

**FACTORS INFLUENCING MATERNITY  
SERVICES UTILIZATION IN LOIMA  
AND TURKANA CENTRAL DISTRICTS  
OF TURKANA COUNTY**

**THESIS SUBMITTED IN PART FULFILLMENT  
OF THE DEGREE OF MASTER OF MEDICINE  
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**DECLARATION**

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## DEDICATION

*This book is dedicated to my elder brother, the late Long'olol A. Lobuin(Epoy-aluk), my father, the late Abok Lobuin (Apaalomunat), and my mother Eruon Abok, three people who literally fought many difficult battles for me and ensured i abandoned herding goats and camels and started school.*

*Special gratitude to my wife Julie Amaire and my children Egialan, Ekuwom, Eruon and Ekitella. Thank you for your unwavering support and encouragement.*

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## **ABBREVIATIONS**

AIDS	-Acquired Immune Deficiency Syndrome.
ALRMP	-Arid lands resource management programme
ANC	-Ante natal care
AOP	- Annual operational plan
DHMB	-District health management Board
DHMT	-District Health management team
FBO	-Faith based organisation
HH	-Household
HIV	-Human immunodeficiency virus
KDHS	-Kenya demographic and health survey
Ksh	-Kenya shillings
Km	-Kilometre
MDG	-Millennium development goals
M.MED	-Master of Medicine
MPS	-Making pregnancy safer
NGO	-Non- governmental organisation
PNC	-Postnatal care
SPSS	- Statistical package for the social sciences
TBA	- Traditional birth attendant
WHO	-World health organization

## **DEFINITIONS**

**Skilled attendant** – is defined by World Health Organization (WHO) as a health professional such as a medical doctor, clinical officer or nurse- who has been educated and trained to proficiency in the skills needed to manage normal pregnancies, childbirth, and the immediate post partum period, and in the identification, management and referral of complications in women and newborns.

**Maternal death** – The death of a woman while pregnant or within 42 days of termination of pregnancy irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

**Quality maternal care** – The provision of a minimum level of care to all pregnant women and their new born babies, and higher level of care to those who need it; obtaining the best possible medical outcome of mother and baby; providing care which satisfies users and providers and maintaining sound managerial and financial performance.

**Maternal mortality Ratio (MMR):** The number of maternal deaths that result from the reproductive process per 100,000 live births.

**Perinatal Mortality rate** – Still births and neonatal deaths within seven days of birth per 1000 total births in a given year.

**Maternal morbidity** – medical conditions in a woman caused by pregnancy, labour and delivery (up to 42 days post delivery).

**Focused antenatal care (FANC)-** Refers to here four spaced visits as recommended by World Health Organisation (WHO)

**Household-** A group of people who live together and usually eat from the same pot.

# ABSTRACT

## **Background**

Developing countries of Asia and Africa account for 99% of the yearly 536,000 maternal mortalities, most of which are avoidable. It is for this reason, among others, that MDGs were developed. Understanding why women still do not use antenatal care services, health facility delivery and postnatal care services is crucial towards achieving MDGs and addressing the tragedy of high maternal mortality in the developing countries.

Turkana central and Loima districts are one of the districts in Kenya with low utilisation of ANC and skilled care during delivery. The two districts had only 8.1% of deliveries assisted by skilled personnel in 2008. Hence the need to understand reasons for poor utilisation of these crucial maternity services. It is for this purpose that this study is designed.

## **Objective**

To determine the factors that influence antenatal care attendance, skilled assistance during delivery and postnatal care among the women of Loima and Central districts of Turkana County.

**Study Design:** This was a cross-sectional household survey that sought to determine factors associated with maternity services utilisation by comparing those women who had delivered at home with those who delivered in a health facility in the preceding 2 to 36 months in Turkana central and Loima districts of Turkana County.

**Main outcome measures:** Information on sociodemographic, sociocultural, socioeconomic characteristics among ANC attendants, mothers who delivered at home or a health facility and PNC attendants was collected. Information on physical access and perceived quality of maternity services was also collected to correlate ANC attendance, health facility delivery and post natal clinic attendance among mothers who had home and health facility deliveries.

## **Results:**

Mother's education (p value <0.0001) was strongly associated with choice of place of delivery; Mothers who had post-primary school were 17 (OR= 17.2 CI 3.0-98.8) times likely to deliver in a health facility than those with less formal education. Having a

monogamous spouse (p value= 0.006, OR= 2.7 CI 1.3-5.5), a health facility having been place of previous delivery (p value < 0.0001, OR=5.5 CI 2.1-14.4) and satisfaction with a previous birthing position (p value 0.015, OR= 14.3 CI 1.7-122.3) were also significant in determining place of delivery. If birth plan was discussed in ANC during pregnancy (p value <0.0001 and OR 7.8 CI 2.9- 21) had significant influence on where mothers delivered. Means of transport to a health facility determined place of delivery (p value < 0.0001).A mother who had access to a vehicle was 31 times (OR 31 CI 7.0-142.3) likely to deliver in a health facility than one who walked to the facility during labour. Community perception of quality of maternity services was crucial; mothers who perceived health facilities to promptly attend to them were 8 times (OR 7.5 CI 2.3-24.7) likely to deliver in a health facility. Perceived adequacy of equipment and medical supplies was also significant (p value = 0.010 and OR 15.9 CI 1.9-131.7). ANC attendance for at least four visits was 68.1% and 63.2% for health facility and home users respectively. PNC attendance was 95.7% and 85.3% for health facility users and home users respectively.

### **Conclusions:**

Education of women, discussion of the birth plan during ANC, polygamy, birthing position and place of initial delivery were critical in determining place of delivery in this area

### **Recommendation**

Education of the girl child and highlighting the benefits of monogamy to the community need to be focused on. There is need to focus on and especially target primigravidae to have deliveries in health facilities by promoting advocacy, education on danger signs and emphasizing to the community the importance of health facility delivery. Other safe birthing positions apart from recumbent position need to be discussed with health workers and allowed in health facilities. A birth plan needs to be discussed in ANC. The government needs to deliberately open up the area economically for these two districts to realise improved reproductive health indicators.

## **INTRODUCTION**

The World Health organization (WHO) in 2005 estimated that 536,000 maternal deaths occur annually. These deaths often occurred around pregnancy, childbirth and the immediate postpartum period and usually, in the developing countries where they accounted for a third of all deaths of women. For every maternal death, at least 30 women suffer injuries and often permanent disability.<sup>1</sup>

The KDHS survey of 2008/2009 indicated that the maternal mortality ratio in Kenya was 488 per 100,000 live births.<sup>2</sup> Haemorrhage, infections, unsafe abortions, hypertensive diseases and obstructed labour accounted for 80% of these deaths.<sup>1,2</sup> Many of these deaths are avoidable. Millions of women in developing countries lack adequate access to quality health care during pregnancy, childbirth and the postnatal period. Quality antenatal care, deliveries by skilled personnel and post natal care - key pillars of safe motherhood initiative (SMI) are among the recognized strategies that are crucial to the reduction of maternal mortality in the developing world.<sup>1</sup>

Whereas 91.5% of mothers attended ANC services in Kenya, only 43.8% were assisted by skilled personnel.<sup>2</sup> KDHS data unfortunately, did not have disaggregated district data. However, the district annual plan for Turkana Central districts for the year 2008 paints the sad picture of generally low ANC utilization and dismal facility delivery of 8.1% of deliveries.

Turkana districts of Loima and Central are on the remotest north western part of Kenya, inhabited by the nomadic pastoralist Ng'iturkana people. They, together with Turkana East, Turkana South, Turkana West and Turkana North constitute Turkana County. Turkana County constitutes 42% of Rift valley landmass. Nearly 50-60% of health care services are offered largely by faith based organizations (FBOs) and non- governmental organizations (NGO's). The Government of Kenya's through the health ministries offer only 40- 50% of health services in the two Turkana districts of central and Loima.<sup>10</sup>

The population of the two districts in 2010 was 273,268<sup>40</sup>. In the same year, there were a total of 39 health facilities in the two districts categorized into; 1 district hospital, 2 health centres and 36 dispensaries. Clinical services in the only hospital were offered by 3

medical doctors, 69 nurses and 5 clinical officers. The remaining 38 facilities had 22 nurses and 2 clinical officers<sup>10</sup>.

Fixed health facilities were supplemented by mobile health services (largely NGO/ FBO run) offering targeted health services. The approximate distance between two facilities was usually about 40-60 km<sup>10</sup>. There is a very poor road network in the area. Absolute poverty levels in 2010 were at 96% (Ministry of Planning/Arid land's resource management programme- ALRMP).

The vastness of the district, inadequate health facilities, perennial qualified staff shortages, nomadic pastoralism and perennial cattle rustling associated insecurity are veritable challenges to health care delivery in these areas. Some Community attitudes and practices and rampant poverty contribute to the poor maternal and other health indicators.

There are hardly any studies that have attempted to explore the role of these factors in this area and similar nomadic communities. Why mothers who live in periurban villages in this area often deliver at home has never been explained. This study thus was undertaken to especially attempt to identify crucial determinants of home and health facility deliveries in the two Turkana districts.



## **CONCEPTUAL FRAMEWORK**

### **NARRATIVE**

Factors determining maternity services utilisation are diverse and yet interrelated. The factors can be grouped into five main factors namely sociocultural factors, Physical access, economic access, past obstetric experience and perceived benefit or quality of care. Individual factors however are also shaped by other broader factors, often beyond the immediate control of the individual or community.

Good roads and availability of transport and communication are prerequisites to improved physical access to distant health facilities. These often require deliberate political effort and commitments to improve the same. Improvement of sexual and reproductive health in special communities like the nomadic Ng'iturkana people requires dynamic change in key health systems issues such as health sector reform, financing, procurement and logistics, and enhanced respective roles of government and NGO's/FBO's.

Legislations aimed at poverty eradication, security improvement and local (i.e. CDF and LATF) and national resource mobilization would need strengthening to improve access to and utilisation of quality maternal services in such special areas. The situational analysis on the contribution of these later factors directly related to political commitment and touching on human rights and gender issues would be difficult to ascertain in this study. Thus, the study aimed to look at the five main factors mentioned above.

Sociocultural contributors encompass both sociodemographic factors and community factors that would hinder or facilitate use of these services. Gender autonomy influences access to these services. Maternal age, marriage status together with the woman's level of formal education and the female gender access to and control of household income and resources are very critical. The husband's level of education is equally important. The community's beliefs and practices including religion play a crucial role as critical determinants of use of maternal health services.

Preferences for the male to be educated while girls are viewed as source of dowry are some underlying community practices that adversely affect the girl child's education.

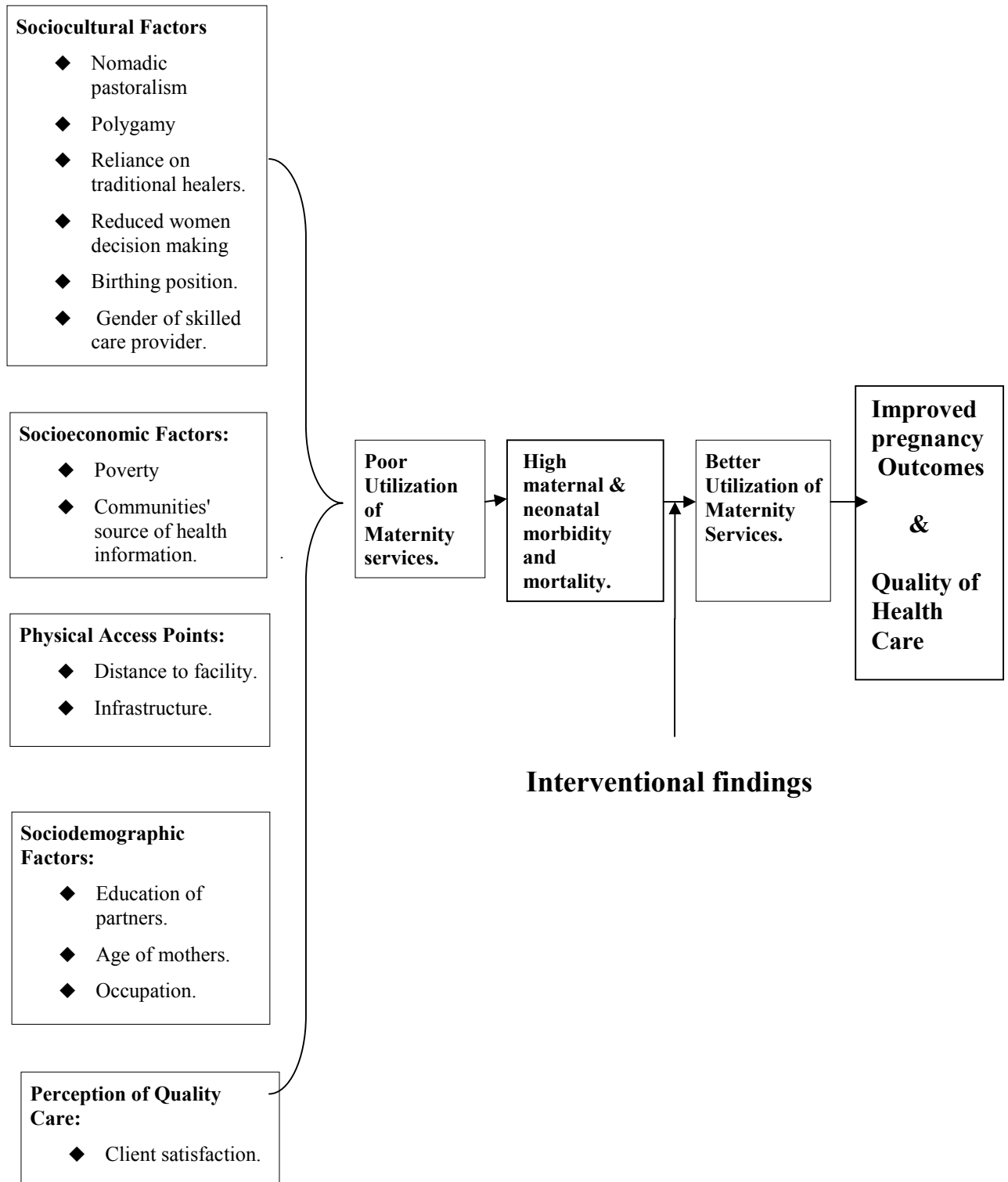
The geographical location of residence and their remoteness or proximity to health services also play a major role in ensuring utilisation or non utilisation of the same. These would in turn be also factors of distance and means of transport to the facility. Perceived benefit is the fourth broad factor and this includes such factors as availability of information, health knowledge available or even Wantedness of the pregnancy- also influenced by community attitudes and practices. Previous use of maternity services is also key as is perceived quality of care available. All these factors operate not isolation but in concert.

In a remote area with poor infrastructure and deeply entrenched cultural practices such as nomadic pastoralism- understanding the contribution of each of these factors would be important to future improvement of outcome and impact indicators.

Measures to reduce the negative effect of physical access factors which include reducing distance to the nearest facilities by building more facilities or scaling mobile services to target nomads would likely improve maternal and neonatal outcome and impact indicators. Central government efforts to improve roads and open up this area will also improve the same indicators. Sociocultural factors that impact negatively on female autonomy also will need to be tackled. The value of early marriages, Polygamy, consideration of women as source of riches (dowry) and practices that discourage formal education need to be re-examined by the community. Reliance on traditional healers equally merits attention.

Available sources of health information determine access and utilisation of maternity services. Various sociodemographic and socioeconomic factors related to above determinants are critical too. In a nutshell, the contributions of these factors to poor access and utilisation of maternity services were looked at in an effort to improve the tragedy of maternal and neonatal mortality and morbidity in the two districts of Turkana County.

## DIAGRAMMATIC



## **LITERATURE REVIEW**

Worldwide, a woman dies every minute from complications of pregnancy and childbirth. It is thus estimated that 1450 maternal deaths occur daily the world over.<sup>1</sup> In 2005, of the estimated total of 536 000 maternal deaths worldwide, developing countries accounted for 99% (533 000) of these deaths. Slightly more than half of the maternal deaths 50.4% (270 000) occurred in the sub-Saharan Africa region alone, followed by South Asia 35.1% (188 000). Thus, sub-Saharan Africa and South Asia accounted for 86% of global maternal deaths.<sup>2</sup>

The lifetime risk of maternal death is highest in Africa at 1 in 26 while the developed regions had the smallest lifetime risk of 1 in 7300.<sup>1,2</sup> In Kenya maternal mortality ratio(MMR) was 414 per 100,000 live births in 2003. It increased to 488 per 100,000 live births<sup>2</sup> in 2008. Maternal mortality ratio worldwide has decreased at an average of less than 1% annually between 1990 and 2005 – far below the 5.5% annual decline, which is necessary to achieve the fifth MDG. Maternal mortality ratio annual reduction has been worse in sub-Saharan Africa at approximately 0.1 percent<sup>1, 2</sup>.

In addition, perinatal mortality tends to follow the same geographical pattern as for maternal deaths. Approximately 98% of the 5.7 million perinatal deaths suffered globally occur in developing countries. Nearly 3 million babies are born dead each year and another 3 million do not survive beyond the first week of life. About one-third of perinatal deaths in developing countries are related to intrapartum complications leading to birth asphyxia. Preterm birth, malformations, and infections related to pregnancy and birth contribute to the remainder of the early neonatal deaths. Early neonatal deaths account for 38% of all infant mortality and 29% of 'under-five' mortality in developing countries, representing a substantial portion of overall child deaths<sup>4,5</sup>

Late neonatal deaths are to some extent due to perinatal conditions, but mostly to infections acquired after birth, many of which are associated with poor hygiene, often associated with home deliveries, lack of information on adequate newborn care and/or poor neonatal feeding practices. Often the death of mothers is closely related with newborn deaths, as maternal mortality and morbidity have a direct negative impact on the survival chances of the newborn.<sup>2, 4, 5</sup> For every woman who dies, many more women

suffer from disease and disability at the height of their productivity and family responsibility.<sup>6</sup>

More than 70% of maternal deaths are due to haemorrhage (25%), sepsis (15%), unsafe abortion (13%), eclampsia (12%) or obstructed labour (8%). HIV/AIDS, malaria and tuberculosis aggravate pregnancy and childbirth complications. Many of these deaths are avoidable.<sup>1, 5</sup>

While most pregnancies and births are uneventful, all pregnancies are at risk. Around 15% of all pregnant women develop a potentially life-threatening complication that calls for skilled care and some will require a major obstetrical intervention to survive<sup>4, 7</sup>.

The benefits of antenatal care, skilled delivery and targeted postnatal care are immense and are critical to the improvement of maternal outcome and impact indicators. Reduction in maternal and infant morbidity and mortality rates in England and the United States were attributed to good antenatal care. Babies born to women who receive no antenatal care are three times likely to die in infancy.<sup>38</sup>

In some developed countries, however, the concept of planned home birth is currently the focus of ongoing controversy; an undesirable outcome of home delivery, such as high maternal and perinatal mortality, is well documented in developing countries thus forestalling any such debate.<sup>7, 8</sup>

Millions of women in developing countries like Kenya lack adequate access to quality health care during pregnancy and childbirth. Antenatal care during pregnancy, skilled attendance during delivery and targeted post natal care are some of the key pillars of safe motherhood initiative (SMI)-improvement of which are critical to the reduction of maternal mortality ratio in Kenya. One of the distinguishing characteristics of the SMI that sets it apart from other health initiatives is the focus on the well being of women as an end in itself. It recognizes the intrinsic value of a woman separate from the effect of any woman's death effect on her children and other family members<sup>13</sup>

In Kenya 91.5% of pregnant women attended ANC- with more than 9 in 10 women having been attended to by a health professional at least once for antenatal care, during the

recent birth in the preceding five-year period. Coverage was slightly higher in urban areas than in rural areas (96% versus 90%). Deliveries by skilled personnel were 43.8% whereas the percentages of deliveries occurring in a health facility were 43.6%.<sup>2</sup>These figures show a wide variation in various regions of the country. Rift-valley province had ANC attendance at 88.4% and skilled attendance at delivery at 33.7%.<sup>2</sup>However disaggregation of the data was not done to district level.

The Turkana district annual operational plan (AOP 6) estimates that the percentage of pregnant mothers who attended ANC in the year 2008 was 72% .<sup>10</sup>This figure when compared with the national and Rift valley province performance was low. The same AOP 6 shows that only 8.1% of mothers delivered in a health facility; a figure way below the national and all provinces average.<sup>10</sup>The infant mortality rate (IMR) was 66 deaths per 1000 live births compared to the national figure of 52 deaths per 1000 live births in 2008<sup>2,10</sup>.

Maternal health refers to the health of women during pregnancy, childbirth and the postpartum period. Therefore Maternity services encompass the full gamut of organized services targeted to provide health care to expectant and nursing mothers. These services are key pillars of safe motherhood, which is described as the ability of a woman to have a safe and healthy pregnancy and delivery. A strategic approach paper issued by WHO Department of Making Pregnancy Safer (MPS) states that every birth should be attended by a skilled health worker if the terrible toll of maternal deaths is to be reduced<sup>4,11</sup>.

It also states that many of the maternal deaths could be averted if all women had the assistance of a skilled health worker before, during and after pregnancy including access to emergency medical care if complications should ensure.<sup>11</sup>Provision of quality maternity services that are accessible and affordable is key to any such realization<sup>4, 5, 6, 11</sup>. Even where the services are available and accessible, the utilization is very low.<sup>12, 13</sup> This therefore has necessitated various studies to be done to look at determinants of antenatal utilization and especially skilled delivery assistance (which mostly occurs in health facilities) in the developing countries.

In their findings from multidisciplinary review titled “Too far to walk,” Sreen Thaddeus and Deborah Maine came up with the now commonly used three phases of delay<sup>13</sup>. They noted that Phase 1 delay was due to delay in deciding to seek health care on the part of the

individual, family or both. These are often discussed as barriers or constraints to the utilization of health services. The various researchers on this area had observed that increasing the availability of services did not necessarily increase the utilization of the same. Thus factors that contributed to the under- utilization of the health services were examined and found to be barriers in the socio-cultural milieu that often shaped values, beliefs and attitude in the various communities studied. Socio-economic conditions and geographical settings were also found out to shape physical accessibility<sup>13</sup>.

Thus, distance, cost, quality and sociocultural factors were found to be important barriers especially in rural areas. This is worsened by lack of transport and poor roads.<sup>13</sup> The writers thus came up with a distance decay curve meaning the farther away from a facility people live, the less likely they are to use it.

However, most of the studies from Kenya, Guatemala and Nigeria concluded that health facility utilization was not solely a function of distance but that distance decay is shaped by factors like institutional accessibility factors like financial cost and quality of care. Economic factors certainly would merit consideration in a region like Turkana with very high absolute poverty levels.<sup>10,12,16,34</sup> There could also be the fear of the surgical interventions associated with health facility delivery.

Illness factors, especially as perceived by the client and not health care provider were also noted to be very important<sup>16</sup>. The patients usually assessed and defined the gravity of their illness using other parameters. A condition that was generally too widespread in a particular community could even be perceived to be normal, natural or inevitable and at times not amenable to treatment.<sup>13</sup> Pregnancy and childbirth being ubiquitous events would thus easily be considered normal or natural for women- despite the potential risks. Worse still mothers would at times be resigned to death from these events and consider it as normal or inevitable.

Women status in society is also critical, as it is a composite indicator of educational, cultural, economic, legal and political position of a woman in a given society. Whoever has the onus of making a decision touching on the woman's health thus determines health seeking behavior of the former; Women in many countries, several studies have shown, do not decide on their own to seek care. The husband often assumes a major role in making such decisions. The educational status of the woman, in terms of number of years

of formal schooling, was found to have a major role in the decision to seek skilled assistance during delivery.<sup>13</sup>

The study also found out that even when a decision had been made to seek formal health care, there arose other obstacles to the utilization of these services. Unavailability and transportation delayed the decision to seek care. These are the phase two delay factors. These are those delays occurring on the way to the facility. They result from actual accessibility of the facility resulting from location of facility or travel distances involved; these are common impediments in rural areas. Identification and a solution to these delays usually has programmatic implications.<sup>13</sup>

Phase three delay in a facility and lack of personnel and especially qualified ones is a contributor, as is an ill equipment of the same with critical supplies. The studies analysed show the futility of always blaming the patient for late care seeking behavior, while in other circumstances it was and it still is, that the health care system often fails the patient.<sup>13</sup>

A study done in 2001 in ANC clinics in three dispensaries in Narok district found out that despite 89% of clients having attended ANC clinic in the study area, only 34% delivered in the health facilities. It was found out that 66.7% of women did not attend ANC in last pregnancy because distance to the facility was a deterrent factor. However 25% of clients reported lack of knowledge of existence of such services.<sup>12</sup> It was also noted that 27.6% of women delivered at home because they found the health facility was far; of concern were the 26.7% of women who actually thought better care was offered when deliveries occurred at home.<sup>12</sup>

In a study done in three rural health centres in Nyanza, it was found out that 34.5% of the women seen had not gone for any formal prenatal care. It was concluded in that study that ANC attendance did not seem to prepare the women in that community for safe birth as evidenced by the eventual low utilization of facilities during delivery. It was also found out that 58% of these home deliveries experienced some perinatal complications, with 13% resulting in perinatal mortality.<sup>23</sup>

Lack of transport to the facility and cost of disposable items used during delivery were often given as reasons for not delivering in a health facility.<sup>15</sup> A study done in Kenya in



2006 found out that even in antenatal clinic in Kenyatta National hospital mothers had poor birth preparedness and that 14.7% of them were not informed of importance of hospital delivery<sup>31</sup>. Travel time, a factor of distance, was also implicated in another study South Nyanza<sup>23</sup>.

In South Africa, Abrahams et al, found out that perceived benefits of antenatal care played a crucial role, more than the lack of knowledge of the same, on the timing of ANC attendance. Giving women such basic information such as when likely to deliver and status of baby during the clinic was noted to have improve perception of ANC attendance.<sup>14</sup>

In a provincial hospital in Equatorial Guinea, it was found out that the length of the woman's formal education had a positive effect on ANC attendance. The mothers who had more formal education were likely to book into antenatal clinic earlier and even follow the health provider's instructions diligently. Hospital workers, husbands and parents were the greatest influence on ANC attendance at 50.7%, 19% and about 14% respectively.<sup>15</sup> In Nigeria, 96.3% of women with mostly secondary school and tertiary level education opined that pregnancy related complications could lead to death.<sup>16</sup>

In rural Cambodia, previous contact with a health provider and woman's education were key determinants to facility use during delivery. Distance from hospital and economic status were significant variables but these were found not be critical determinants of facility delivery when confounding variables were adjusted.<sup>20</sup> In Zaria, north Nigeria, mother's education, husband's occupation and age at first pregnancy determined utilization of hospitals during delivery.<sup>21</sup>

In rural Bangladesh, 95% of deliveries occurred at home with only 16% assisted by trained personnel whereas 57% of deliveries were assisted by untrained TBAs. Relatives and others conducted 26% of the deliveries. Mother's education had a positive association with use of public health facilities. Women with secondary school education or higher had highest use of facilities at 12.4% whereas 2.3% of those with no formal education utilized the same. More ANC visits were also associated with facility delivery.<sup>17</sup>

In a study done in a teaching hospital in Sokoto, Nigeria in 2004, 68.5% ANC attendants who had hospital. This was a relatively higher proportion in comparison to 49.9% that had

been found in a study in Sagamu, Nigeria<sup>39</sup>. This was attributed to the community friendliness of the hospital and the affordability of its services; of note however is the fact that the study group had higher literacy rates.<sup>28</sup> It was found that fewer multigravidae tended to deliver in the health facilities than primigravidae. A previous home delivery was found to be a risk factor for subsequent home delivery. Privacy at home was the other critical determinant of site of delivery<sup>28</sup>.

In Kenya, Magadi and others noted that access rather than sociodemographic factors were the main determinants to home deliveries as 38% of women delivered without skilled care because the distance to a health facility, lack of transport was a reason in 20% cases. Ignorance, traditional beliefs and refusal played a role in 28% of cases.

In many countries of the developing world, distance to the facilities and the socioeconomic status of the family play bigger contributory role to the tragedy home deliveries. The two, in a way are interrelated as transport to a facility would usually require some form payment, availability of which depends on the socioeconomic status<sup>18, 19, 25, 26, 28</sup>. The woman's autonomy or place in the household was one of the determinants that were significant, requiring need to address some sociocultural factors and decision making practices at household levels to improve maternal health services.<sup>26</sup>

In a study in western Kenya in 2006, maternal age over 30 years, higher parity, low socioeconomic status, less than 8 years of education, and more than one hour walking distance were significant contributors to home deliveries. These were the same factors that exacerbated the problem in Uganda and Tanzania.<sup>21, 22, 23, 27</sup> Previous place of delivery and occupation of spouse were additional factors that were also found to be significant contributors in Rakai District of Uganda.<sup>27</sup> The home deliveries occurred despite the often high perinatal mortality associated.<sup>22</sup>

The Maasai, a nomadic cultural group related to the Ng'iturkana people, have had deeply ingrained cultural practices and taboos surrounding pregnancy. There was reported dietary restriction but the community still recognized the value of modern health care when complications arose. Education was noted to have begun to change some attitudes toward modern health care. Yet, the general deficiency of resources for health care still hampered this progress.<sup>25, 30</sup>

The study was therefore designed to identify the important but correctable barriers to ANC attendance and deliveries in health facilities. It also aimed to identify the determinants of postnatal care attendance. This was meant to pave way to recommendations that would enhance better health seeking behaviour during pregnancy, delivery and the puerperium.

## **RATIONALE**

Access and utilisation of maternity services are some of the key pillars of safe motherhood initiative. From the health perspective, Turkana County is a relatively closed and rarely studied community. There are no district specific studies done in this area to evaluate the magnitude of utilization of maternal services and the outcomes of the same.

Literacy levels especially for women are low in this region. Polygamy is also still common. The inhabitants of this area have a migratory lifestyle that is dictated by the vagaries of weather and the attendant security situation at a particular time. There still exists a cultural fixation with the still existent traditional doctors. It has been a difficult community to perceive and understand.

This therefore called for a need to engage the community through studies that will unveil underlying issues contributing to maternal and perinatal mortality. This study was thus undertaken to address some factors which are crucial in opening up of understanding some problematic issues in relation to antenatal care, health facility delivery and postnatal care utilization in this community. Suitable and sustainable interventions were hoped to be arrived at and recommendations on areas meriting targeted further studies were also aimed at. Turkana Central and Loima districts would be ideal for this type of study as they are currently managed by one health management team and board. The two areas are still socioculturally, economically and in terms of physical barriers to health services utilisation, representative of the larger Turkana County.

## **RESEARCH QUESTIONS**

What factors contribute in determining antenatal care, skilled delivery and postnatal care utilisation among women who have health facility or home delivery in Turkana central and Loima districts of Turkana County?

## **OBJECTIVES**

### **BROAD**

To determine the factors that influence antenatal care attendance, skilled assistance during delivery and use of postnatal care services in Loima and Turkana central districts of Turkana County.

### **SPECIFIC**

1. To determine the relationship between the sociodemographic characteristics of the respondents and maternity services utilisation
2. To determine the correlation between sociocultural factors and socioeconomic factors, and maternity services utilisation
3. To determine the relationship between ANC attendance and recent delivery experience, and eventual health facility utilisation during delivery in the two districts
4. To determine the correlation between distance to a health facility and maternity services utilisation
5. To determine the contribution of the community's perceived quality of maternity services to utilisation of the maternity services.

## **STUDY METHODOLOGY**

### **Study design**

This was a cross-sectional comparative study done in Central and Loima districts of Turkana County. The following characteristics were compared among women who had home and health facility deliveries; sociodemographic, sociocultural, socioeconomic, obstetric experience, distance to a health facility and community perceived quality of care. The comparisons were also done on ANC use among health facility users with those who delivered at home. The likelihood of the two groups utilizing PNC services was also compared.

### **Study setting**

The study was done in Turkana central and Loima districts of Turkana County located in Rift valley province. Until 2007, the two districts were referred to as Turkana central and are currently still managed as one unit by the region District Health Management team (DHMT). In total they are made up of 5 divisions, 18 locations and 47 sub locations.

The study area borders Turkana South district to the south and Turkana North district to the North. Internationally the area borders Uganda to the west. The district also shares the waters of Lake Turkana with Marsabit district to the east. It lies between latitudes 0° 45' South and 1° 07' South and longitudes 36° East and 37° 27' East.

It is an arid and semi-arid area characterized by warm and hot climate. The temperatures range between 20°C and 38°C with a mean of 30°C. The rainfall pattern and distribution is erratic and unreliable both with time and space. There are two rainfall seasons. The long rains (Akiporo) usually occur between April and July and the short rains between October and November and ranges between 52 mm and 480 mm annually with a mean of 200 mm. The driest periods (Akamu) are January, February and September.

The two districts have a total area coverage of 14,766km<sup>2</sup> of which 3,320km<sup>2</sup> is occupied by Lake Turkana. The combined population of the Loima and Turkana central in 2010 was 273,268 people (Census 2009/2010); about 65-75% of the population lives in rural areas. There are estimated 70,201 women of reproductive age in the area in 30,908 households. The population density ranges from 9 people/km<sup>2</sup> in Kerio division to 70/km<sup>2</sup> in Central division

Poverty levels average 96%. The districts have 39 fixed health facilities (1 hospital, 2 health centres and 36 dispensaries). The average distance to nearest facility about 40- 50 km. Most of the inhabitants are nomadic pastoralists.

### **Study participants' recruitment and enrolment**

The study participants comprised mothers who delivered in the preceding 2-36 months. The mothers who met the inclusion criteria were identified and those who consented interviewed in a place of their comfort around their houses (either under a tree with shade or any nearby structure with shade and alone without spouse). Confidentiality was upheld.

### **Study population**

The study population was women who delivered in preceding 2-36 months in Turkana central and Loima districts of Turkana County.

### ***Inclusion criteria***

1. Mothers who had deliveries in the preceding 3years
2. Mothers who were residents of Loima and Turkana Central districts at the time of pregnancy and delivery
3. Mothers who consented to the interview

### ***Exclusion criteria***

1. Mothers who were not sure of their last delivery timing
2. Mothers who were too sick to participate in the study.
3. Mothers who had deliveries less than two months from date of interview

### **Sample Size and sampling procedure**

#### **Sample size**

The KDHS 2009-2010 survey found out that 43.8% of pregnant mothers had skilled delivery in the mentioned year whereas 96% of women attended ANC. The two figures were divided to get an approximate percentage of ANC attendants who had skilled deliveries. This was approximated at 45.6%. The sample size formula below for comparing proportions was used to detect a threefold difference in antenatal attendance between women who delivered at a health facility versus those who did not.

It was hypothesized that 45.6% of ANC attendants delivered in health facility compared to 21.5% among women who did not attend ANC.

$$N = \frac{z_{1-\alpha/2}^2 p \times (1-p_1) + z_{\beta}^2 \times p_2 \times (1-p_2)}{(p_1 - p_2)}$$

Where

$\alpha=0.05$  representing 95% confidence interval

$\beta=0.2$  representing 80% power

$p_1$ - Estimated proportion of ANC attendants delivering at facility level (in Kenya about 45.6%)

$p_2$ . Proportion of non ANC attendants delivering at facility= about 21.5%

Thus 67 women from both groups were to be enrolled; medical facility users and non users.

Sample size=134

Adjusted by an assuming 20% expected non response= 28

Total sample size = 162

### **Sampling procedure**

Stratified sampling was used. A third of respondents were from urban and periurban areas while two thirds were from rural areas. A total of 137 respondents who met eligibility criteria were identified and interviewed sequentially. Women who had the rarer occurrence, which was health facility delivery, were looked for one at a time and when consented were interviewed. A woman who delivered at home in households nearby was the next to be looked for and when identified, consent for interview requested and if accepted interviewed. In some cases where a woman who health delivery was found at the periphery of a location, she was interviewed and interviewers went back to a nearby household (with a mother who had home delivery) they had passed and interviewed such mothers.



This sampling procedure was appropriate for this study because of the relatively smaller proportion of study group (health facility deliveries) compared to the home deliveries in this area. Standardized questionnaires were used and pretested 3 weeks before actual collection of data. Three research assistants who spoke both English and Ng'aturkana in addition to Kiswahili were trained on study protocols.

### **Study Instrument**

It was interviewer administered structured questionnaire with closed and open-ended questions.

### **Data Collection and management**

The principal investigator trained three research assistants who helped in enrolment of study participants and collection of data. The research assistants were trained on the research protocol. The DMOH, DHMT, the chiefs and assistant chiefs of areas where the study was done were sensitized about the study before commencement.

Data was collected through use of a structured questionnaire which contained sociodemographic, sociocultural, socioeconomic, past obstetric events, factors of physical access and the mothers' perception of quality of care. The Data was kept in a secure, lockable cabinet and thereafter transported securely to the investigator and biostatistician. The study procedure was as described below.

Before the study started, The DHMT was briefed about the study by the principal investigator. Thereafter the provincial administrators were briefed about this study. Mapping of the areas was done. A computer was used to generate locations where the study was to be conducted after being subdivided into two; urban and rural sub-locations. The area has 18 locations in the two districts which were subdivided into rural and urban/periurban. Urban/periurban populations were in Lodwar and some parts of Kalokol town. The rest were rural. Rural inhabitants constituted 70%- 65% of the inhabitants; therefore 2 urban and 4 rural/periurban populations (locations) were generated. About 26 households in two urban/periurban locations in Lodwar and Kalokol were each sampled. The rest were to be from rural locations, 28 households each. The starting point in every village was the chief's household and the route was mapped. Facing northward households to the right of the chief's homestead were sampled first till 10 households are arrived at,

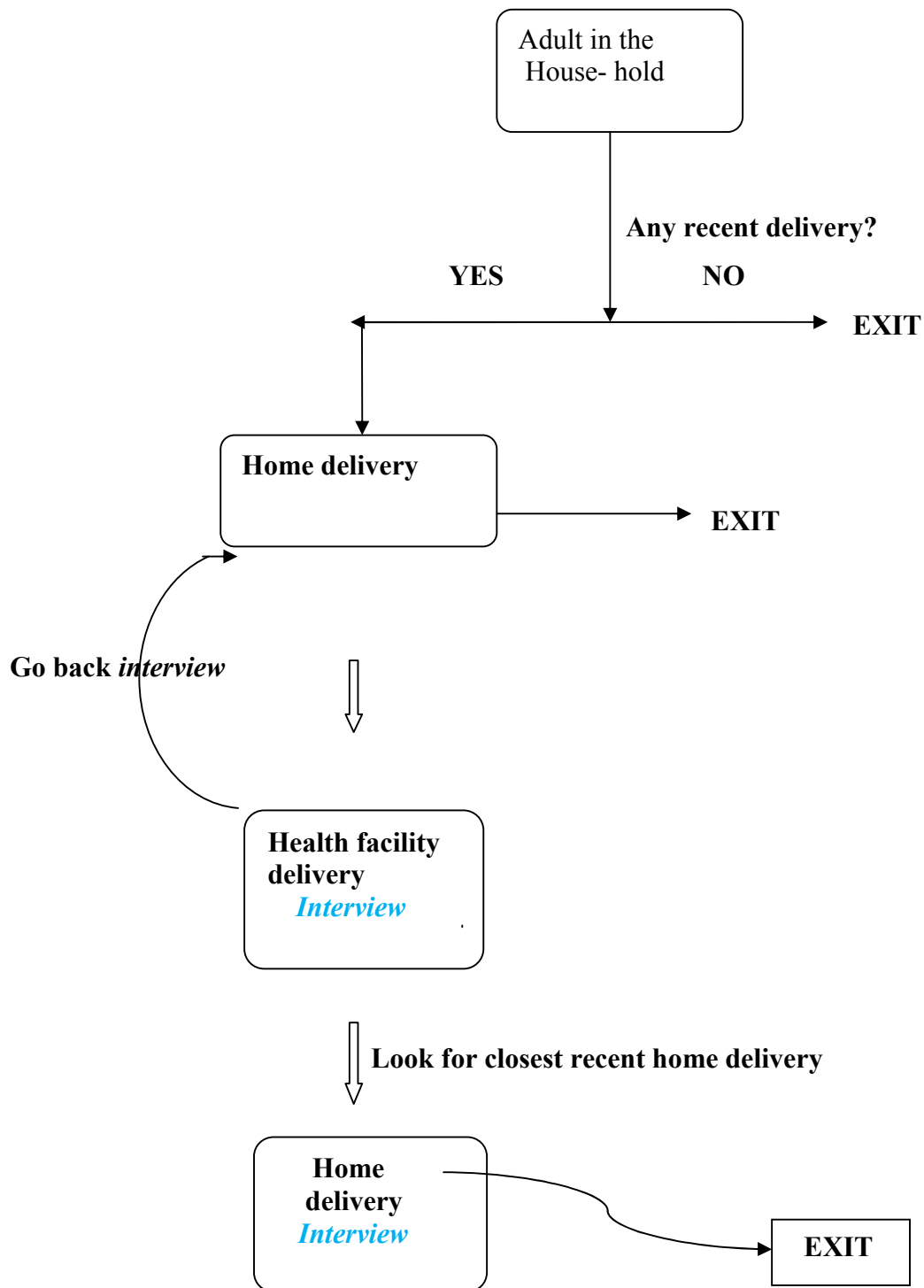
then those to the left till 10 HH are arrived at. Thereafter, from the previous end point to right another 10 households, then left, till stipulated number of respondents is interviewed.

The first thing was formal introductions and asking any adults in household for mothers who have had deliveries in preceding 3 years, then confirming from mother if it was health facility delivery. December, 2008 general election will be used as a reference point to facilitate recall by even illiterate respondents

Those who delivered less than 2 months before date of interview were excluded. Thereafter, the purpose of study was explained and consents to participate sought for from those who qualified. Study was done in morning and after 4 pm when many mothers had returned from daily activities and when it was not too hot, this was done preferably under a nearby tree with sufficient shade.

The participants were interviewed alone without spouses to enable them express themselves freely. For every mother who had a health facility delivery, another mother who lived nearby and delivered at home within the 3 years and not less than 2 months was interviewed. Where two or more mothers from the same household delivered at facility, both were interviewed and the nearest equal numbers of non facility users were also interviewed. If no person in a household with eligible mother was present a return date was communicated to nearby households to inform the missing potential respondents. The participants were recruited on voluntary basis. A structured closed and open ended questionnaire was administered. Interviewees were thanked after interview.

**SCHEMA: FLOW OF PARTICIPANTS RECRUITMENT IN THE VILLAGE**



## **Study Variables**

### **Dependent variables**

The independent variables were antenatal clinic attendance, Health facility delivery and postnatal clinic attendance

### **Independent variables**

Sociodemographic variables were age, education level attained, occupation, religion and marital status for respondent and spouse. Age and education are ordinal and the rest nominal.

The sociocultural factors are parity, Previous ANC attendance, and place of preceding delivery, Nomadism, Polygamy, Decision making (gender autonomy), involvement of traditional healers, Wantedness of pregnancy, Gender of person who delivered, and birthing position. Parity and previous ANC attendance are ordinal while the rest were nominal.

Physical access factors include distance to facility during ANC, delivery and postnatal periods which were continuous and Means of access to facility during ANC, delivery, postnatal period which were nominal.

Socioeconomic factors included family monthly income, property/ animals owned by the family were continuous and source of health information nominal.

The Perceived quality of health care factors includes staff friendliness, timeliness and client satisfaction with service, all of which were nominal.

These variables were compared among women who had health facility delivery and those that had home deliveries.

## **Quality Control**

A standard structured questionnaire in English was used for all interviewees. The research assistants had a good command of English, Swahili and Ng'aturkana. The study area was mapped two weeks earlier and starting points and the routes to be used identified and existent households clearly mapped with help of the relevant local assistant chief and his team. The starting point was clearly identified, which was the assistant chief's homestead. The interviews were also conducted in select geographically adjacent urban or rural areas all concurrently. Pretesting of questionnaire was done three weeks earlier and questions

refined and standardized. Data was entered daily and missing data followed up immediately where possible.

### **Data analysis**

Data was collected through use of structured questionnaires which were primarily pre-coded but open ended questions were also used. The questionnaires contained sociodemographic, sociocultural, socioeconomic, past obstetric events, factors of physical access and the mothers' perception of quality of care.

Data was entered into the password protected Microsoft Access Database. Analysis was done using Statistical package for Social Scientists (SPSS version 17.0) data analysis programme. At first in univariate analysis, nominal variables associated with facility delivery were compared using chi-squared statistics while continuous variables were compared using T tests, then stepwise backward logistic regression was undertaken during multivariate analysis to identify independent determinants of place of delivery. The Data was kept in a secure, lockable cabinet and thereafter transported securely to the investigator and biostatistician

### **Study Limitations**

Recall of past events and decisions a problem to many respondents but the last general election reference point which was 3 years ago reduced this.

The Turkana calendar is known by seasons or special events; this is totally different from the modern calendar. In addition, a Turkana calendar year is usually about 6 months. The relatively short time of 3 years, whose health events the mothers were to recall and the specific event (general election) and the research assistants used reduced this likely source of error. The modern calendar was clarified to the respondents and ascertained to also minimize this source of bias.

Traditionally, Ng'iturkana people rarely want to divulge the family size and the family wealth, and especially domestic animals owned. The research assistants who had worked in the district and were knowledgeable on the culture were helpful in this aspect. Insecurity and vast distances to be covered posed some challenge. We, however, liaised with the local provincial administrators to provide information on security situations in specific areas. They were also called upon to provide where it was found necessary.

## **PLANS FOR DISSEMINATION AND UTILITY**

The plans are as follows:-

- Publication as a dissertation in partial fulfillment for the award of the degree of Master of Medicine in Obstetrics and Gynecology of the University of Nairobi.
- Depending on the results:-
  - Discuss with the District health management Board (DHMB), District health management team (DHMT) and the District health stakeholders forum the findings of the study and advise on the recommendations that will likely lead to increased uptake of maternity services.
  - Share the findings with the two relevant Ministries of Health to advise on policy and further research
- Publication in local and international journals

## **RESEARCH ETHICS**

### **Human subjects**

Women who delivered between 2- 36 months at time of the study were recruited into this study.

### **Minors**

Eighteen years is the age of consent according to Kenyan law but study participants between 15- 18 are regarded as emancipated minors if they are sexually active and can give consent. These were interviewed too.

### **Institutional Review Board**

This study was approved by Kenyatta National Hospital/ University of Nairobi Ethics Research Committee( KNH/UON- ERC; approval ref No.P78/3/2011). Permission was also given by the District Health Management Team (DHMT) for Loima and Turkana central.

### **Risks to Subjects**

There was little risk to the subjects in this study. Confidentiality was maintained by research assistants who were trained by the principal investigator on ethical issues before the start of the study. All questionnaires were coded without names of respondents and records properly kept and locked up by research assistants before transmission to the principal investigator who also locked the records up properly. Electronic records within the data base was password protected and only data entry personnel and the researchers involved on this project had/have access. Written informed consent was given. Informed verbal consent was interpreted in Kiswahili or Ng'aturkana for illiterate clients. Respondents were free to decline participation in the study without any penalties.

### **Benefits of the study**

Participation in the study by respondents was voluntary. No incentive was given. The findings of the study will enable health care providers, policy makers, partners determine relevant factors that merit attention to scale up access and utilisation of critical maternal services. The results of the study will be communicated to the district health stakeholders

## **RESULTS**

The study was conducted in the month of June to mid August 2011 in Turkana central and Loima districts of Turkana County. The study participants consisted of a total of 137 women who had delivered between 2 to 36 months by the time of the study. Of these, 69 mothers had delivered in a health facility delivery and 68 delivered at home. These results reflect on the factors that may have resulted in the poor utilisation of maternity services and especially assistance by skilled personnel during delivery in the two districts.

### **A. SOCIODEMOGRAPHIC FACTORS**

#### **1. Residence of study participants**

**Table 1: Urban and rural distribution of study participants**

<i>Residence</i>	<i>Place of delivery</i>		<i>P value</i>
	<i>Home (N=68)</i>	<i>Health facility (N=69)</i>	
	<i>No. (%)</i>	<i>No. (%)</i>	
<i>Urban/periurban</i>	21(30.9)	22(31.9)	0.899
<i>Rural</i>	47(69.1)	47(68.1)	
<b><i>Total</i></b>	<b>68(100)</b>	<b>69(100)</b>	

Table 1 shows the distribution of mothers interviewed by urban/periurban or rural residence. Participants who had home deliveries were paired with those who had health facility deliveries. A total of 137 mothers were interviewed where 43 (31.4%) were from urban/periurban areas and 94(68.6%) from rural areas. This was within the 65%-70% rural populations in the area where the study was done. Place of residence was not statistically insignificant (p value 0.899) in influencing utilisation of maternity services.



## 2. Age distribution of mothers and their spouses by places of delivery

**Table 2A and 2B: Age distribution of mothers and their spouses by place of delivery**

<i>Table 2A</i> <i>Age group</i>	<i>Place of delivery</i>		<i>P value</i>
	<i>Home (N=68)</i>	<i>Health facility (N=69)</i>	
	<i>No. (%)</i>	<i>No. (%)</i>	
<i>Mothers age</i>			
<=15	1 ( 1.5)	0 ( 0.0)	0.728
16-20	10 (14.7)	9 (13.1)	
21-25	22 (32.4)	24 (34.8)	
26-30	17 (25.0)	15 (21.7)	
31-35	9 (13.2)	11 (15.9)	
36-40	7 (10.3)	8 (11.8)	
41-45	2 ( 2.9)	0 ( 0.0)	
>45	0 ( 0.0)	2 ( 2.9)	
	<b>68(100%)</b>	<b>69(100%)</b>	
<i>Table 2B</i>			
<i>Spouses' age</i>	<i>(N=61)</i>	<i>( N=56)</i>	0.932
21-25	4(6.6)	6(10.7)	
26-30	14(23.0)	14(25.0)	
31-35	15(24.6)	14(25.0)	
36-40	14(23.0)	14(25.0)	
41-45	7(11.5)	5( 8.9)	
46-50	2(3.3)	1( 1.8)	
51-55	3(4.9)	2( 3.6)	
56-60	2(3.3)	0( 0.0)	
	<b>61(100%)</b>	<b>56(100%)</b>	

Table 2A shows the age distribution of the respondents. Mothers below 15 years constituted 1(1.5%) of home deliveries compared to zero among health facility deliveries. The largest age group was the 21-25 years which comprised (22)32.4% of home deliveries compared to (24)34.8% of health facility deliveries. The over 45years age group mothers constituted (2)2.9% of health facility deliveries. The mother's age was not significant (p value 0.728) in influencing place of delivery.

Table 2B shows the age distribution of respondents' spouses. It shows that there was no significant difference between the ages of the spouses. Most of the spouses were within

the age groups 26- 40 years whose wives constituted (43)70.6% of home deliveries and (42)75% of health facility deliveries. Spouses' age was not statistically significant (p value 0.932) in determining place of delivery.

**Table 3: Antenatal care attendance by age of mothers and spouses**

<i>Age of mothers and spouses</i>	<i>Place of delivery</i>					
	<i>Home(N=68)</i>			<i>Health facility(N=69)</i>		
	<i>ANC attendance</i>		<i>p value</i>	<i>ANC attendance</i>		<i>p value</i>
<i>≥ 4 visits</i>	<i>&lt;4 visits</i>	<i>≥ 4 visits</i>		<i>&lt;4 visits</i>		
	<i>No. (%)</i>	<i>No. (%)</i>		<i>No. (%)</i>	<i>No. (%)</i>	
<i>Mother's age</i>						
<i>&lt;15</i>	1 (1.5)	0 (0.0)	0.809	0	0	0.390
<i>16-20</i>	5 (7.4)	4 (5.9)		4 (5.8)	5 (7.3)	
<i>21-25</i>	12 (17.6)	11 (16.2)		18 (26.1)	6 (8.7)	
<i>26-30</i>	12 (17.6)	5 (7.4)		9 (13.1)	6 (8.7)	
<i>31-35</i>	6 (8.8)	3 (4.4)		7 (10.1)	4 (5.8)	
<i>36-40</i>	5 (7.4)	2 (2.9)		7 (10.1)	1 (1.4)	
	2 (2.9)	0 (0.0)		2 (2.9)	0 (0.0)	
	43(63.2)	25(36.7)		47( 68.1)	22(31.9)	
<i>Spouse's age</i>						
<i>21-25</i>	3 (4.9)	1 ( 1.6)	0.395	2 (3.6)	4 ( 7.1)	0.278
<i>26-30</i>	7 (11.5)	7 (11.5)		8 (14.4)	6 (10.7)	
<i>31-35</i>	11 (18.1)	4 ( 6.7)		10 (17.7)	4 ( 7.2)	
<i>36-40</i>	9 (14.7)	5 ( 8.2)		8 (14.3)	6 (10.7)	
<i>41-45</i>	5 (8.2)	2 ( 3.3)		5 ( 8.9)	0 ( 0.0)	
<i>46-50</i>	2 (3.3)	0 ( 0.0)		1 ( 1.8)	0 ( 0.0)	
<i>51-55</i>	3 (4.9)	0 ( 0.0)		2 ( 3.6)	0 ( 0.0)	
<i>56-60</i>	0 (0.0)	2 ( 3.3)		0 ( 0.0)	0 ( 0.0)	
	40(65.6)	21(34.4)		36(64.2)	20(35.8)	

Table 3 shows that ANC attendance of WHO recommended four (or more in some mothers) ANC visits was highest for mothers in the age groups 16-25 years in both home and health facility deliveries. This constituted 24 (35.2%) of home deliveries and 27 (39.2%) of health facility deliveries. Most mothers who had less than four ANC visits were also in this age groups; they constituted 16 (23.6%) among home deliveries compared to 12 (17.4%) of health facility deliveries.

Table 3 also shows that Mothers who had at least 4 antenatal visits constituted 42(63.2%) of home deliveries and 47(68.1%) of health facility deliveries. Mothers' age was not a significant in influencing ANC attendance among home or health facility deliveries (p value 0.809 and 0.390 respectively).

Mothers with spouses in the age bracket 26-40 years constituted the largest age groups among mothers who had 4 or more ANC visits. This was 27(44.3%) of mothers who had home deliveries compared to 26 (46.4%) of mothers who had health facility deliveries. The age of the spouses was not significant determinant of antenatal care utilisation (p value 0.395 and 0.278 respectively)

**Table 4: Postnatal clinics attendance by age of mothers and spouses**

<i>Age of mothers and spouses</i>	<i>Place of delivery</i>					
	<i>Home(N=68)</i>			<i>Health facility(N=68)</i>		
	<i>PNC attendance</i>		<i>P value</i>	<i>PNC attendance</i>		<i>P value</i>
<i>Yes No. (%)</i>	<i>No No. (%)</i>	<i>Yes No. (%)</i>		<i>No No. (%)</i>		
<b><i>A. Mother's age</i></b>						
<i>&lt;15</i>	1 ( 1.5)	0 (0.0)	0.952	0 ( 0.0)	0 (0.0)	0.468
<i>16-20</i>	8 (11.8)	1 (1.5)		9 (13.0)	0 (0.0)	
<i>21-25</i>	19 (27.9)	3 (4.4)		22 (31.9)	1 (1.4)	
<i>26-30</i>	14 (20.6)	3 (4.4)		14 (20.3)	1 (1.4)	
<i>31-35</i>	7 (10.3)	2 (2.9)		10 (14.5)	1 (1.4)	
<i>36-40</i>	7 (10.3)	1 (1.5)		9 (13.0)	0 (0.0)	
	2 (2.9)	0 (0.0)		2 ( 2.9)	0 (0.0)	
<b><i>B. Spouse's age</i></b>						
<i>21-25</i>	2 ( 3.9)	0 (0.0)	0.601	5 ( 8.9)	0 (0.0)	1.000
<i>26-30</i>	12 (23.5)	1 (2.0)		13 (23.2)	2 (3.6)	
<i>31-35</i>	14 (27.5)	2 (3.9)		15 (26.8)	1 (1.8)	
<i>36-40</i>	12 (23.5)	1 (2.0)		13 (23.2)	2 (3.6)	
<i>41-45</i>	7 (13.8)	0 (0.0)		5 ( 8.9)	0 (0.0)	
<i>46-50</i>	2 ( 3.8)	0 (0.0)		1 ( 1.9)	0 (0.0)	
<i>51-55</i>	3 ( 5.7)	0 (0.0)		2 ( 3.8)	0 (0.0)	
<i>56-60</i>	1 ( 1.9)	1 (2.0)		0 ( 0.0)	0 (0.0)	

Table 4 shows that postnatal care attendance by mothers in the age range 16- 25 years constituted the largest age group among home and facility deliveries where this group made up about 33(48.5%) of home deliveries compared to 36 (52.2%) of health facility deliveries. Age of the mother was not a significant determinant of PNC services utilisation among home or health facility users ( p values 0.952 and 0.468).The ages of the spouses were also insignificant in influencing PNC services utilisation among mothers who had home and health facility deliveries( p values 0.601 and 1.00 respectively).

### 3. Education

**Tables 5 A and 5B: Place of delivery by participant's and spouse's level of education**

<i>Table 5A</i> <i>Level of education</i>	<i>Place of delivery</i>		<i>P value</i>
	<i>Home (N=68)</i> <i>No.(%)</i>	<i>Health facility(N=69)</i> <i>No.(%)</i>	
<b><i>Level of education of participants</i></b>			
<i>No formal education</i>	44(64.7)	18(26.1)	<0.0001
<i>Class 1- 3</i>	7(10.3)	5( 7.2)	
<i>Class 4-8</i>	15(22.0)	22(31.9)	
<i>Secondary and above</i>	2( 3.0)	24(34.8)	
<b><i>Total</i></b>	<b>68(100%)</b>	<b>69(100%)</b>	
<b><i>Table 5B</i></b>			
<b><i>Level of education of spouses</i></b>			
<i>No formal education</i>	22(34.9)	10(17.2)	0.004
<i>Class 1-3</i>	6( 9.5)	2( 3.5)	
<i>Class 4-8</i>	15(23.8)	9(15.5)	
<i>Secondary</i>	11(17.5)	12(20.7)	
<i>Secondary and above</i>	9(14.3)	25(43.1)	
<b><i>Total</i></b>	<b>63(100%)</b>	<b>58(100%)</b>	

Table 5A shows that among the participants who delivered at home 44(67.4%) had no formal education whereas among those who delivered in a health facility 18(26.1%) had no formal education. Among mothers who delivered at home 7(10.3% ) had Class 1-3 level of education compared to 5(7.2%) of those who had health facility delivery with same level of education. Participants with class 4-8 level of education made up of 15 (22%) of home deliveries compared to 22(31.9%) of health facility deliveries. The table also shows that 1(1.5%) of home deliveries occurred among participants who had secondary school or post secondary level of education compared to 12(17.4%) of health facility deliveries that occurred in among participants with secondary school or post secondary level of education. This was statistically significant (p value <0.0001) in influencing place of delivery

Table 5B shows that 22(34.9%) of home deliveries occurred among participants with spouses without any formal education compared to 10(17.2%) of health facility deliveries

in the same group. Women with spouses who had attained class 1-3 level of education constituted 6(9.5%) of home deliveries compared to 2(3.5%) of health facility deliveries. Participants with post secondary level of education made up of 9(14.3%) of home deliveries compared to 25(43.1% ) of health facility deliveries. This was significant only during univariate analysis but not in multivariate analysis.

**Table 6A: Antenatal care attendance by education level of mothers and spouses**

<i>Education level</i>	<i>Place of delivery</i>					
	<i>Home(N=68)</i>			<i>Health facility(N=69)</i>		
	<i>ANC attendance</i>		<i>p value</i>	<i>ANC attendance</i>		<i>p value</i>
<i>≥4 times</i>	<i>&lt;4 times</i>	<i>≥4 times</i>		<i>&lt;4 times</i>		
	<i>No. (%)</i>	<i>No. (%)</i>		<i>No. (%)</i>	<i>No (%)</i>	
<b>Mothers</b>						
<i>No formal education</i>	24 (35.3)	20 (29.4)	0.117	13 (18.8)	5 ( 7.2)	0.703
<i>Lower primary</i>	6 ( 8.8)	1 ( 1.5)		4 ( 5.8)	1 ( 1.5)	
<i>Upper primary</i>	12 (17.6)	3 ( 4.4)		15 (21.7)	7 (10.1)	
<i>Secondary and above</i>	1 ( 1.5)	1 ( 1.5)		15(21.7)	9 (13.0)	
<b>Spouses</b>						
<i>No formal education</i>	12 (19.0)	7( 11.1)	0.502	7 (12.1)	3 ( 5.2)	0.176
<i>Lower primary</i>	4 ( 6.3)	2 ( 3.2)		1 ( 1.8)	1 ( 1.8)	
<i>Upper primary</i>	8 (12.7)	7 (11.1)		4 ( 6.9)	5 ( 8.6)	
<i>Secondary and above</i>	15 (23.8)	5 ( 7.9)		26 (44.8)	11 (18.9)	

Table 6A shows that among mothers who had four or more ANC visits, women without formal education constituted 24(35.3%) of home deliveries compared to 13 (18.8%) among health facility deliveries. Women without formal education who had less than four ANC visits also constituted 20 (29.4%) and 5 (7.2%) of home and health facility deliveries respectively. The women who had primary and above education and had more than 4 ANC visits constituted 13(19.1%) of home deliveries and 30 (43.4%) of health facility deliveries. Mothers' education was not significant in determining ANC services utilisation (p values 0.917 and 0.703) among home or health facility users respectively

Table 6A also shows that where spouses of mothers had attained post primary education, such mothers if utilised ANC services four or more times constituted 15(23.8%) of home

deliveries mothers' spouses and 26 (44.8%) of health facility delivery mothers spouses. Education level of spouse was not a significant determinant of ANC service utilisation p values 0.502 and 0.176) among home or health facility users respectively.

**Table 6B: Post natal clinic attendance by mothers' and spouses' level of education**

<i>Level of Education</i>	<i>Place of delivery</i>					
	<i>Home(N=68)</i>			<i>Health facility(N=69)</i>		
	<i>PNC attendance</i>		<i>P value</i>	<i>PNC attendance</i>		<i>P value</i>
<i>Yes</i>	<i>No</i>	<i>Yes</i>		<i>No</i>		
	<i>No. (%)</i>	<i>No. (%)</i>		<i>No. (%)</i>	<i>No. (%)</i>	
<b>Mothers</b>						
<i>No formal education</i>	35 (51.5)	5 (7.4)	0.552	16 (23.2)	2 (2.9)	0.331
<i>Lower primary</i>	7 (10.3)	0 (0.0)		5 (7.2)	0 (0.0)	
<i>Upper primary</i>	14 (10.6)	0 (0.0)		21 (30.4)	0 (0.0)	
<i>Secondary</i>	1 (1.5)	0 (0.0)		12 (17.4)	0 (0.0)	
<i>Tertiary</i>	1 (1.5)	0 (0.0)		12 (17.4)	0 (0.0)	
<b>Spouse</b>						
<i>None</i>	19 (32.8)	1 (1.7)	0.093	9 (15.7)	1 (1.8)	0.024
<i>Lower primary</i>	3 (5.2)	1 (1.7)		1 (1.8)	1 (1.8)	
<i>Upper primary</i>	13 (22.4)	2 (3.4)		9 (15.7)	0 (0.0)	
<i>Secondary</i>	10 (17.2)	0 (0.0)		11 (15.7)	0 (0.0)	
<i>Tertiary</i>	9 (15.5)	0 (0.0)		25 (43.9)	0 (0.0)	

Table 6B shows that the respondents who had no formal education and attended PNC clinic constituted 35(51.7%) of home deliveries compared to 16 (13.1%) of home deliveries if such mothers had upper primary and above level of education.

This table also shows that mothers who had no formal education who attended PNC clinics constituted 16 (23.2%) of health facility deliveries compared to 43 (55.2%) of health facility deliveries where such mothers had upper primary and above education. Education of mother was not a significant determinant of PNC services utilisation among mothers who had home or health facility deliveries (p value 0.552 and 0.331 respectively).

The table also shows that where spouses of mothers had no formal education, such mothers where they had home deliveries constituted

Table 6B shows that 19 (32.8%), 3 (5.2%) and 19(32.7%) of home deliveries with spouses who attended PNC clinic, had no formal, lower primary and above secondary school levels of education respectively compared to 9 (15.7%), 1 (1.8%) and 36(64.6%) of health facility delivery women with spouses who also had no formal, lower primary and above secondary school levels of education respectively. Education level of spouse was not significant in determining PNC clinic attendance among home deliveries (p value 0.093) but was significant influence in postnatal care clinic attendance among health facility deliveries (p value 0.024)

#### 4. Respondent's occupation

**Table 7: Place of delivery by respondents' and spouses' occupation**

<i>Occupation</i>	<i>Place of delivery</i>		<i>P value</i>
	<i>Home (N=68)</i>	<i>Health facility (N=69)</i>	
<i>No. (%)</i>	<i>No. (%)</i>		
<b>A. Respondent</b>			
<i>Herder</i>	10 (14.7)	9 (13.0)	0.004
<i>Unemployed</i>	31 (45.6)	20 (29.0)	
<i>Formally employment</i>	0 ( 0.0)	11 (16.0)	
<i>Self employed</i>	27 (39.7)	29 (42.0)	
<b>Total</b>	<b>68</b>	<b>69</b>	
<b>B. Spouse</b>			
<i>Herder</i>	20 (31.8)	8 (13.8)	<0.0001
<i>Unemployed</i>	5 ( 7.4)	2 ( 3.4)	
<i>Formally employment</i>	20 (31.8)	8 (13.8)	
<i>Self employed</i>	18 (28.6)	40 (69.0)	
<i>Declined</i>	5 ( 7.4)	11 (16.0)	
<b>Total</b>	<b>63(100%)</b>	<b>58(100%)</b>	

Table 7A shows that 10 (14.7%) of home deliveries occurred among women who were herders compared to (9) 13% of health facility deliveries in the same group. Among those who delivered at home 31(45.6%) were unemployed compared to 20(29%) of women who had health facility who were also unemployed. Among women who had health facility deliveries 11(16%) were formally employed compared to none among those who had home deliveries. The self employed respondents constituted 27(39.7%) of home deliveries



compared to 29(42%) of health facility deliveries. Respondents' occupation was found significant in determining place of delivery only in univariate analysis.

Table 7B shows that women whose spouses who were herders constituted 20(31.8%) of home deliveries against 8(13.8%) of health facility deliveries. The women whose spouses were formally employed constituted 20(31.8%) of home deliveries against 8(13.8%) of health facility deliveries in this group. Among those who had home deliveries 18(28.6%) were self employed compared to 40(69%) of those who had health facility deliveries who were also self employed. Occupation of was significant (p value < 0.0001) in influencing place of delivery only in univariate analysis.

**Table 8: Antenatal care attendance by occupation of mothers and spouses**

<i>Occupation</i>	<i>Place of delivery</i>					<i>p value</i>
	<i>Home(N=68)</i>		<i>p value</i>	<i>Health facility(N=69)</i>		
	<i>ANC attendance</i>			<i>ANC attendance</i>		
	<i>≥4 times</i>	<i>&lt;4times</i>		<i>≥4times</i>	<i>&lt;4times</i>	
<i>No. (%)</i>	<i>No. (%)</i>	<i>No. (%)</i>	<i>No. (%)</i>	<i>p value</i>		
<b>Mothers</b>						
<i>Herder</i>	8 (11.8)	2 (2.9)	0.265	6 (8.7)	3 ( 4.3)	0.945
<i>Formally employed</i>	0 ( 0.0)	0 (0.0)		7 (10.1)	4 ( 5.8)	
<i>Self employed</i>	14 (20.3)	13 (19.1)		21 (30.4)	8 (11.6)	
<i>Unemployed</i>	21 (30.9)	10 (14.7)		13 (18.8)	7 (10.1)	
<b>Spouse</b>						
<i>Herder</i>	12 (20.7)	7 (20.1)	0.313	5 ( 8.6)	3 ( 5.2)	0.214
<i>Formally employed</i>	10 (17.2)	7 (20.1)		3 ( 5.1)	5 ( 8.6)	
<i>Self employed</i>	14 (24.1)	3 ( 5.2)		29 (50.0)	11 (19.0)	
<i>Unemployed</i>	4 ( 6.9)	1 ( 1.7)		1 ( 1.7)	1 ( 1.7)	

Table 8 shows that four ANC visits were undertaken by unemployed mothers who made up 21(30.9%) of home deliveries followed by the self employed who constituted 14(20.3%) of the home deliveries.

The table shows that those who utilised ANC at least four times among mothers who had health facility delivery were the self employed who made up 21(30.4%) of health facility deliveries, followed by the unemployed who constituted 13(18.8%)of health facility deliveries. Occupation was not a significant of ANC attendance (p value 0.265 and 0.945 for home and health facility users respectively).The occupations of the spouses of the women was not significant in influencing ANC attendance among home or facility attendants (p value 0.313 and 0.214 respectively).

**Table 9: Postnatal clinic attendance by occupation of mother and spouse**

<i>Occupation</i>	<i>Place of delivery</i>					
	<i>Home(N=68)</i>			<i>Health facility(N=69)</i>		
	<i>PNC attendance</i>		<i>P value</i>	<i>PNC attendance</i>		<i>P value</i>
	<i>Yes</i>	<i>No</i>		<i>Yes</i>	<i>No</i>	
<i>No. (%)</i>	<i>No. (%)</i>		<i>No. (%)</i>	<i>No.(%)</i>		
<b>Mothers</b>						
<i>Herder</i>	11 (16.2)	2 (2.9)	0.372	7 (10.1)	2 (2.9)	0.016
<i>Formally employed</i>	0	1(1.4)		11 (15.9)	0 (0.0)	
<i>Self employed</i>	23 (33.8)	2 (2.9)		28 (40.6)	0 (0.0)	
<i>Unemployed</i>	24 (35.3)	5( 7.4)		20 (29.0)	1 (1.4)	
<b>Spouses</b>						
<i>Herder</i>	17 (25.0)	1 (1.5)	0.173	7 (10.1)	2 (2.9)	0.056
<i>Formally employed</i>	15 (22.1)	3 (4.4)		8 (11.6)	0 (0.0)	
<i>Self employed</i>	17 (25.0)	0 (0.0)		39 (56.5)	0 (0.0)	
<i>Unemployed</i>	5 ( 7.4)	0 (0.0)		2 ( 2.9)	0 (0.0)	

Table 9 shows that PNC attendance among mothers who were employed (self and formally employed) constituted 23(33.8%) of those who had home deliveries. This was not significant in influencing PNC attendance.

The table shows that PNC attendance among those who were employed were 39(55.9%) of health facility deliveries. Occupation of spouse was significantly associated with PNC attendance among health facility deliveries (p value 0.016).

Table 9 also shows that PNC attendance among mothers whose spouses were employed and had home deliveries constituted 32(47.1%) of home deliveries. The unemployed constituted 5(7.4%) of home deliveries in this group. The PNC attendance among the

employed spouses' wives constituted 47(68.1%) of health facility deliveries whereas the unemployed made up 2(2.9%) of health facility deliveries in this group.

## B (i). SOCIO-CULTURAL DETERMINANTS

Table 10: Place of delivery by sociocultural factors

Sociocultural factors	<u>Place of Delivery</u>		P value
	Home	Health facility	
	No.(%)	No. (%)	
<b>Marital Status</b>			
Single	5( 7.4)	14(20.3)	0.074
Cohabiting	0( 0)	2( 2.9)	
Divorced	7(10.3)	5( 7.2)	
Married	56(82.3)	48(69.6)	
<b>Migration</b>			
Yes	5 ( 7.4)	15(21.7)	0.02
No	55(80.9)	48(69.6)	
Declined	8(11.7)	6( 8.7)	
<b>Migration times</b>			
1	5( 7.4)	11(15.9)	0.31
2	0( 0)	4( 5.8)	
3	0( 0)	0( 0)	
≥4 times	0( 0)	0( 0)	
<b>Only Wife</b>			
Yes	23(33.8)	41(59.4)	0.002
No	37(54.4)	17(24.6)	
Not sure	8(11.8)	11 (16.0)	
<b>If Polygamous- number of co-wives</b>			
2	29(42.6)	14(20.3)	0.435
3	6( 8.8)	3( 4.3)	
4	1( 1.5)	0( 0)	
5 and above	1( 1.5)	0( 0)	
Not sure	3( 4.4)	5( 7.2)	
<b>If Traditional healer seen</b>			
Yes	31(45.6)	23(33.3)	0.083
No	31(45.6)	43(62.3)	
Declined	6( 8.8)	3( 4.4)	
<b>Pregnancy Wantedness</b>			
Wanted	46(67.6)	48(69.6)	0.987
Unwanted	20(29.4)	21(32.4)	
Declined	2( 2.9)	0( 0)	
<b>Delivery decision maker</b>			
Myself	55(80.9)	46( 66.7)	0.158
Husband	9(13.3)	14(20.3)	
Her mother	2( 2.9)	7(10.2)	
Mother in law	0( 0)	1( 1.4)	
Other	2( 2.9)	1( 1.0)	

Table 10 shows that single mothers constituted (14)20.3% of health facility deliveries compared to (5)7.4% of home deliveries. Among (48)69.6% of health facility deliveries were married women compared to (56)82.3% of home deliveries. Marital status was not significant in determining place of delivery (p value 0.074)

Among mothers who had health facility deliveries (15)21.7% were nomadic (migrated from place to place) during the period against were (5)7.4% who were nomadic and delivered at home. Settled mothers constituted 48(69.6%) health facility deliveries against (55) 80.9% home deliveries. This is a curious finding that seems to suggest that nomadic mothers are more likely to utilize a health facility during delivery. However only 20 of 124 (16.1%) mothers who answered this question practiced nomadic lifestyle. Six mothers who had health facility delivery and Eight mothers who had home delivery declined to respond to the relevant question. Whereas nomadic lifestyle was significant on univariate analysis (p value 0.02), times migrated in or out of a place was not statistically significant in determining place of delivery (p value 0.31).

Where a mother was the only wife (husband monogamous), such women constituted 41(59.4%) health facility deliveries compared to 23(33.8%) home deliveries. Where a mother was in a polygamous relationship such women constituted 17(24.6%) of the health facility deliveries compared to 37(54.4%) of home deliveries. The number of co-wives was not statistically significant in influencing place of delivery (p value 0.435)

Where mothers attended a traditional healer, 23(33.3%) of them had health facility deliveries against 31(45.5%) of home deliveries. This was not statistically significant (p vale 0.083).

Among 48(69.6%) of health facility deliveries were pregnancies that were wanted compared to 46(67.6%) of home deliveries in such a background. Pregnancies that were adjudged to have been unwanted comprised 21(32.4%) of health facility deliveries compared to 20(29.4%) home deliveries in such a situation. Wantedness or unwantedness of pregnancy was not statistically significant in determining place of delivery (p value 0.987)

Among the respondents who delivered at home, (50)80.9% had decision on place of delivery made by the respondent herself compared to the decision made by herself in (46) 66.7% of home deliveries. The husband made the decision on place to deliver in 9(13.3%) of home deliveries compared to 14(20.3%) of health facility deliveries. The respondent's mother made such a decision in 2(2.9%) of home deliveries compared to 7(10.2%) of health facility deliveries. The decision maker on place of delivery was not statistically significant (0.158).

Thus significant sociocultural factors on univariate analysis were; Nomadic pastoralism (p value 0.02), Marital status of the spouse-Being only wife (Monogamous or polygamous) with p value 0.002. On multivariate analysis, being only wife was found to be an independent predictor of health facility delivery. From table 10, this was a significant independent determinant of choice of place of delivery (p value 0.006).

**Table 11: Antenatal care attendance by various sociocultural factors**

<i>Sociocultural Factors</i>	<i>Place of delivery</i>					
	<i>Home(N=68)</i>		<i>P Value</i>	<i>Health facility(N=69)</i>		<i>P Value</i>
	<i>ANC attendance</i>			<i>ANC attendance</i>		
<i>Marital status</i>	<i>≥4 times No. (%)</i>	<i>&lt;4times No.(%)</i>		<i>≥4times No. (%)</i>	<i>&lt;4times No.(%)</i>	
<i>Single</i>	3 ( 4.4)	2 ( 2.9)	1.000	12 (17.4)	2 (2.9)	0.317
<i>Cohabiting</i>	0(0.0)	0(0.0)		2(2.9)	0(0.0)	
<i>Estranged/Divorced</i>	4 ( 5.9)	2 (2.9)		3(4.3)	2 (2.9)	
<i>Married</i>	36(52.9)	21 (30.9)		30(43.5)	18 (26.1)	
<b><i>Migrated</i></b>						
<i>Yes</i>	4 ( 5.9)	1( 1.5)	0.643	6(8.7)	9(13.0)	0.012
<i>No</i>	34(50.0)	21(30.9)		36(52.2)	12 (17.4)	
<i>Unsure</i>	5(7.4)	3(4.4)		5(7.2)	1(1.4)	
<b><i>Was only Wife</i></b>						
<i>Yes</i>	13 (19.1)	10(14.7)	0.673	27(39.1)	14 (20.3)	0.428
<i>No</i>	25 (36.8)	12 (17.6)		11 (15.9)	6(8.7)	
<i>Not sure</i>	5 (7.4)	3 (4.4)		9(13.0)	2 (2.9)	
<b><i>ANC Decision maker</i></b>						
<i>Myself</i>	35 (51.5)	16 (23.5)	0.154	35 (50.7)	15 (21.7)	0.965
<i>Husband</i>	3 (4.4)	3 (4.4)		4(5.8)	3 (4.3)	
<i>Mother</i>	3 (4.4)	0(0.0)		5(7.2)	2 (2.9)	
<i>Mother in law</i>	1 (1.5)	0(0.0)		1 (1.4)	0(0.0)	
<i>Other</i>	0(0.0)	2 (2.9)		2 (2.9)	1 (1.4)	
<i>Unsure</i>	1 (1.5)	4(5.9)			1(1.4)	

Table 11 shows that attendance of four ANC visits among the married was 36(52.9%) of mothers who had home deliveries and 30(43.5%) of health facility deliveries. Among the nomadic women, attendance of the four ANC visits was 13(19.1%) of mothers who delivered at home compared with 27(39.1%) among women who had health facility deliveries. The later was a significant determinant of ANC attendance among health women who had health facility deliveries.

**Table 12: Postnatal care clinic attendance by various sociocultural factors**

<i>Sociocultural factors</i>	<i>Place of delivery</i>					
	<i>Home(N=68)</i>		<i>P Value</i>	<i>Health facility(N=69)</i>		<i>P Value</i>
	<i>PNC attendance</i>			<i>PNC attendance</i>		
	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>		
<i>No(%)</i>	<i>No.(%)</i>	<i>No.(%)</i>	<i>No.(%)</i>			
<b><i>Marital status</i></b>						
<i>Single</i>	6 ( 8.8)	0 (0.0)	0.330	13 (18.8)	0 (0.0)	1.000
<i>Cohabiting</i>	0 ( 0.0)	0 (0.0)		2 ( 2.9)	0 (0.0)	
<i>Estranged/Divorced</i>	3 ( 4.4)	1 (1.5)		5 ( 7.2)	0 (0.0)	
<i>Married</i>	49 (72.1)	4 (5.9)		46 (66.7)	2 (2.9)	
<i>Declined</i>	0( 0.0)	5 (7.4)		0 ( 0.0)	1 (1.4)	
<b><i>Migration</i></b>						
<i>Yes</i>	3 ( 4.4)	1 (1.5)	0.320	13(18.8)	2 (2.9)	0.056
<i>No</i>	48 (70.6)	4 (5.9)		47(68.1)	0 (0.0)	
<i>Unsure</i>	7(10.3)	5(7.4)		6( 8.7)	1 (1.4)	
<b><i>Only wife</i></b>						
<i>Yes</i>	19 (27.9)	2(2.9)	0.297	39(56.5)	1(1.4)	0.58
<i>No</i>	34 (50.0)	2(2.9)		16(23.2)	1(1.4)	
<i>Not sure</i>	5 ( 7.4)	6(8.8)		11(15.9)	1(1.4)	

Table 12 shows that the married PNC attendants were 49(72.1%) of home deliveries and 46(66.7%) of health facility deliveries. The Nomadic made up 3(4.4%) of home deliveries and 13(18.8%) of health facility deliveries among PNC attendants. Women with monogamous husbands constituted 27.9 %( 19) of home deliveries and 36(56.5 %) of health facility deliveries among PNC attendants.



## B (ii). SOCIO-ECONOMIC FACTORS

**Table 13: Place of delivery by family monthly income**

<i>Income</i>	<i>Place of delivery</i>		<i>p value</i>
	<i>Home (N=68)</i>	<i>Health facility (N=69)</i>	
<i>No. (%)</i>	<i>No. (%)</i>		
<b><i>Monthly Income</i></b>			
<i>Less than 3000</i>	<i>56 (82.4)</i>	<i>30 (43.6)</i>	<i>&lt;0.0001</i>
<i>3001-4999</i>	<i>7 (10.3)</i>	<i>18 (26.1)</i>	
<i>5001-9999</i>	<i>1 ( 1.5)</i>	<i>9 ( 13.0)</i>	
<i>10000-19999</i>	<i>1 ( 1.5 )</i>	<i>6 ( 8.7)</i>	
<i>Over 20000</i>	<i>0 ( 0.0)</i>	<i>2 ( 2.9)</i>	

Table 13 shows that among women who delivered at home 56(82.4%) of them had incomes less than Kes 3,000 per month compared to 30(43.6%) of those who delivered in health facilities with same family earnings.

Mothers who had monthly earnings of Kes 3,001-5,000 comprised 18(26.1%) of health facility deliveries compared to 7(10.3%) of home deliveries. Participants who had monthly earnings above Kes 10,000 contributed to 6(8.7%) of hospital deliveries against 1(1.5%) of home deliveries.

**Table 14: ANC and PNC clinics attendance by family income**

<i>Monthly income</i>	<i>Place of delivery</i>					
	<i>Home(N=68)</i>		<i>P value</i>	<i>Health facility(N=69)</i>		<i>P value</i>
	<i>ANC attendance</i>			<i>ANC attendance</i>		
	<i>≥4times</i>	<i>&lt;4times</i>	<i>≥4times</i>	<i>&lt;4times</i>		
<i>No. (%)</i>	<i>No. (%)</i>	<i>No. (%)</i>	<i>No. (%)</i>			
<i>Less than 3000</i>	35(51.4)	21 (30.9)	0.490	23 (33.3)	8 (11.6)	0.353
<i>3001-5000</i>	4 (5.9)	4 ( 5.9)		10 (14.5)	8 (11.6)	
<i>5001-10000</i>	2 (2.9)	0 ( 0.0)		7 (10.1)	4 ( 5.8)	
<i>10001-20000</i>	2 (2.9)	0 ( 0.0)		6 (8.7)	1 ( 1.4)	
<i>Over 20000</i>	0 (0.0)	0 ( 0.0)		1 (1.4)	1 ( 1.4)	

<i>Monthly income</i>	<i>PNC attendance</i>		<i>P value</i>	<i>PNC attendance</i>		<i>P value</i>
	<i>Yes</i>	<i>No</i>		<i>Yes</i>	<i>No</i>	
	<i>no (%)</i>	<i>no (%)</i>		<i>no(%)</i>	<i>no (%)</i>	
<i>Less than 3000</i>	48 (70.6)	5 (7.4)	1.000	29 (42.0)	2 (2.9)	0.732
<i>3001-5000</i>	7 (10.3)	0 (0.0)		19 (27.5)	0 (0.0)	
<i>5001-10000</i>	1 ( 1.5)	0 (0.0)		8 (11.6)	1 (1.5)	
<i>10001-20000</i>	2 ( 2.9)	0 (0.0)		7 (10.1)	0 (0.0)	
<i>Over 20000</i>	0	0(0.0)		3 ( 4.3)	0 (0.0)	
<i>Unsure</i>	0	5(7.4)		0		

Table 14 shows in mothers who had home deliveries, four visit ANC attendance was 35(51.4%) of home deliveries among those who had incomes less than Kes 3,000 and 4(5.9%), 2(2.9%) of home deliveries among home deliveries among those who had incomes Kes 3001-5000 and 5001-10000 respectively. In mothers who had health facility deliveries 4 visit ANC attendance among those with income less than Kes 3000 and 3001-5000 was 23(33.3%) and 10(14.5%) of health facility deliveries respectively. None of these incomes was significant in influencing ANC attendance

Table 14 also shows that in mothers who home deliveries, postnatal care attendance among those with incomes less than Kes 3000 and 3000-5000 was 48(70.6%) and 7(10.3%) of home deliveries respectively. In women who had health facility deliveries, PNC attendance among women who had incomes less than Kes 3000 and 3001-5000 was 29(42%) and 2(2.9%) of health facility deliveries respectively. None of these incomes was significant in influencing PNC attendance.

### C. RELATIONSHIP BETWEEN ANTENATAL CARE ATTENDANCE AND PAST DELIVERY EXPERIENCE, WITH PLACE OF DELIVERY

**Table 15 A: Place of delivery by antenatal care attendance in last pregnancy**

<i>ANC attendance</i>	<i>Place of delivery</i>		<i>P value</i>
	<i>Home (N=68)</i>	<i>Health facility (N=69)</i>	
<b>Previous pregnancy ANC attendance</b>			
Yes	63(92.6)	66(95.7)	0.236
No	5( 7.4)	2( 4.3)	
<b>Timing of first visit (month)</b>			
1-2	4( 5.9)	3( 4.3)	0.818
3-4	23(33.8)	27(39.2)	
5-6	27(39.7)	26(37.7)	
>7	9(13.2)	9(13.0)	
Not sure	5( 7.4)	4 ( 5.8)	
<b>Times attended ANC</b>			
1	6 ( 8.8)	4 ( 5.8)	0.481
2-3	13(19.1)	15(21.7)	
4	15(22.1)	9(13.0)	
≥4	38(41.1)	28(45.1)	
<b>Discussed birth plan</b>			
Yes	32(47.0)	60(87.0)	<0.0001
No	35(51.5)	9(13.0)	
Unsure	1 (1.5)	0( 0.0)	

Table 15A shows that ANC attendance (one visit) in most recent pregnancy among health facility deliveries were 66(95.7%) compared to 63(92.6%) among home deliveries. When the WHO recommended at least 4 visits were assessed, 47(68.1%) of health facility deliveries compared to 43(63.2%) of home deliveries attended ANC at least four times. There was no marked difference between the two groups. ANC attendance during the recent pregnancy was not statistically significant in determining subsequent place of delivery (p value 0.236).

The time of first ANC attendance in the most recent delivery was first one to two months (upto 8 weeks) among 4(5.9%) of mothers who finally had home deliveries and 3(4.3%) of the mothers who subsequently had health facility delivery. Most early reporting to ANC was at three to four months; these mothers subsequently constituted 27(39.2%) of health facility deliveries and 23(33.8%) of home deliveries. This was statistically insignificant in determining the place of delivery (p value 0.481).

Table 15A shows that among mothers who had home deliveries, 19(27.9%) had attended ANC less than four times compared to 19(27.5%) of health facility deliveries. About 15(22.1%) of home deliveries and 9(13.0%) of health facility deliveries had attended ANC four times. Mothers who had attended ANC five times and above constituted 28(41.1%) of home deliveries compared to 38(55.1%) of health facility deliveries

The table shows that during ANC, birth plan and specifically place of delivery was discussed among 60(87%) mothers who delivered in facility 32(47.0%) mothers who delivered at home

**Table 15 B: Place of delivery by past obstetric events**

Past obstetric Events/experiences	Place of delivery		P value
	Home (N=68) No.(%)	Health facility(N=69) No.(%)	
<i>Parity 1</i>	17(25.0)	16 (23.2)	0.81
2	10(14.7)	15 (21.8)	
3	12(17.6)	11(15.9)	
4	7(10.4)	5 (7.3)	
≥4	26(38.2)	26(37.7)	
<i>Declined</i>	3 (4.4)	1(1.4)	
<b>Complication in previous delivery</b>			
<i>Yes</i>	19(32.2)	24(43.6)	0.107
<i>No</i>	39(66.1)	26(47.3)	
<b>Place of previous delivery</b>			
<i>Home</i>	45(86.5)	28(51.9)	<0.0001
<i>Health facility</i>	6(11.5)	24(46.2)	
<b>Accoucher in previous pregnancy</b>			
<i>Health worker</i>	10(19.2)	24(46.2)	0.003
<i>TBA</i>	20(38.5)	18(34.6)	
<i>Relatives</i>	16(30.8)	5(9.6)	
<i>Other</i>	6(11.5)	5(9.6)	
<b>If Accoucher was health worker- gender</b>			
<i>Male</i>	2(3.8)	20(38.5)	0.636
<i>Female</i>	4(7.7)	26(50.0)	
<b>Previous Birthing Position</b>			
<i>Flat on back (Recumbent)</i>	6(11.5)	28(53.8)	<0.0001
<i>Squatting</i>	44(84.7)	20(38.5)	
<i>Hands and knees</i>	2(3.8)	4 (7.7)	
<b>Recent birthing Position</b>			
<i>Flat on back (Recumbent)</i>	1(1.5)	60(87.0)	<0.0001
<i>Squatting</i>	59(86.8)	6 (8.7)	
<i>Hands and knees (all four)</i>	7(10.2)	0(0.0)	
<i>Other</i>	1(1.5)	3 (4.3)	
<b>Satisfied with recent birthing position</b>			
<i>Yes</i>	63(92.6)	52(75.3)	<0.0001
<i>No</i>	2(2.9)	14(20.2)	
<i>No comment</i>	3(4.4)	3(5.5)	

Table 15 B shows that among home deliveries 17(25%) were primigravidae compared to 16(23.2%) of health facility deliveries. Mothers who had over five deliveries (grand multipara) were 26(38.2%) of home deliveries compared to 26(37.7%) of health facility deliveries. Parity was not a statistically significant (p value 0.81) determinant of place of delivery.

Table 15 B also shows that 6(11.5%) of mothers who had recent home and 24(46.2%) of mothers who had a recent health facility delivery reported that the previous delivery was in a health facility. Among recent home deliveries, 45(86.5%) of them had a previous preceding home delivery compared to 28(51.9%) of recent health facility deliveries who also had previous preceding home deliveries. Previous place of delivery was strongly associated with subsequent place of delivery (p value <0.0001).

Respondents who had previously complicated deliveries comprised 24(43.6%) of mothers who had subsequent health facility delivery against 19(32.2%) who had home deliveries. This however was not statistically significant (p value 0.107) in determining place of delivery.

Among the mothers who delivered at home recently 10(19.2%) of them had previously had a delivery assisted by a health worker compared to 24(46.2%) of recent health facility deliveries that had a history of a previous delivery assisted by a health worker. Training of previous accoucher was also

Mothers previously assisted by a TBA constituted 18(34.6%) of health facility deliveries against 20(38.5%) of home deliveries. Mothers that were assisted in the previous pregnancies by relatives constituted 5(9.6%) of recent health facility deliveries compared to 16(30.8%) of recent home deliveries. The training or lack of training of the accoucher was a significant influence to subsequent place of delivery only on univariate analysis (p value 0.003). For those who had previous health facility delivery, the gender of the health worker was not a statistically significant (p value 0.636) determinant of place of delivery.

Mothers who previously had flat on back/ recumbent (“hospital position”) birthing position constituted 28(53.8%) of health facility deliveries against 6(11.5%) of home deliveries. The commonest previous birthing position in home deliveries was squatting

position and 20(38.5%) of recent health facility delivery previously delivered by it compared to 44(84.7%) of recent home deliveries.

Table 15B shows that in the recent deliveries, 60(87%) of mothers who had hospital deliveries had it 'by flat on back' birthing position/recumbent while 1(1.5%) of home deliveries had it by this birthing position. Mother's who had recent delivery by squatting birthing position constituted 6(8.7%) of mothers delivered in hospital compared to 59(86.8%) of home deliveries by this position. Birthing position in previous delivery was statistically significant ( $p$  value $<$  0.0001) determinant of subsequent place of delivery. Among recent home deliveries 63(92.6%) were satisfied with the birthing position during the home delivery compared to 52(75.3%) of mothers who had recent health facility who were satisfied with the delivery position used.

**Table 15 C: Post natal clinic attendance by place of delivery**

<i>Attendance of PNC</i>	<i>Place of delivery</i>		<i>P value</i>
	<i>Home delivery (N=68) No.(%)</i>	<i>Health facility (N=69) No.(%)</i>	
<b><i>Attended PNC</i></b>			
<i>Yes</i>	58(85.3)	66(95.7)	0.204
<i>No</i>	10 (14.7)	3(4.3)	
<b><i>First PNC Visit</i></b>			
<i>1 week</i>	27(39.7)	35(50.7)	<0.0001
<i>2-3 weeks</i>	28(41.2)	11(15.9)	
<i>4-6 weeks</i>	2 (2.9)	18(26.1)	
<i>Over 6 weeks</i>	1 (1.5)	2(2.9)	
<b><i>Times attend PNC</i></b>			
<i>1</i>	2 (2.9)	2(2.9)	0.786
<i>2</i>	4(5.9)	5(7.2)	
<i>3-4</i>	24(35.3)	23(33.3)	
<i>Other</i>	28(41.2)	36(52.2)	
<b><i>Decision maker</i></b>			
<i>Myself</i>	53(77.9)	47(68.1)	0.101
<i>Husband</i>	4(5.9)	13(18.8)	
<i>Mother</i>	1(1.5)	5(7.2)	
<i>Mother in law</i>	0(0.0)	0(0.0)	
<i>Other</i>	0(0.0)	1(1.4)	

Table 15 C also shows that, among respondents who had recent home delivery, 58(85.3%) of them attended PNC compared to 66(95.7%) of women who had health facility delivery. The decision maker on whether to attend PNC was the respondent in 53(77.9%) of home deliveries and 47(68.1%) of health facility deliveries. The spouse made the decision in 4(5.9%) of home deliveries compared to 13(18.8%) of health facility deliveries.

The mother to the respondent made this decision in 1(1.5%) of home deliveries compared to 5(7.2%) of health facility deliveries. Concerning, the timing of the first visit to the PNC clinic, 55(70.9%) of mothers who had home deliveries made the first visit within 3 weeks



compared to 46(66.6%) of mothers who had health facility deliveries. There was no difference in the number of post natal visits made.

The following factors related to previous obstetric experience were significant in determining subsequent place of delivery;

**1. Preceding place of delivery:**

From table 15 B, Among the 137 respondents, 104 (77.6 %) had previously been pregnant. About 6(11.5%) of mothers who had previous home and 24(46.2%) of mothers who had a previous health facility delivery reported that the place of previous delivery was in a health facility.

Among recent home deliveries, 45(86.5%) of them had a previous preceding home delivery compared to 28(51.9%) of recent health facility deliveries who also had previous preceding home deliveries. This was thus found to be statistically significant (p value <0.0001) in determining place of subsequent delivery.

**2. Birthing position in previous delivery:**

From table 15 B, Mothers who previously had flat on back (“hospital position”) birthing position constituted 28(53.8%) of health facility deliveries against 6(11.5%) of home deliveries. The commonest previous birthing position in home deliveries was squatting position and 20(38.5%) of recent health facility delivery previously delivered by it compared to 44(84.7%) of recent home deliveries.

In the recent deliveries, 60(87%) of mothers who had hospital deliveries had it ‘by flat on back’ birthing position while 1(1.5%) of home deliveries had it by this birthing position. Mother’s who had recent delivery by squatting birthing position constituted 6(8.7%) of mothers delivered in hospital compared to 59(86.8%) of home deliveries by this position. Birthing position in previous delivery was statistically significant (p value< 0.0001) in influencing place of subsequent delivery.

### **3. Discussion of delivery plan during ANC**

From table 15 B, during ANC, birth plan and specifically place of delivery was discussed among 60(87%) mothers who delivered in facility and 32(47.0%) mothers who delivered at home. This was not discussed among mothers who constituted 35(51.5%) of home deliveries. Thus birth plan discussion was found to be a strongly statistically very significant ( $p$  value $<0.0001$ ) influence on place of delivery.

## D. PHYSICAL ACCESS

**Table 16: Place of delivery by distance and means of transport to health facility**

<i>Distance</i>	<i>Place of delivery</i>		<i>P value</i>
	<i>Home (N=68)</i>	<i>Health facility (N=69)</i>	
	<i>No.(%)</i>	<i>No.(%)</i>	
<b><i>Distance to Facility during Delivery</i></b>			
<i>Less than 5 km</i>	48(70.6)	34(49.3)	0.002
<i>6-10 km</i>	10(14.7)	10(14.5)	
<i>11-20 km</i>	7(10.3)	7(10.1)	
<i>21-30 km</i>	0(0.0)	5(7.3)	
<i>31-40 km</i>	1(1.5)	1(1.4)	
<i>Over 40 km</i>	0(0.0)	12 (17.4)	
<i>Not sure</i>	2(2.9)	0(0.0)	
<b><i>Means used to access Facility</i></b>			
<i>Car/Lorry</i>	2(2.9)	30(43.5)	<0.0001
<i>Motor cycle</i>	1(1.5)	6 (8.7)	
<i>Bicycle</i>	0 (0.0)	1(1.4)	
<i>Cart</i>	0 (0.0)	0(0.0)	
<i>Donkey</i>	1(1.5)	1 (1.4)	
<i>Walking</i>	57 (83.8)	27(39.1)	

Table 16 shows that during delivery, the mothers who were less than 5 km from facility comprised of 48(70.6%) of home deliveries compared to 34(49.3%) of health facility deliveries. Those who stayed over 6 to 10 km to a facility at this time were 10(14.5%) of health facility deliveries and 10(14.7%) of home deliveries. Mothers who resided over 40km during pregnancy constituted 12(17.4%) of health facility deliveries compared to none in home delivery. Distance during delivery was significant (p value 0.002) influence on place of delivery.

Means of access to a facility during delivery was statistically significant in determining choice of place of delivery (p value <0.0001).Whereas those had access to a car/ lorry comprised 43.5% of health facility deliveries, they made up of 2(2.9%) of home deliveries. Mothers who could only access a facility by walking constituted 27(39.1%) of health facility delivery compared to 57(83.8%) of home deliveries.

In multivariate analysis, means of access to a facility walking or vehicle were the most significant independent factor to utilisation of health facility during delivery (multivariate table at the end).

**Table 17: ANC and PNC attendance by distance to nearest health facility**

<i>ANC attendance</i>	<i>Place of delivery</i>					
	<i>Home(N=68)</i>			<i>Health facility(N=69)</i>		
	<i>ANC attendance</i>		<i>P value</i>	<i>ANC attendance</i>		<i>P value</i>
	<i>≥4times</i>	<i>&lt;4times</i>		<i>≥4times</i>	<i>&lt;4times</i>	
<i>Distance</i>	<i>No. (%)</i>	<i>No. (%)</i>	<i>No. (%)</i>	<i>No. (%)</i>		
<i>Less than 5 kms</i>	32 (47.1)	18 (26.5)	1.000	26 (37.7)	11 (15.9)	0.956
<i>6-10 kms</i>	6 ( 8.8)	4 ( 5.9)		6 ( 8.7)	4 (5.8)	
<i>11-20 kms</i>	4 ( 5.9)	3 ( 4.4)		4 ( 5.8)	2 (2.9)	
<i>31-40 kms</i>	1 ( 1.5)	0 ( 0.0)		4 ( 5.8)	1 (1.4)	
<i>Over 40 kms</i>	0 ( 0.0)	0 ( 0.0)		7 (10.1)	4 (5.8)	

<i>PNC attendance</i>	<i>Place of delivery</i>					
	<i>Home</i>			<i>Health facility</i>		
	<i>PNC attendance</i>		<i>P value</i>	<i>PNC attendance</i>		<i>P value</i>
	<i>Yes</i>	<i>No</i>		<i>Yes</i>	<i>No</i>	
<i>Distance</i>	<i>no (%)</i>	<i>no (%)</i>	<i>no (%)</i>	<i>no (%)</i>		
<i>Less than 5 kms</i>	43 (63.2)	1 (1.5)	0.018	37 (53.6)	0 (0.0)	0.124
<i>6-10 kms</i>	9 (13.2)	1 (1.5)		10 (14.5)	0 (0.0)	
<i>11-20 kms</i>	4 ( 5.9)	2 (2.9)		6 ( 8.7)	0 (0.0)	
<i>21-30 kms</i>	0 ( 0.0)	0 (0.0)		4 ( 5.8)	0 (0.0)	
<i>31-40 kms</i>	1 ( 1.5)	1 (1.5)		1 ( 1.4)	0 (0.0)	
<i>Over 40 kms</i>	1 ( 1.5)	0 (0.0)		8 (11.6)	2 (2.9)	
<i>Unsure</i>	0 ( 0.0)	5 (7.4)		0 ( 0.0)	1 (1.4)	

Table 17 shows that among mothers who had home deliveries, four visit ANC among them was 32(47.1%), 6(8.8%) and 4(5.9%) of home deliveries when they lived less than

5,6-10,11-20km respectively. Among women who had health facility deliveries, PNC attendance among them was 26(37.7%), 6(8.7%) and 4(5.8%) of health facility deliveries when they lived less than 5, 6-10, 11-20km respectively. Distance to facility was not a significant determinant to attendance of ANC.

Table 17 also shows that among mothers who had home deliveries, PNC attendance among them was 43(63.2%), 9(13.2%) and 4(5.9%) of home deliveries when they lived than 5, 6-10, 11-20km respectively. Distance to health facility was a significant determinant of PNC utilisation (p value 0.018).Among mothers who had health facility deliveries, PNC attendance among them was 37(53.6%), 10(14.5%) and 6(8.7%) of health facility deliveries when they lived than 5, 6-10 and 11-20km respectively. Distance was not a significant influence on PNC utilisation in this group (p value 0.124).

## E. PERCEIVED QUALITY OF MATERNAL CARE

**Table 18: Place of delivery by perception of staff attitude**

		Place of delivery		P value
		Home (N=68)	Health facility (N=69)	
Perception		No. (%)	No. (%)	
<b>ANC staff attitude</b>	Excellent	3(4.8)	8(12.1)	0.017
	Good	30(47.6)	40(60.6)	
	Fair	27(42.8)	15(22.7)	
	Bad	0( 0.0)	3( 4.6)	
	Declined	3( 4.8)	0( 0.0)	
<b>Delivery well conducted</b>	Yes	3( 4.4)	64(92.8)	<0.0001
	No	0 ( 0.0)	1( 1.4)	
	Declined	65(95.6)	4( 5.8)	
<b>PNC Staff attitude</b>	Excellent	1( 1.7)	23(33.3)	0.495
	Good	6(10.4)	37(53.6)	
	Fair	0( 0.0)	3( 4.3)	
	Bad	0( 0.0)	3( 4.3)	
	Declined	51(87.0)	0( 0.0)	

Table 18 shows that among those who utilized health facility during delivery, 48(72.7%) of them rated staff attitude during ANC health workers as good or excellent compared to 33(52.4%) of those who had home deliveries.

There were insufficient respondents among home deliveries on staff friendliness during PNC; however, 60(86.9%) of health deliveries rated health staff friendly or excellent during PNC.

Table 18 shows that, on whether a home or health facility delivery was well conducted, 64(92.8%) of respondents who had medical facility delivery agreed, only 3(4.4%) of the home deliveries agreed. The rest declined to answer the question.

**Table 19. Place of delivery by community's rating of service provided**

<i>Rating</i>	<u><i>Place of delivery</i></u>		<i>P value</i>	
	<i>Home Delivery (N=68)</i>	<i>Health facility (N=69)</i>		
<i>RATING OF SERVICES</i>	<i>No. (%)</i>	<i>No. (%)</i>		
<i>Rating of ANC Services</i>	<i>Excellent</i>	3(4.4)	10(14.5)	0.282
	<i>Good</i>	32(47.1)	34(49.4)	
	<i>Fair</i>	24(35.3)	23(33.3)	
	<i>Bad</i>	2(2.9)	1(1.4)	
	<i>Declined</i>	7(10.3)	1 (1.4)	
<i>Rating of Delivery</i>	<i>Excellent</i>	0(0.0)	7(10.1)	0.324
	<i>Good</i>	1(1.5)	34(49.3)	
	<i>Fair</i>	3(4.4)	25(36.2)	
	<i>Bad</i>	0(0.0)	0(0.0)	
	<i>Declined</i>	64(94.1)	3 (4.4)	
<i>Rating of PNC Services</i>	<i>Excellent</i>	1(1.7)	7(10.7)	0.114
	<i>Good</i>	32(55.2)	36(54.5)	
	<i>Fair</i>	25(43.1)	22(33.3)	
	<i>Bad</i>	0(0.0)	1 (1.5)	
<i>Waiting Time</i>	<i>Prompt</i>	0 (0.0)	8(11.6)	<0.0001
	<i>Average</i>	5(7.4)	43(62.4)	
	<i>Some delay</i>	16 (23.5)	10(14.5)	
	<i>Very long</i>	4(5.9)	7(10.1)	
	<i>Declined</i>	23 (33.8)	1 (1.4)	
<i>Privacy</i>	<i>Excellent</i>	0(0.0)	17(24.6)	0.006
	<i>Good</i>	4(5.9)	24(34.8)	
	<i>Fair</i>	11 (16.2)	15(21.7)	
	<i>Bad</i>	3 (4.4)	7(10.1)	
	<i>Declined</i>	50 (73.5)	6 (8.8)	
<i>Adequate Equipments and supplies</i>	<i>Yes</i>	9(13.2)	36(52.)	<0.0001
	<i>No</i>	54(79.4)	33(47.8)	
	<i>Declined</i>	5(7.4)	0(0.0)	

Table 19 shows that where mothers rated ANC services provided during pregnancy as good to excellent, such mothers constituted 44(53.9%) of health facility delivery compared to 35(51.5%) home delivery mothers.

Recent delivery was good to excellent by 41(59.4%) of health facility delivery users against the rating of home delivery of good to excellent by 1(1.5%) of home delivery users. However, about 64(94.1%) of the mothers who had home deliveries declined to answer this question.

PNC services were rated good to excellent by 43(65.2%) of health facility delivery mothers against that same rating by 33(56.9%) by home deliveries.

Waiting time during ANC and Delivery was adjudged average to prompt by 51(84%) people who had health facility delivery compared to 5(7.4%) of mothers who had home deliveries

Privacy at place of delivery was good to excellent by 41(69.4%) health facility delivery mothers compared to only 4(5.9%) of mothers who had home deliveries. However, 50(73.5% ) of mothers who had home deliveries declined to answer this question).

Table 19 also shows that among health facility delivery mothers 52.2% of them thought the facility had adequate equipment and supplies; only 13.2% of home deliveries had confidence in adequacy of health facility supplies and equipment. Perceived adequacy of medical supplies and equipment in a health facility was also statistically significant (p value <0.0001) determinant of health facility utilisation.

The following factors related to the community's perception of quality of maternal care were of little or no significance in the choice made by mothers to deliver in a medical facility or at home; Staff friendliness (p value 0.495), rating of maternal services( ANC- p value 0.282, Delivery- p value 0.324, PNC- p value 0-114).



**Table 20: Statistically significant factors on multivariate analysis (for place of delivery)**

<b>Significant Factors</b>	<b>Place of delivery</b>		<b>OR</b>	<b>95% CI</b>	<b>p value</b>
	<b>Home</b>	<b>Health facility</b>			
<b>1. Level of education</b>					
Primary or Below	66(97.1)	45 (65.2)	17.2	3.0-98.8	0.001
Post –Primary	2 (2.9)	24 (34.8)			
<b>2. Number of wives</b>					
<b>Only Wife</b>					
Yes	41(59.4)	23 (33.80)	2.7	1.3 - 5.5	0.006
No	17(24.6)	37 (54.4)			
<b>3. Preceding Delivery Place</b>					
Health facility	6 (11.5)	24(46.2)	5.5	2.1 – 14.4	<0.0001
Home	45 (86.5)	28(51.9)			
<b>4. Birthing Position Satisfaction</b>					
No	2 (2.9)	14 (20.2)	14.3	1.7 – 122.3	0.015
Yes	63 (92.6)	52 (75.3)			
<b>5. Discussed Delivery place with health worker</b>					
Yes	32 (47.0)	60 (87)	7.8	2.9-21.0	<0.0001
No	35 (51.5)	9 (13)			
<b>6. Means of access to health facility</b>					
Motor cycle	1 (1.5)	6(8.7)	2.5	0.2 – 32.2	<0.0001
Walking	57 (83.8)	27 (39.1)	31.7	7.0 – 142.3	
<b>7. Adequacy of Equipments and supplies</b>					
Yes	9(13.2)	36(52.2)			<0.0001
No	54(79.4)	33(47.8)			
<b>8. Waiting Time</b>					
≥average	5 (7.4)	51(74)	7.5	2.3 – 24.7	0.001
Delays	20 (29.4)	17(24.6)			

Table 20 shows that;

**The education of the respondent** was found to an independent determinant of place of delivery (p value= 0.001). Mothers with post primary school level of education were 17

times (OR= 17.2 CI 3.0-98.8) likely to deliver in a health facility than mothers with lower level of education.

The table also shows that **mothers whose husbands were monogamous** were 3 times likely to deliver in a health facility than mothers who were in polygamous relationships (OR= 2.7 CI 1.3-5.5)

**The place of immediate preceding delivery:** Was statistically significant (p value < 0.0001). The like-hood of a hospital delivery occurring was 6 times more than home delivery if the immediate preceding delivery was a hospital delivery (OR 5.5 CI 2.1-14.4)

**Satisfaction with a previous Birthing position:** Was statistically significant (p value =0.015). Mothers who were satisfied with a particular birthing position were 14 times (OR 14.3 CI 1.7-122.3) likely to deliver by that position in following delivery.

**Birth plan:** Where eventual place of delivery was discussed with health worker during ANC was statistically significant (p value <0.0001) in determining place of delivery. Mothers who discussed elements of birth plan were 8 times (OR 7.8 CI 2.9- 21) likely to deliver in a health facility than those that did not discuss it.

**Means of transport to a health facility** during delivery was a significant determinant of place of delivery (p value < 0.0001). Mothers who had access to a motorcycle were 3 (OR 2.5 CI 0.2 – 32.2) times likely to deliver in a health facility than one who walked for any distance. Mothers who had access to a vehicle were 32 times (OR 31.7 CI 7.0 – 142.3) likely to deliver in a health facility than one who walked during labour.

**Perceived adequacy of equipment and medical supplies:**

Table 20 shows that this was statistically significant (p value= 0.010). Mothers who perceived that the health facility had adequate medical supplies and equipment were 16 (OR 15.9 CI 1.9-131.7) times likely to deliver in a health facility.

**Prompt attention by health staff:** Table 20 shows that this was statistically significant (p value = 0.001). Where the mothers perceive a facility to promptly attend to them, mothers were 8 (OR 7.5 CI 2.3-24.7) times likely to deliver in a health facility than at home than where they thought medical staff were slow.

## **DISCUSSION**

This was a cross-sectional comparative study which aimed at determining factors that influence the utilisation of maternity services, especially utilisation skilled personnel during delivery, in two districts of Turkana County. Characteristics of women who had home and health facility deliveries were compared.

In this study the median age of the respondents was 26 years in women who had home and health facility; this age was similar to one in a study done in western Kenya to study use of ANC services and deliveries in western Kenya and a study done in Rakai district of Uganda<sup>21,27</sup>. This study has shown that the age of the mother and spouse did not influence utilisation of maternity services.

Mother's education was a strongly significant determinant of maternity services utilisation (p value < 0.0001). Mothers progressively utilized maternity services with increasing education level and standard eight level of education was an especially important level above which mothers highly utilized facility delivery. Among mothers without formal, approximately two thirds (64.7%) delivered at home and only about a quarter (26.1%) delivered in a health facility; however, with education above primary school, 3% delivered at home compared to 34.8 % who delivered in a health facility.

Mothers with above primary school level of education were thus 17 times likely to deliver in a health facility than mothers with lower level of education. Education of women among the Ng'iturkana people therefore is crucial if health behaviour in reproductive health and especially among pregnant women is to be changed. This finding was in keeping with findings by previous studies in Tanzania, Equatorial Guinea, Ghana, Nigeria, Nepal<sup>7,8,16,24,36</sup>. Education of the mother however had negligible influence on the utilisation of ANC and PNC services in this study, a departure from studies done in Kenya and Uganda<sup>21,27</sup>

Education of the spouse while significant in univariate analysis was insignificant after confounders were factored in multivariate analysis. Education level of the spouse, however, had influence on utilisation of PNC especially among women who had health

facility, highlighting the positive role men play in improving the utilisation of this often under-utilised service.

In univariate analysis, the occupations of both the respondent and the spouse were significant in utilisation of facility delivery during delivery (p value 0.004 and <0.0001 respectively). Women who were formally employed were all found to have utilized health facility during delivery, where the self employed constituted 29(42%) of health facility deliveries and the unemployed constituted only 20(29%) of health facility deliveries. However they were found to be of little significance after confounders were adjusted for on multivariate analysis. This finding differed with findings in a similar study done in rural Pakistan<sup>37</sup>. The occupations of the couple are related to the education, socioeconomic status, place of residence and the lifestyle of the same, thus the likely diminution of significance when these factors were considered.

Community practices like polygamy are still rampant in this community; about (114)76% of the women interviewed were married (to monogamous or polygamous spouse) slightly differing with married women in a study done in Bosomtwe district Ghana<sup>35</sup>. In the later, the married women were 82.3% of the participants. In Zaria, north Nigeria this was even 97.8%<sup>36</sup>. However, 37(54.4%) of respondents who had home deliveries compared to 17(24.6%) among health facility deliveries were in a relationship with a polygamous spouse. Most polygamous men had 2 wives and 37(54.4%) of such women delivered at home. Being only wife in a relationship was a statistically determinant of utilisation of maternity services in this community (p value 0.002). Mothers whose husbands were monogamous were 3 times likely to deliver in a health facility than mothers who were in polygamous relationships (OR= 2.7 CI 1.3-5.5). This stresses that a lot of effort and commitment needs to be put to stamp out polygamy in this community for improvement in maternal health indicators would be realized.

Absolute income of family had influence on choice of place of delivery (p value < 0.0001); a finding that is in agreement with other previous studies.<sup>21, 22</sup> An important negative finding is that absolute family income did not influence utilisation of ANC and PNC services utilisation.

The following three factors related to immediate preceding delivery were found to be statistically significant in determining subsequent place of delivery: place of immediate preceding delivery (p value 0.001), the training of the person who assisted the delivery (p value 0.003) and the birthing position in that delivery (p value <0.0001). Mothers who had an immediately preceding hospital delivery were 6 times more likely to have a subsequent hospital delivery (OR 5.5 CI 2.1-14.4). This is in agreement with a similar study done in Rakai, northern Uganda<sup>27</sup>.

Mothers previously delivered by health workers constituted the bulk of subsequent health facility delivery (59.4%) and only 32.4% of home deliveries. This reinforces the finding above about initial and subsequent place of delivery. This is reassuring in these Turkana districts, but that the health facilities are at times manned by unqualified staff because of perennial staff shortages becomes a drawback.<sup>10</sup>

The mothers were generally happy with the birthing positions in the two places; at home-squatting and hospital recumbent (flat on back) position. In this study 104 of 137 (77.6%) mothers were multiparous. Those who had the hospital common flat on back birthing position constituted 28(53.8%) of subsequent health facility delivery, an indication that these patients were satisfied with the delivery position. Home deliveries were often in squatting position, and this group made the 46(84.7%) of the mothers who delivered at home. Health facilities should thus in this community allow other delivery positions that would be both culturally acceptable but also acceptable in formal health care. Nomadic pastoralism was significant for choice of place of delivery in univariate analysis, but was found not to be an independent influence on multivariate analysis. Nomadism however had influence on PNC attendance among health facility deliveries (p value 0.012).

Parity was not found significant in determining use of maternity services (p value of 0.81). A different finding to one in rural Tanzania and Nepal<sup>8, 24</sup>. In Tanzania, it was found out that mothers with one previous or more pregnancy were likely to deliver at home than the primigravidae. The same finding by Nepal.<sup>8, 24</sup> Obstetric experiences in both cases was thought to have made mothers overconfident and therefore view labor as a problematic only in primigravidae. The study seems to suggest that that previous obstetric experience does not play a role in choice of place of the following delivery.

ANC attendance during recent delivery was of little significance in influencing place of delivery with p value 0.236. About 66 (95.7%) of respondents who had health facility deliveries had attended ANC once compared to (63) 92.6% home deliveries. This ANC attendance is significantly higher than the 91.5% in KDHS 2008. When, the WHO recommended 4 antenatal visits were examined, the figure was 68.2% among health facility deliveries compared to 63.6% among home deliveries. The 3 year recall period and the fact that most of the patients were multiparous could have also been the cause of this discrepancy. Number of times attended ANC (p value 0.818) and the time of gestation attended first ANC (p value 0.481) were also of no significance. That ANC attendance is of no significance in place of delivery goes against the findings in Cambodia and Nepal<sup>8,18</sup>.

Gender of the assistant during previous delivery in this community was did not influence choice of subsequent place of delivery; A finding that would be a relief to health care providers in this community with strong cultural presence and with fewer qualified female skilled personnel. Complications in previous delivery was also found to be of little significance in determining subsequent delivery place, a finding that contrasts with a similar study in Cambodia where this was a critical determinant of facility delivery<sup>18</sup>.

The most important predictor of facility delivery in obstetric history was place of delivery was discussed with health worker during ANC (p value <0.0001). Mothers who discussed elements of birth plan (where to deliver) were 8 times (OR 7.8 CI 2.9- 21) likely to deliver in a health facility than those that did not discuss it. This finding highlights the importance of discussing the birth plan with the mother in ANC. This is in keeping with findings of a study on birth preparedness done in KNH<sup>31</sup>

In univariate analysis, distance to a health facility during pregnancy, delivery and PNC period were all significant (p value 0.02, 0.03, 0.25 respectively) in determining utilisation of maternity services. Means of access to a medical facility was however found to be strongly associated (p value <0.0001) with health facility use for delivery.

It is noteworthy that most of the respondents who lived less than 5 km from health facilities contributed to 70.6% of home deliveries. For those who lived over 6 to 10 km to a health facility at this time, 50% had health facility delivery. The finding that all of those

mothers who were over 40km during pregnancy had facility delivery deserves attention. Though their number was small this is still a pointer to the insufficient attention facilities give those closer to them and more interest in those who live further away. The effect of mobile services often offered in the area by health partners could have lead to higher sensitization on health matters among this group.

That those who lived very far from the facilities and the nomads could particularly have been wary of dangers associated with delivery and gone to stay with relatives in towns or shopping centres is a possibility. The prolonged drought and the recently more frequent skirmishes with neighbouring communities could have distorted the picture in those living at a distance of over 40km away from health facilities. This was similar to the finding in utilisation of PNC services where utilisation was very high in both home and health facility users. These findings are in are in contrast with similar studies previously done in Kenya<sup>12, 32</sup>. There is a possibility that the illiterate respondents confused PNC with routine facility visits for child immunization.

The means of access to a facility during labour, having access to a car or lorry (p value <0.0001) and walking (p value < 0.0001) were found to be very significant in determining place of delivery A mother walking had odds of 31 times (OR 31 CI 7.0-142.3) more likelihood to deliver at home than one who had access to a car or lorry. Accessing these means of transport could also have been a factor of economic empowerment among some respondents. In a rural area with very high absolute poverty levels which of late has been highly dependent on relief food coupled with poor infrastructure, all these factors individually or in concert play a negate role in utilisation of maternity services

Several factors were looked at as proxies of participants' perception of quality of care offered in a facility and how it related to utilisation of maternity services. Their rating of staff attitude at ANC, delivery or PNC was inquired form mothers. Staff friendliness at these times and whether they thought delivery was well or poorly conducted. Waiting time, patient's rating of privacy in services provided, rating of equipments and supplies in the hospital and mothers rating of post natal services.

The factors listed below were of no statistical significance in influencing utilisation of maternity services; Staff friendliness (p value 0.495), rating of maternal services (ANC- p value 0.282, Delivery- p value 0.324, Rating of PNC- p value 0-114).

In univariate analysis, the following factors were found to be significant in influencing choice of place of delivery; health facility staff attitude during ANC( p value 0.017), When delivery was rated to have been well conducted( p value <0.0001), where during ANC attendance elements of birth plan( discussed place of delivery) were discussed(p value <0.0001), waiting time( p value <0.0001), Where the community perceives the facility has adequate supplies and equipment(p value <0.0001) and Privacy (p value 0.006). This is in contrast to a study done in Cambodia that had found these factors insignificant<sup>18</sup> where these two factors had minimal influence on choice of place of delivery.

Waiting time and Perceived adequacy of equipment and medical supplies were very critical factors of perception of quality by the community.

Waiting time was found to be significant (p value 0.001). Where the mothers perceive a facility to promptly attend to them, mothers were 8 (OR 7.5 CI 2.3-24.7) times likely to deliver in a medical facility than at home than where they thought medical staff were slow. Perception of adequacy of medical supplies and equipment was statistically important on multivariate analysis (p value 0.010). When mothers had a perception of adequate medical supplies and equipment they were 16 (OR 15.9 CI 1.9-131.7) times likely to deliver in a health facility. This is an interesting finding considering staff shortages often seen in this area.<sup>10</sup> The facilities and the community also require closer interaction and sharing of information on services offered in nearby facilities.



## **CONCLUSIONS**

Based on the results of this study, the following conclusions can be made;  
Factors that are critical to improvement of utilisation skilled personnel during delivery in Loima and Turkana districts of Turkana County are:

1. Educating the mother in this area is a crucial determinant of choice of place of delivery and an important means of markedly improving maternity services utilisation.
2. Polygamy was fairly common in the area and had a negative influence on health facility utilization.
3. Birth plan was not routinely discussed during ANC in many health facilities in these districts and this reduced the number of women seeking skilled staff assistance during delivery. The mothers who had home deliveries, who in this area were the majority, had a strong preference for vertical birthing positions (squatting position). There is need to sensitize our skilled staff on the merits of allowing other birthing positions other than the recumbent position in health facilities in this area.
4. The first pregnancy was the most critical determinant of future health facility delivery among these nomads and must be targeted to improve maternal health outcomes.
5. Poverty had a negative influence on utilisation of health facilities during delivery in this area and efforts to improve the economic strength of the inhabitants of this area will also cascade to improving outcome and impact indicators in health sector.
6. Strong community and health facility interaction fostered better utilisation of maternity services and need strengthening.

## **RECOMMENDATIONS**

1. The government and partners should institute deliberate long term measures to improve girl child education in this area in order to improve on reproductive health indicators among other aspects.
2. The community needs to be sensitized on negative effects of practices like polygamy and efforts to reduce it need to be pursued.
3. The health workers need to make discussion of birth plan routine part of ANC services. There is also need to adopt community friendly birthing positions which are safe. Sensitization of the health staff is key to this.
4. There is need to sensitize the community about benefits of skilled care during delivery. Special focus should be on provision of the service to the primigravidae.
5. Improve interaction between health facilities and the communities they serve to enhance positive perception on services, especially the benefit of utilizing available reproductive health services.
6. Need for the government to prioritize improvement of infrastructure in this County

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## Appendix 2: DATA COLLECTION QUESTIONNAIRE

### **Section A: SOCIO-DEMOGRAPHIC HISTORY**

#### **Respondent's detail**

1. Serial Number

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2. Age in years

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3. Sub- location.....

4. Educational background

- a) No formal education                      b) Up to class 3  
c) Up to class 8                                d) Secondary school  
e) Tertiary college and above

5. Occupation

- a) Herder                                        b) Formally employed  
c) Self employed                              d) Jobless

6. Religion

- a) Christian                                      b) Muslim  
c) Traditional                                  d) other .....

7. Marital status (during recent pregnancy)

- a) Single                                         b) cohabiting  
c) Estranged / divorced                      d) married

#### **Spouse's details**

1. Age in years

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2. Education level attained

- a) None    b) Lower primary  
c) Upper primary                                d) Secondary school  
f) Tertiary college and above

3. Occupation

- a) Herder  
b) Self employed  
c) Salaried employee  
d) jobless

4. Marriage status
  - a) Monogamous
  - b) Polygamous (state how many wives).....
  - c) Cohabiting

**B) Socio-cultural factors**

1. How many times have you become pregnant?
  - a) 1   b) 2   c) 3   d) 4   e) 5-6   f) over 7
2. What were the outcomes .....
3. Where did you have your recent delivery?
  - a) Health facility   b) Home   c) On the way to facility
4. What was outcome?
  - a) Live birth – well   b) Live birth- developed complications
  - c) Still birth
5. Did you attend ANC during this pregnancy?
  - a) Yes   b) No
6. If YES, starting which month?
  - a) 1-2   b) 3-4   c) 5-6   d) 7-8   e) 9
7. How many times did you attend ANC?
  - a) 1   b) 2-3   c) 4   d) 5-6   e) 7 and above
8. If NO, why? .....
9. Did you discuss about delivering in a health facility?
  - a) Yes   b) NO
10. During previous pregnancy, did you attend ANC?
  - a) Yes   b) No
11. Did you or your family migrate away from your usual residence (ere) during recent pregnancy?
  - a) Yes   b) No
12. If Yes, How many times?
  - a) Once   b) Twice   c) Thrice   d) Four times and over
13. Are you the only wife (your husband has)?
  - a) Yes   b) No   c) Not sure

14. If NO, How many (Including you) wives does your husband have?  
a) 2    b) 3    c) 4    d) over 5    e) Not sure
15. Who made the decision on you attending ANC?  
a) I    b) Husband    c) My Mother    d) Mother in law    e) other.....
16. Did you see any traditional healers during pregnancy?  
a) Yes    b) No
17. If yes, for what reason.....
18. Was this pregnancy?  
a) Wanted    b) Unwanted
19. Who made decision on where you delivered?  
a) I    b) Husband    c) My Mother    d) Mother in law    e) other.....
20. If you have been pregnant more than once, where was the preceding delivery?  
a) Health facility    b) home    c) On the way.
21. Who conducted previous delivery?  
a) Health worker    b) TBA    c) Relatives    d) Others
22. If didn't deliver in facility, give reason.....
23. If health worker, was He/ she?  
a) Male    b) Female
24. Did you have any complication in previous delivery?  
a) Yes    b) No
25. If yes, which? .....
26. What birthing position did you have in preceding pregnancy?  
a) Flat on Back (Lithotomy)    b) squatting    c) Hands and knees (all 4s)    d) other
27. What birthing position did you have in recent birth?  
a) Flat on Back (Lithotomy)    b) squatting    c) Hands and knees (all 4s)    d) other
28. Were you happy with this position?  
a) Yes    b) No
29. Did you attend PNC?  
a) Yes    b) No
30. If Yes, tick  
a) Had complications    b) Bumped into it/ coincidence  
c) Because of child Immunization    d) other
31. If yes, who made decision?  
a) I    b) Husband    c) My Mother    c) Mother in law    d) other



32. What time after delivery was your first PNC visit?  
a) 1 week      b) 2 -3weeks      c) 4-6 weeks      d) Over 6weeks
33. How many times did you attend?  
a) 1              b) 2              c) 3-4              d) Other

### **C) Physical access factors**

34. How far was facility from home during delivery?  
a) Less than 5km      b) 6-10km      c) 11- 20km  
d) 21-30km              e)31-40km      f) Over 40km
35. How far was facility from home during ANC?  
a) Less than 5km      b) 6-10km      c) 11- 20km  
d) 21-30km              e)31-40km      f) Over 40km
36. How far was facility from home POST DELIVERY?  
a) Less than 5km      b) 6-10km      c) 11- 20km  
d) 21-30km              e)31-40km      f) Over 40km
37. If attended, how did you access the health facility?  
a) Car / lorry              b) motor cycle      c) bicycle  
d) Cart                      e) Donkey              f) walking
38. If you did not attend any, how would you have accessed it at these times?  
a) Car / lorry              b) motor cycle      c) bicycle  
d) Cart                      e) Donkey              f) walking

### **D) Socio-economic factors**

39. How much do you earn monthly?  
a) Less than 3,000    b) 3,000-5,000    c) 5,000-10,000    d) 10,000- 2, 0000    e) over 20,000
40. State number of animal you have
- a) Cows.....  
b) Camels.....  
c) Shoats (goats /sheep).....
- d) Donkeys .....  
e) Other.....



48. What is your overall rating of?

i) ANC services

a) Excellent                      b) Good                      c) Fair                      d) Bad

ii) Facility deliveries

a) Excellent                      b) Good                      c) Fair                      d) Bad

iii) PNC services

a) Excellent                      b) Good                      c) Fair                      d) Bad

49. If did not utilize, Give reason;

i) ANC.....

ii) Facility delivery.....

iii) PNC services.....

50. How do you think we can improve Health facility delivery utilization?.....

**THANK YOU**

### **Appendix 3: RESPONDENT INFORMATION AND CONSENT FORM.**

The study is on Factors determining Maternity services (ANC, health facility delivery and PNC services) utilisation in Loima and Turkana Central districts of Turkana County.

**Principal investigator:** Roberts Eloto Abok, MBChB, M.Med Student in the Department of Obstetrics and Gynaecology, University of Nairobi. Phone No. 0722432285

**Chairman KNH-ERC-** Professor K. M Bhatt, Phone No. 0202726300

#### **Introduction**

The purpose of this consent is to give you information about the study on determinants of Maternity services utilisation in two districts of Turkana County. This information will help you decide to be in the study or not. Please read this form carefully (or ask to be read to you carefully). You may ask questions about the purpose of the research, what we would ask you to do, the possible risks and benefits, your rights as a volunteer and anything else about the research or this form that is not clear. When we have answered all questions, you can decide to be part of the research or not. This process is called informed consent. If you wish, we will give you a copy of this form for your record.

#### **Reason for this research**

The purpose of this study is to understand the factors that determine whether a mother utilizes maternity services (Antenatal care, health facility delivery and Postnatal care services) or not. Utilisation of these services plays a critical role to reduction of maternal and neonatal morbidity and mortality. The long term aim of the study is to understand the factors that especially inform the choice between health facility or home deliveries. Understanding the interplay between these determinants will contribute to improvement of maternal and neonatal morbidity and mortality.

I therefore intend to get baseline information that will be useful to health service providers, planners and other health service partners and the community in scaling up access and utilisation of maternity services.

#### **Benefits**

The results will be useful in understanding the determinants of ANC utilisation or non utilisation, skilled assistance use during delivery or home deliveries and Postnatal services

use after delivery. With better understanding of the determinants, the services access and utilisation can be scaled up.

**Possible risks**

There are no risks associated with this study because there are no invasive procedures to be performed on you as part of the study.

**Confidentiality**

The information given to researchers will be kept in strict confidence. However no information by which your identity can be revealed will be released or published.

**Participant’s agreement**

I voluntarily agree to participate in the study on factors determining maternity services utilisation in Loima and Turkana districts of Turkana County. I understand that participation in the study does not entail financial benefit. I have been informed that the information obtained will be treated with utmost confidentiality and my current treatment (if any) or any future treatment will not be compromised if I decline participation or withdraw from study.

I have had a chance to ask questions, if I have questions later about the research I can ask the researcher.

Signature of participant..... Date.....

Signature of Witness..... Date.....

I certify that the nature and purpose of, potential benefits, possible risks associated with participating in this study have been explained to the above participant.

.....  
Signature of Investigator/ research assistant Date

## **APPENDIX 4: DUMMY TABLES**

### **A) SOCIODEMOGRAPHIC CHARACTERISTICS**

Characteristic	n (%) or mean [range	n (%) or mean [range
	Medical facility Delivery	Home Delivery
Age( in years)		
Marriage status		
a) Married		
b) Single		
c) Divorced		
d) Cohabiting		
e) Other (state)		
Educational background		
a) No formal education		
b) Lower primary		
c) Upper primary		
d) Secondary school dropout		
e) Form four		
e) Tertiary college and above		
Occupation		
a) Herder		
b) Formally employed (state)		
c) Self employed (state)		
d) Jobless		
e) Other ( state)		
Religion		
a) Christian		
b) Muslim		
c) Traditional		
d) other (state)		

**Spouse's information** (where applicable)

Characteristic	n (%) or mean [range]	
	Facility delivery	Home delivery
Age( state)		
Occupation		
a) Herder		
b) Formally employed (state)		
c) Self employed (state)		
d) Jobless		
e) Other (state)		
Education background		
a) No formal education		
b) Lower primary		
c) Upper primary		
d) Secondary school dropout		
e) Form four		
f) Tertiary college and above		
Marriage status		
a) Monogamous		
b) Polygamous ( state how many wives)		
c) Cohabiting		

## B) SOCIOCULTURAL

Characteristic	n (%) or mean [range]	
	Facility delivery	Home delivery
1. How many total deliveries have you had?		
1		
2		
3		
4		
5-6		
Over 7		
Outcomes?		
2. Place of recent delivery?		
Medical facility		
Home		
On the way to facility		
3. Outcomes?		
4. ANC attended?		
Yes		
No		
5. First ANC attendance which month?		
1-2		
3-4		
5-6		
7-8		
9		
6. Number of times ANC attended?		
1		
2-3		
4		
5-6		
Over 7		



7. Not attended- Reason		
8. Did you attend ANC preceding pregnancy?		
Yes- No of Times		
No		
9. Migrated out of normal settlements during index pregnancy		
Yes		
No		
10. Number of Migration times (one way)?		
1		
2		
3		
Over 4		
11. Polygamous?		
Yes		
No		
12. Number of wives?		
2		
3		
4		
Over 5		
Unsure		
13. Who made decision to attend ANC?		
I		
Husband		
My Mother		
Mother in law		
Other		
14. Attended traditional healers?		
Yes		
No		
15. If yes. State Reason		
16. Was pregnancy Wanted?		

Yes		
No		
17. Who made decision on delivery Place?		
I		
Husband		
My Mother		
Mother in Law		
Others		
18. Place of Antecedent (preceding) pregnancy?		
Health facility		
Home		
En route to health facility		
19. Who conducted antecedent pregnancy?		
Health worker		
TBA		
Relative		
Other- state		
20. If above health worker? Was he/ she?		
Male		
Female		
21. Antecedent pregnancy, was it?		
Complicated		
Not complicated		
22. If above complicated, state complication		
23. What was birthing position in antecedent delivery?		
Flat on back( Lithotomy)		
Squatting		
All fours		
Other( state it)		
24. What was birthing position in index (recent) delivery?		
Flat on back( Lithotomy)		
Squatting		

All fours		
Other( state it)		
25. Satisfied with birthing position?		
Yes		
No( comment)		
26. Attendance of PNC?		
Yes		
No		
27. Had any complications post delivery?		
Yes		
No		
28. Why attended PNC?		
Complication		
Coincidental		
Immunisation		
Other( state)		
29. Who made decision to attend PNC?		
I		
Husband		
My Mother		
Mother in law		
Other( state)		
30. First PNC visit when post delivery (weeks)?		
1		
2-3		
4-6		
Over 6 weeks		
31. No of times attended?		
1		
2		
3-4		
Over 4		

#### D) PHYSICAL ACCESS

Characteristic	n (%) or me [range]	
	Medical facility delivery	Home delivery
32. How far was the facility from home at pregnancy time?		
a) below 5 km		
b) 6-10 km		
c) 11- 20 km		
d)21- 30km		
e) 31-40 km		
f) Over 40km		
33. How far was the facility from home at delivery time?		
a) below 5 km		
b) 6-10 km		
c) 11- 20 km		
d)21- 30km		
e) 31-40 km		
f) Over 40km		
34. How far was the facility from home post delivery time?		
a) below 5 km		
b) 6-10 km		
c) 11- 20 km		
d)21- 30km		
f) Over 40km		
35. If Attended any maternity services, what means did you use?		
a) Car/ Bus/ Lorry		
b) Motor cycle		
c) Bicycle		
d) Cart		

e) Donkey		
f) Walking		
State service/s attended		
35. If not attended any maternity services, what means would have been used to reach facility?		
a) Car/ Bus/ Lorry		
b) Motor cycle		
c) Bicycle		
d) Cart		
e) Donkey		
f) Walking		
State service/s not attended		

#### **D) SOCIO-ECONOMIC FACTORS**

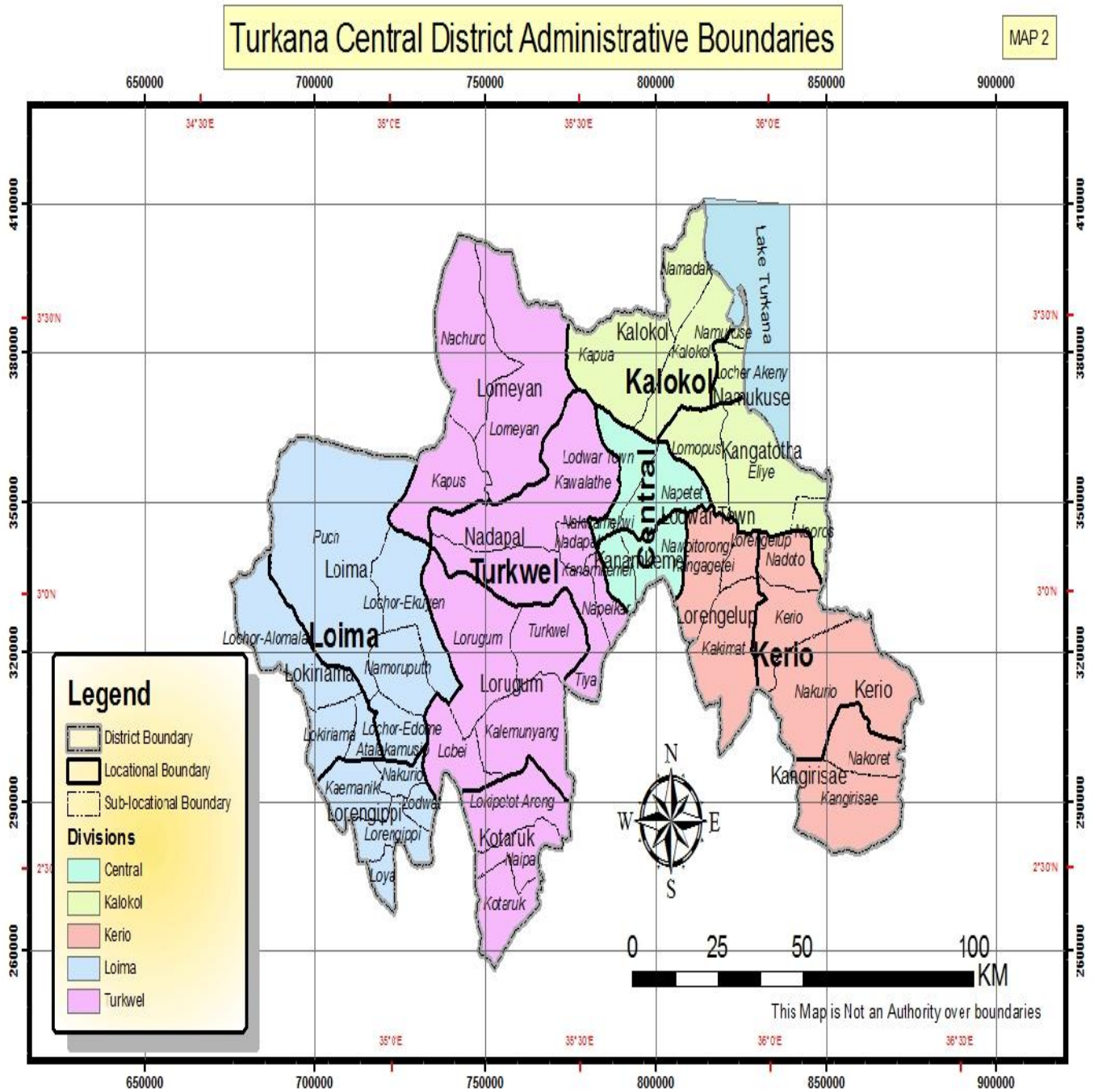
Characteristic	n (%) or mean [range]	
	Medical facility deliveries	Home deliveries
36. Family monthly income( Ksh)		
a) less than 3000		
b) 3000- 5000		
c) 5000- 10000		
d) 10000- 20000		
e) Over 20000		
f) Unsure		
37. How many of these animals does family own?		
Cows		
Camels		
Shoats		
Donkeys		

Others( type and number)		
38. State any expenses incurred to access in Ksh?		
ANC		
Delivery		
Post natal clinic		
39. If not utilized, state likely expenses?		
ANC		
Delivery		
Post natal clinic		
40. Your source of maternity health information during recent Pregnancy?		
a) Television		
b) Radio		
c) Health worker		
d) TBA		
e) Chief/sub chief		
f) local councilor		
g) Neighbours		
h) other (state)		

**E) PERCEIVED BENEFIT/ PERCEIVED QUALITY OF CARE**

41. Staff attitude at ANC?		
a) Excellent		
b) Good		
c) fair		
d) bad		
e) I didn't attend		
42. Person who delivered attitude?		
a) Excellent		
b) Good		
c) fair		
d) bad		
43. Staff attitude at PNC?		
a) Excellent		
b) Good		
c) fair		
d) bad		
e) I didn't attend		
44. Did you think the delivery was well conducted?		
a) Yes		
b) No		
45. Timeliness at any of stages attended?		
a)Very Prompt		
b) Prompt		
c)average		
d)Some delay		
e)very long		
46. Satisfied with delivery medical facility/ home- Explain		
a) Yes		
b) No		

## Appendix 5: Maps of Turkana Central and Kenya





# MAP OF KENYA

MAP 1

Showing Map of the three Turkana Districts

