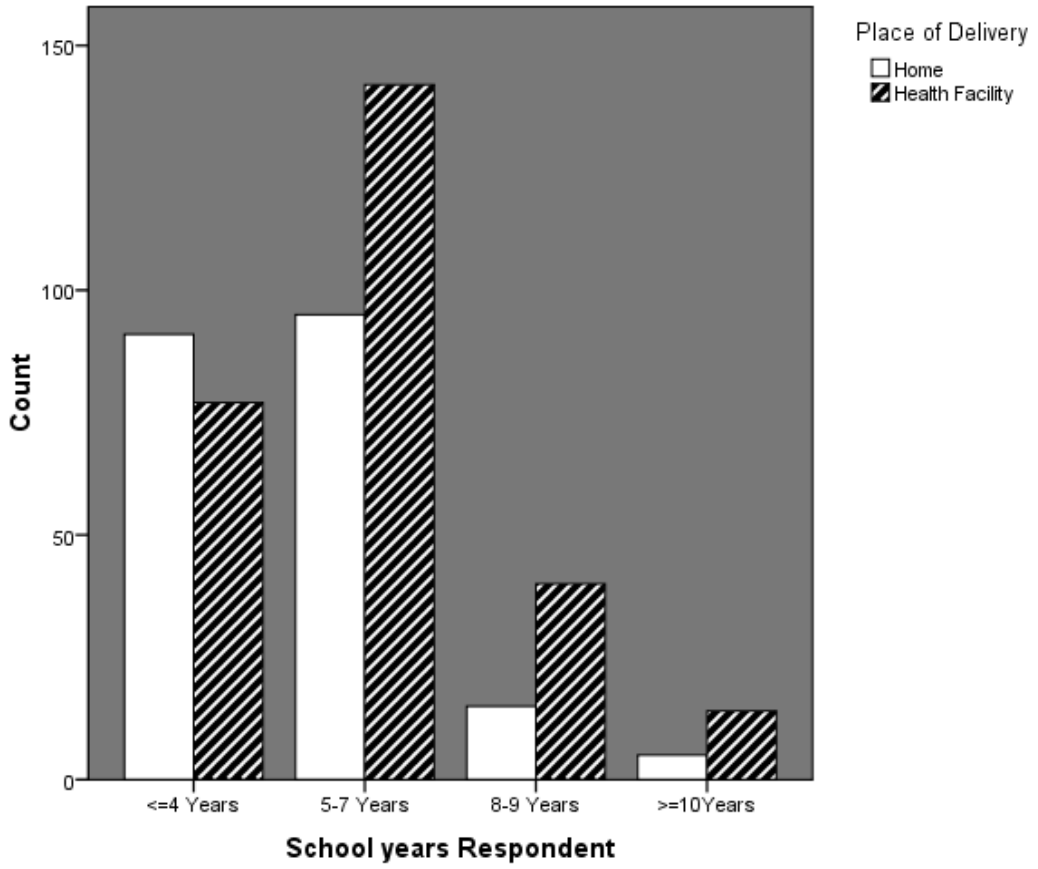
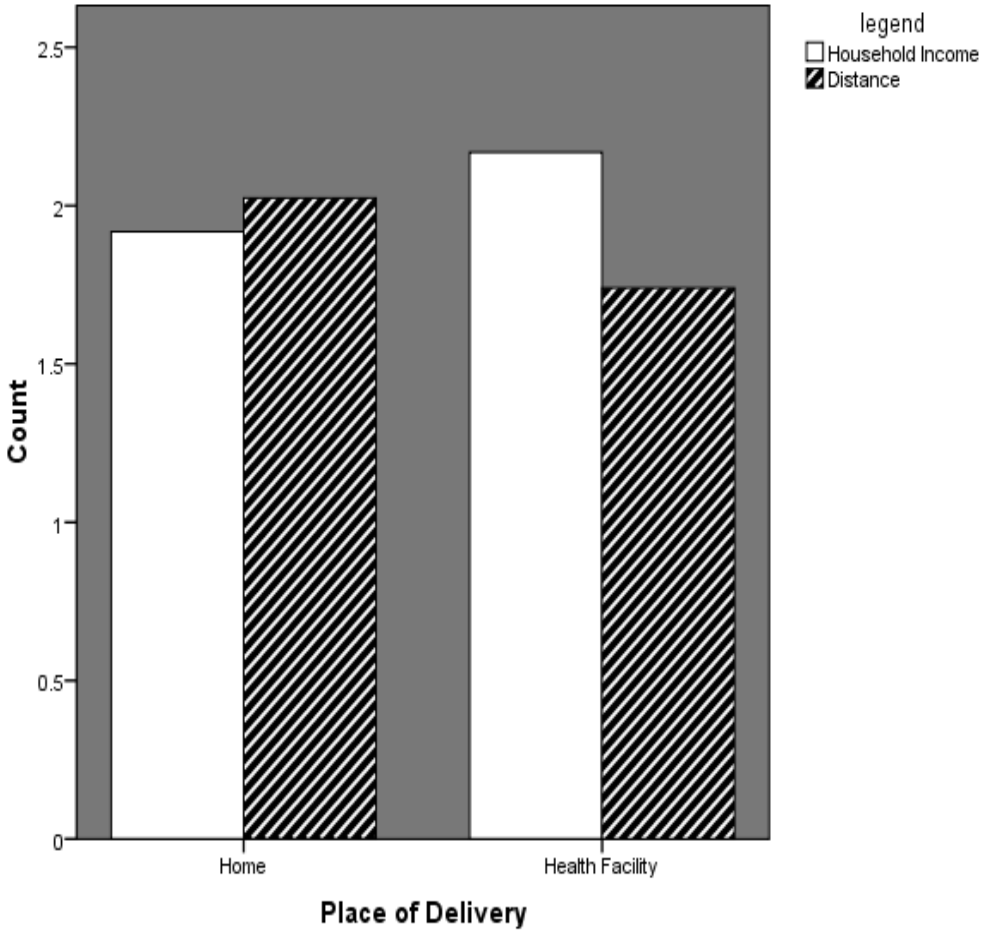


Figure 3: Comparison of the place of delivery by income and distance



CHAPTER FIVE

5.0 DISCUSSION OF THE FINDINGS

5.1 Prevalence and determinants of home deliveries

A prevalence of home deliveries in Nchelenge (43 percent), though lower than what is reported in the recent Zambia demographic and health survey (CSO, MOH, TDRC, University of Zambia and Macro International Inc 2009), is unacceptably high. A comparison with the reported deliveries occurring at home in Nchelenge district by traditional birth attendants and extracted from the health management information system (HMIS) for Nchelenge district, stood at 20.2 % in 2010, a prevalence which also is unacceptably high. This is because antenatal evidence suggests that most home deliveries still remain largely unreported and thus are not captured in the district aggregated information system, reflecting that the burden reported in this study might be an under estimation.

The study did not find any association between the mother's current age, their marital status, their parity, nor the occupation of the child's father. On multivariate logistic regression analysis, only the number of years of schooling by mothers; the household income and the distance of the mother's village to a health facility were found to be significantly associated with births that occurred at home. The perceptions on home deliveries varied on the basis of individual and community perspectives and revealed that following instruction, advice and personal experiences may have a bearing on women delivering at home irrespective of the proximity of their villages to a health facility. The distance to the health facility remained a prominent reason for home

deliveries in our study area as most villages are only accessible by foot paths and most of the roads in the rainy season become impassable. This made it very difficult for expectant women to travel to the health facility, especially when labor commenced at night. This finding regarding the inaccessibility of health facilities to women who lived far away was similar to studies in Burkina Faso and Indonesia that reported distance as an impediment for women who delivered at home (Some, Sombie and Meda 2011; Titaley and others 2010). In our study, the distance of the respondent's village was estimated in kilometers using the known designated routes from the nearest health facility to the village where the respondents were interviewed. Our findings, therefore, may not necessarily be similar to those from Nepal (Wagle and others 2004) that measured distance in terms of the time it took to travel to the maternity hospital and not by the number of kilometers.

Our findings on the education of mothers are comparable with those of a study done by Osubor, Fatusi and Chiwuzie (2006) in Nigeria which reported that education had a significant association with place of delivery while the age and marital status were found to have no association with respect to the place of delivery. Another study in Senegal by Faye and others (2010) also reported that having at least primary schooling, showed an association with child birth at home (OR: 0.59, CI 95% [0.46, 0.74]), as did the study by Lukumar and Pathmeswaran (2006) in Sri Lanka where low (<grade 5) maternal education (OR=3.5, 95% CI [1.8, 6.6]) had an association with home deliveries.

The household income was based on the reported monthly average combined income that the respondent said she earned from any gainful activity whether by herself, her spouse or indeed both of them. Our study findings showed a significant association

between household income and delivering at home. These findings were not, however, similar to those by Lukumar and Pathmeswaran (2006) in Sri Lanka who reported a non-significant association.

The study found that the majority of the mothers while agreeing to be able to deliver at home (71%) also indicated that they found home deliveries to be unsafe (73%). These findings were comparable with those of a study that was done in rural Turkey where 75.5% of mothers reported that home deliveries were unsafe (Kukulu and Öncel 2007) with the exception that this perspective in our study was obtained from women who delivered either at home and at a health facility a year prior to our study whereas those of Kukulu and Öncel (2007) were obtained from mothers who had delivered only at home at one time or the other.

Our study reported staff attitudes and inadequate workforce as a reason for preference by women to deliver at home. Some women felt they were not offered encouragement by health workers at health facilities and that to the contrary most health workers usually complained of being tired. This finding in our study may be related to both the lack of adequate health workers in a health facility and the work load that a single health worker may not accomplish on their own as reported in Indonesia (Titaley and others 2010). In a rural area of Tanzania, staff attitudes were also among the reasons presented for influencing the place of delivery (Mrisho and others 2007).

Abrupt and unexpected labor was another contributory reason for home deliveries. Our study found that women reported having had no option but to deliver at home because of such circumstances. This element coupled with the unavailability of transportation due

to a total lack of money to hire a vehicle or bicycle; made many women to opt to labor at home with the assistance of a traditional birth attendant or at times with no assistance at all. These findings were comparable to those found in Burkina Faso and Tanzania (Some, Sombie and Meda 2011; Mrisho and others 2007).

The following of instruction or merely being advised to deliver at home with a traditional birth attendant's assistance also emerged as a reason for delivering at home. Our finding in this study was that mothers were willing to follow instructions given by their spouses and more importantly their own parents about the place where they should deliver. This was also a finding in Indonesian where aspects of trust for traditional birth attendants and following instruction from family members were mentioned (Titaley and others 2010).

The study found a number of traditional beliefs and cultural practices that explained why women delivered at home. Issues of infidelity in marriage at the time of the woman's pregnancy either by herself or the spouse came out prominently and were given as reasons for necessitating certain practices that could only be performed by elderly women or traditional birth attendants in the confines of a home environment and not at the health facility. Requirements to keep secret a woman's confession of infidelity at labor also contributed to women preferring to be delivered at home as the elders performed the cultural duties to safeguard the unborn child. Our study found that women were even prepared to travel to another village in order to avoid a traditional birth attendant who could not keep secrets. These aspects of reasons for making women deliver at home were in the context of our study setting and may not necessarily have been the same for other studies.

5.2 Bias considerations

The study was conducted among women who were attending immunization posts. This may have biased our findings with regard to the prevalence of home deliveries as most of our respondents may have had a preference for seeking health services.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The occurrence of home deliveries in a low income rural setting of a developing country was associated to the distances of villages to health facilities and the household incomes as well as the number of years that mothers spent in school. These observed determinants alone however, do not entirely explain the circumstances under which each home delivery occurs and thus the personal experiences of mothers and the perspectives of community members and considerations of tradition and beliefs, combined with the afore mentioned determinants offer a better understanding of what factors determine a home delivery in Nchelenge, Zambia.

6.2 Implications for policy and research

Need for Community Midwives

With the growing population and the need for more health facilities, the ministry of health in addition to the direct entrant midwifery programme should consider scaling up further, the availability of skilled personnel by training community midwives who may be able to conduct deliveries in the community. This approach will not only supplement the efforts of increasing health workers but is necessary because the majority of women and mothers still have difficulties attending health facilities due to long distances. As the majority of deliveries in Zambia are still occurring at home and some without any form of care, community midwives may lessen the burden of distances and afford mothers an

opportunity to be attended by a skilled health provider who may quickly refer them to a health facility for further management in the event of complications.

Minimum girl child education without restrictions should be Secondary school level

The Zambian education system should allow for the education of the girl child to reach grade nine level even if they have not met the minimum standard requirement of passing a primary school grade seven examination. This will allow more women who attain child bearing age of fifteen years make better decisions regarding their health and that of the unborn baby and therefore improve the health of mothers and babies at delivery.

Consideration of cultural and traditional norms when implementing local strategies to improve care for women at delivery

Local strategies for improving the care provided to mothers at delivery should involve the education and sensitization of community members who have an influential stake in the livelihood of mothers and women in their respective villages. This will enhance community participation in mother safety programmes at community level and thus reduce the barriers to professional care with regard to cultural and traditional practices.

No requirements for women to deliver in health facilities

There should be no requisition of items needed at delivery from women who attend health facilities for delivery. This will encourage mothers who are unable to afford them to deliver at health facilities where they can receive professional care.

Future research on limitations identified

The limitations for the present study included lack of resources and time, that would have made it possible to carry out a cross sectional study of residences in the district, preferably using households that have already been mapped for other programmes and research taking place in the district.

7.0 REFERENCES

Adhikari, R.K. and Dahal L.H. 2008. "Factors affecting place of delivery in Dhading district." Journal of Institute of Medicine., 30(3), 42-48.

Almeida, F.M., Alencar G.P., Novaes M.H.D., França ISiqueira A.A., Schoeps D., Campbell O. and Rodrigues L. 2005. "Accidental home deliveries in southern SãoPaulo, Brazil." Rev Saúde pública., 39(3), 366-375.

Bastian, H., Keirse M.J.N.C. and Lancaster P.A.L. 1998. "Perinatal death associated with planned home birth in Australia: population based study." BMJ., 317(7155), 384-388.

Bolam, A., Manandhar D.S., Shrestha P., Ellis M., Malla K. and Costello A.M. 1998. "Factors affecting home delivery in the Kathmandu valley, Nepal." Health policy and planning., 13(2), 152-158.

Boucher, D., Bennett C., McFarlin B. and Freeze R. 2009. "Staying home to give birth: why women in the United States choose home birth." J Midwifery women's health., 54, 119-126.

Central Statistical Office, Ministry of Health, Tropical Diseases Research Centre, University of Zambia and Macro International Inc .2009. Zambia demographic and health survey 2007. Calverton, Maryland, USA: CSO and Macro International Inc.

Costello, A., Osrin D. and Manandhar D. 2004. "Reducing maternal and neonatal mortality in the poorest communities." BMJ., 329, 1166-1168.

Edirne, T., Ersoy F. and Yaman H. 2004. "Mother health in Turkey." Middle East Journal of Family Medicine., 2, 2.

Faye, A., Wone I., Samb O.M. and Tal-Dia A. 2010. "Study of the contributing factors to home delivery, Senegal." Bull. Soc. Pathol. Exot., 103,246-251.

Goldenberg, R.L., McClure E.M. and Belizán J.M. 2009. "Commentary: reducing the world's stillbirths." BMC Pregnancy and childbirth., 9(suppl 1), S1.

Green, L.W., and Kreuter M.W. 1999. Health Promotion Planning: an educational and ecological approach. 3rd ed. Toronto: McGraw-Hill.

Hatt, L., Stanton C., Ronsmans C., Makoweiecka K. and Adisasmita A. 2009. "Did professional attendance at home births improve early neonatal survival in Indonesia." Health policy and planning., 24, 270-278.

Hodgkin, D. 1996. "Household characteristics affecting where mothers deliver in rural Kenya." Health economics., 5, 333-340.

Hutton, E.K., Retsma A.H. and Kaufman K. 2009. "Outcomes associated with planned home and planned hospital births in low risk women attended by midwives in Ontario, Canada, 2003-2006: A retrospective cohort study." Birth., 36(3), 180-189.

Idris, S.H., Gwarzo U.M.D. and Shehu A.U. 2006. "Determinants of place of delivery among women in a semi-urban settlement in Zaria, northern Nigeria." Annals of African medicine., 5(2), 68-72.

Integrated Regional Informational Networks (IRIN). 2009. Tanzania: home deliveries contribute to mother, child deaths, available at: http://www.unhcr.org/refworld/docid/49ab9a13chtml[accessed 3 February 2010].

International Institute for Population Sciences (IIPS) and Macro International. 2007. National Family Health Survey (NFHS-3), 2005-06: India: Volume 1. Mumbai: IIPS.

Janssen, P.A., Saxell L., Page L.A., Klein M.C., Liston R.M. and Lee S.K. 2009. "Outcomes of planned homebirth with registered midwife versus planned hospital birth with midwife or physician." CMAJ., 181(6-7), 377-383.

Johnson, K.C. and Daviss B. 2005. “Outcomes of planned home births with certified professional midwives: large prospective study in North America.” BMJ. 330(7505), 1416.

Kennare, R.M.,. Keirse M.J.N.C, Tucker G.R. and Chan A.C. 2010. “Planned home and hospital births in South Australia, 1991-2006: differences in outcomes.” Med J Aust., 192(2), 76-80.

Kukulu, K and Öncel S. 2009. “Factors influencing women’s decision to have a home birth in rural Turkey.” Midwifery., 25, 32-38.

Lukumar, P. and Pathmeswaran A. 2006. “Factors associated with home deliveries in Thampalakaman, Trincomalee.” Ceylon medical journal., 51(2), 59-62.

Mpembeni, R.N.M., Killewo J.Z., Leshabari M.T., Massawe S.N., Jahn A., Mushi D. and Mwakipa H. 2007. “Use pattern of maternal health services and determinants of skilled care during delivery in southern Tanzania: implications for achievement of MDG-5 targets.” BMC pregnancy and child birth., 7(29).

Mrisho, M., Schellenberg J.A., Mushi A.K., Obrist B., Mshinda H., Tanner M. and Schellenberg D. 2007. “Factors affecting home delivery in Tanzania.” Tropical medicine and international health., 12(7), 862-872.

National Institute of Population studies (NIPS) [Pakistan] and Macro International Inc. 2008. Pakistan Demographic and Health Survey 2006-07. Islamabad, Pakistan: National Institute of Population studies and Macro International Inc.

National population commission (NPC) and ICF Macro. 2009. Nigeria demographic and health survey2008: key findings. Calverton, Maryland, USA: NPC and ICF Macro.

National Statistical Office and ORC Macro. 2005. Malawi demographic and health survey 2004. Calverton, Maryland, USA.

National Bureau of Statistics (NBS) [Tanzania] and ORC Macro. 2005. Tanzania Demographic and Health Survey 2004-05. Dar-es-Salaam, Tanzania: National Bureau of Statistica and ORC Macro.

Nchelenge District Health Office. 2009. Nchelenge Medium Term Expenditure Framework Action Plan 2008-2010.

Nuwaha, F. and Amooti-Kaguna B. 1999. "Predictors of home deliveries in Rakai district, Uganda." African Journal of Reproductive Health., 3(2), 79-86.

Osubor, K.M., Fatusi A.O. and Chiwuzie J.C. 2006. "Maternal health seeking behavior and associated factors in a rural Nigerian community." Maternal Child Health J., 10(2), 159-169.

Pang, J.W.Y., Heffelfinger J.D., Huang G.J., Benedetti T.J. and Weiss N.S. 2002. "Outcomes of planned home births in Washington State: 1989-1996." Obstetrics and Gynecology., 100(2), 253-259.

Ronsmans, C., Scott S., Qomariyah S.N., Achadi E., Braunholtz D., Marshall T., Pambudi E., Witten K.H. and Graham W.J. 2009. "Professional assistance during birth and maternal mortality in two Indonesian districts." Bull World Health Organization., 87, 416-423.

Sheiner, E., Hershkovitz R., Shoham-Vardi I., Erez O., Hadar A. and Mazor M.. 2004. "A retrospective study of unplanned out-of-hospital deliveries." Arch Gynecol Obstet. 269:85-88.

Some, T.D., Sombie I. and Meda N. 2011. "Women's perceptions of home births in two rural medical districts in Burkina Faso: a qualitative study." Reproductive health., 8, 3.

Sørenson, H.T., Steffensen F.H., Rothman K.J., Gillman M.W., Fischer P., Sabroe S. and Olsen J. 2000. "Effect of home and hospital delivery on long term cognitive function." Epidermiology., 11(6), 706-708.

Sreeramareddy, C.T., Joshi H.S., Sreekumaran B.V., Giri S. and Chuni N. 2007. "Home delivery and new born care practices among urban women in western Nepal: A questionnaire survey." BMC Pregnancy and Childbirth., 26, 27.

Thind, A., Mohani A., Banerjee K., Hagigi F. 2008. "Where to deliver? Analysis of choice of delivery location from a national survey in India." BMC Public Health., 8 (29).

Tita, A.T.N., Stringer J.S.A., Golden R.L., Goldenberg R.L. and Rouse D.J. 2007. "Two decades of the safe motherhood initiative. Time for another wooden spoon award?" The American college of obstetrics and gynecology., 111(5), 972-976.

Titaley, C.R., Hunter C.L., Dibley M.J. and Heywood P. 2010. "Why do some women still prefer traditional birth attendants and home delivery? a qualitative study on delivery care services in West Java Province, Indonesia." BMC Pregnancy and Childbirth., 10,43.

Wagle, R.R., Sabroe S. and Nielsen B.B. 2004. "Socio-economic and physical distance to the maternity hospital as predictors for place of delivery: an observation study from Nepal." BMC pregnancy and childbirth., 4, 8.

World Health Organization, 2004. Making pregnancy safer: the critical role of the skilled attendant. A Joint statement by WHO, ICM and FIGO. Geneva: WHO.

World Health Organization, 2006. Annual Report 2005. Department of making pregnancy safer. Geneva: WHO.

World Health Organization, 2010. Trends in maternal mortality: 1990 to 2008. Geneva: WHO.

World Health Organization, 2007. Maternal mortality in 2005: estimates developed by WHO, UNICEF, UNFPA and the World Bank. Geneva: WHO.

Appendix A

RESEARCH QUESTIONNAIRE

FACTORS ASSOCIATED WITH HOME DELIVERY IN A LOW INCOME RURAL SETTING-OBSERVATIONS FROM NCHELENGE, ZAMBIA.

Questionnaire Number…..Name if interviewer……..…

Date of interview (dd/mm/yyyy)……..

Instructions:

This questionnaire is to be administered to all women aged18-49 years that had a delivery in the past one year. Introduce yourself and explain the purpose of the study. If a woman has had a delivery in the past one year, go ahead and administer the questionnaire once she consents. Please complete one questionnaire for each eligible woman.

Name of village where respondent lives……...

Name of Immunization Post where interview is being conducted…….

Number of kilometers of Post to nearest health facility…….

No	Question	Coding Classification	Code
1	Age at last birthday	18-24 years……1 25-29 years……2 30-34 years……3 35 years and above……4	
2	Distance of immunization post village to nearest health facility	5 KM or less……...1 6-10 KM……2 11 KM and above……...3	
3	What is your current marital status?	Single……1 Married……...2 Other……...3	
4	How many children have you ever had, including those that were born after seven months but died afterwards?	One Child……...1 Two Children……..2 Three or More Children……..3	
5	How many persons live in your household? Including extended family members	Three members or less……1 Four members……2 Five members……3 Six or more members……4	
6	What level of education have you attained?	Primary level/None……1 Junior Secondary……2 Upper Secondary/College……...3	

7	How many years have you spent in school?	Four years or less……1 5-7 years……2 8-9 years……3 10 years and above……4	
8	What level of education has the father of your child attained?	Primary/None……1 Junior Secondary……2 Upper Secondary/college……...3	
9	How many years has the father to your child spent in school	Four years or less……1 5-7 years……2 8-9 years……3 10 and above……...4	
10	What is the occupation of the child's father?	Has No trade/skill/craftsmanship……...1 Carpentry/Bricklayer/Other……..2 Peasant farmer/fisherman……3	
11	How much income is earned in your household each month?	Less than 150,000ZMK……1 150,000-199,000ZMK……..2 200,000-249,000ZMK……..3 250,000ZMK or more……...4	
12	How many times did you attend antenatal care at a health facility in your last pregnancy?	None……1 One or more times……2	
13	What was the place of delivery for your last pregnancy?	Home……..1 Health Facility……2	
14	Concerning home deliveries, would you want to deliver at home?	Yes……1 No……..2 No comment……..3	
15	What's your opinion regarding safety in home deliveries?	Safe……1 Not safe……2 No comment……..3	

CHECK THROUGH THE QUESTIONNAIRE AND THANK THE RESPONDENT FOR HER TIME TO COMPLETE THE QUESTIONNAIRE!

Appendix B: Interview Information Sheet for Research Participants

FACTORS ASSOCIATED WITH HOME DELIVERIES IN NCHELENGE

My name is Davis Mwewa; I am a student pursuing a master's degree in Public Health at the University of Zambia. I am carrying out research on **factors that are associated with home deliveries for women aged 18-49 years old in Nchelenge.** The information that I seek to find out from you will be strictly confidential and for that purpose your name will not be required to be given in this interview. The questionnaire to be administered for this interview will take approximately 10-15 minutes to complete.

The research is intended to help policy makers at the district health office to formulate strategies that can better enhance the welfare and health of women who are pregnant up to the time they go for delivery and afterwards. For this reason your participation will be of immense help to the district and the ministry of health in general. I would further like to assure you that your participation in this study is entirely your own choice and you are free to ask for any clarifications before you consent to take part. Similarly you are free to withdraw from the study at any time when you are uncomfortable to continue with the interview.

This study will not involve any invasive procedures and you are not required to submit any samples of specimens at all. In the event that you should have any questions or concerns do not hesitate to contact me or my supervisor or indeed the chairperson of the research ethics committee on the under listed addresses below:

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Appendix C: Research Participant Interview Consent Form

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INFORMED CONSENT FORM

The intention of this study has been explained to me and I understand the purpose, the benefits, risks and discomforts and confidentiality of the study. I further understand that:

If I agree to take part in this study, I can withdraw at any time without having to give an explanation and that taking part in this study is entirely on voluntary basis.

I_____ (Name)

Agree to take part in this study.

Signed: _____ Date: _____ (Participant)

Participant's signature or thumb print

Signed: _____ Date: _____ (Witness)

Signed: _____ Date: _____ (Researcher)

Appendix D: Immunization Posts in Nchelenge District

No.	Name of Immunization Outreach Post	Health Centre under which Outreach Post is located in Nchelenge District
1	*Kapela*	*Kabuta* Rural Health Centre
2	*Mulanga*	*Kabuta* Rural Health Centre
3	*Felushi*	*Kabuta* Rural Health Centre
4	*Chiba*	*Kabuta* Rural Health Centre
5	*Chilamba*	*Kabuta* Rural Health Centre
6	*Munkombwe*	*Kabuta* Rural Health Centre
7	*Mutabwa*	*Kabuta* Rural Health Centre
8	*Lupili*	*Kabuta* Rural Health Centre
9	*Kabuta* East	*Kabuta* Rural Health Centre
10	*Chula*	*Kabuta* Rural Health Centre
11	*Mukwakwa*	*Kabuta* Rural Health Centre
12	*Ntoto*	*Kafutuma* Rural Health Centre
13	*Kafwala*	*Kafutuma* Rural Health Centre
14	*Mutampuka*	*Kafutuma* Rural Health Centre
15	*Shimpundu*	*Kafutuma* Rural Health Centre
16	*Kalweo*	*Kafutuma* Rural Health Centre
17	*Shimwilima*	*Kafutuma* Rural Health Centre
18	*Miba*	*Kafutuma* Rural Health Centre
19	*Kalilanshindo*	*Kashikishi* Rural Health Centre
20	*Kansensele*	*Kashikishi* Rural Health Centre
21	*Kabukwa*	*Kashikishi* Rural Health Centre
22	*Daison*	*Kashikishi* Rural Health Centre
23	*Kabosha*	*Kashikishi* Rural Health Centre
24	*Chifundo*	*Kashikishi* Rural Health Centre
25	*Yenga*	*Kashikishi* Rural Health Centre
26	Ray of Joy	*Kashikishi* Rural Health Centre
27	*Kenani*	*Kashikishi* Rural Health Centre
28	*Mumpundu*	*Kashikishi* Rural Health Centre
29	*Mubamba*	*Nchelenge* Rural Health Centre
30	*Shikapande*	*Nchelenge* Rural Health Centre
31	*Kenani* Rubber	*Nchelenge* Rural Health Centre
32	*Chilongo*	*Nchelenge* Rural Health Centre
33	*Isokwe* Island	*Nchelenge* Rural Health Centre
34	*Mupitwa* Island	*Nchelenge* Rural Health Centre
35	*Potolo* Island	*Nchelenge* Rural Health Centre
36	*Lushiba*	*Nchelenge* Rural Health Centre
37	*Chibwili*	*Chabilikila* Rural Health Centre
38	*Chipulumushi*	*Chabilikila* Rural Health Centre
39	*Mukanso*	*Chabilikila* Rural Health Centre
40	*Chebele*	*Chabilikila* Rural Health Centre

41	*Kashishi*	*Chabilikila* Rural Health Centre
42	*Chungu/Kanwabatondo*	*Chabilikila* Rural Health Centre
43	*Chupa*	*Kapambwe* Rural Health Centre
44	*Shimulundu*	*Kapambwe* Rural Health Centre
45	*Mushingo*	*Kapambwe* Rural Health Centre
46	*Kalimbwa*	*Kambwali* Rural Health Centre
47	*Mushili*	*Kambwali* Rural Health Centre
48	*Mulwe* North	*Kambwali* Rural Health Centre
49	*Mulwe* South	*Kambwali* Rural Health Centre
50	*Mukange*	*Kambwali* Rural Health Centre
51	*Nshinda*	*Kambwali* Rural Health Centre
52	*Mantapala*	*Kambwali* Rural Health Centre
53	*Nshoka*	*Kambwali* Rural Health Centre
54	*Nsemiwe*	*Kambwali* Rural Health Centre
55	*Lunde*	*Kanyembo* Rural Health Centre
56	*Kanaya*	*Kanyembo* Rural Health Centre
57	*Kashita*	*Kanyembo* Rural Health Centre
58	*Toka*	*Kanyembo* Rural Health Centre
59	*Shanyemba*	*Kanyembo* Rural Health Centre
60	*Mubanga*	*Kanyembo* Rural Health Centre
61	*Chinsamba*	*Kilwa* Island Rural Health Centre
62	*Chipulwe*	*Kilwa* Island Rural Health Centre
63	*Chipuma*	*Kilwa* Island Rural Health Centre
64	*Chisukulu*	*Kilwa* Island Rural Health Centre
65	*Kapopolo*	*Kilwa* Island Rural Health Centre
66	*Bwaya*	*Kilwa* Island Rural Health Centre
67	*Kasompe*	*Kilwa* Island Rural Health Centre
68	*Chawelwa*	*Chisenga* Island Rural Health Centre
69	*Chipashi*	*Chisenga* Island Rural Health Centre
70	*Mumpololmbo*	*Chisenga* Island Rural Health Centre
71	*Kashilu*	*Chisenga* Island Rural Health Centre
72	*Muyembe*	*Chisenga* Island Rural Health Centre
73	*Kasumpa A*	*Kabalenge* Rural Health Centre
74	*Kasumpa B*	*Kabalenge* Rural Health Centre
75	*Mangamu*	*Kabalenge* Rural Health Centre
76	*Chibelka*	*Kabalenge* Rural Health Centre
77	*Mpopo*	*Kabalenge* Rural Health Centre
78	*Mwanda*	*Kabalenge* Rural Health Centre
79	*Katofyo*	*Kabalenge* Rural Health Centre