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Quality of Antenatal Care and its Relationship with Women's Intended Use of their ANC Facility for Delivery: A National Cross-sectional Study in Kenya

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Abstract

Maternal deaths have been one of the leading causes of deaths in sub-Saharan Africa. Delivering at an institution can prevent the majority of maternal deaths in developing countries. A national cross-sectional survey of Kenya was used to determine if the quality of antenatal care (ANC) provided to women is associated with their intention to deliver at the same facility. Multilevel mixed-effects logistic regression was used to examine this relationship. Quality of ANC variables assessed in this study were not significantly associated with women's intention to deliver at the same facility. Mothers preferred to deliver at hospitals, rather than clinics/dispensaries. ANC facility being the closest facility from their home was also positively associated with their intention to deliver at the same facility. Findings from this study suggest that there is a need to increase Kenyan women's perspective towards lower-level facilities and their access to healthcare facilities for delivery.

Keywords: Maternal health services, Quality of healthcare, Antenatal care, Facility-based delivery, Intention, Kenya

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All glory to God, my faithful friend.

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List of Abbreviations

ANC	Antenatal care
BP	Blood pressure
CHW	Community Health Worker
DHS	Demographic and Health Survey
FBD	Facility-based delivery
GDP	Gross Domestic Product
HIV/AIDS	Human Immunodeficiency virus and acquired immune deficiency syndrome
ICC	Intraclass correlation coefficient
KV2030	Kenya Vision 2030
KSPA	Kenya Service Provision Assessment
MMR	Maternal mortality rate
MDG	Millennium Development Goal
NCAPD	National Coordinating Agency for Population and Development
SBA	Skilled birth attendant
SD	Standard deviation
SES	Socioeconomic status
SHW	Skilled health worker
SPA	Service Provision Assessment
Standards	*Standards for Improving Quality of Maternal and Newborn Care in Health Facilities*
TBA	Traditional birth attendant
THE	Total Health Expenditure
TT	Tetanus toxoid
UN	United Nations
USAID	United States Agency for International Development
VCT	Voluntary counselling and testing
WHO	World Health Organization

Chapter 1: Introduction

Maternal mortality continues to be one of the leading causes of death among women in low- and middle-income countries[1]. Every day, approximately 830 women die due to pregnancy-related causes[2]. Close to all maternal deaths, 99%, occur in developing countries[3]. In 2015, the average maternal mortality rate (MMR) in developing countries was 289 per 100,000 live births, which is 20 times that of developed countries (with 12 per 100,000 live births)[3]. Within developing countries, sub-Saharan Africa suffers from the highest MMR of 546 deaths per 100,000 live birth[3]. Most maternal deaths occur due to birth complications, such as haemorrhage and hypertension, during labour or the immediate postnatal period[4]. These birth complications can be prevented and treated if mothers have access to proper care during pregnancy and childbirth[2,4]. Facility-based deliveries (FBDs) can prevent the majority of maternal deaths[4], as delivery occurs with a skilled birth attendant (SBA) in a clean environment, with access to emergency obstetric services[5]. It was found that in sub-Saharan Africa, 99% of SBA assisted births take place at healthcare facilities; whereas, births outside of healthcare facilities are usually assisted by relatives, friends, traditional birth attendants, or with no assistance at all[6,7].

In sub-Saharan Africa, 56% of women use healthcare facilities for delivery[8]. Many studies have identified cost associated with FBDs to be the greatest barrier to having an SBA for childbirth[9,10]. In an attempt to decrease the financial barrier, several countries in sub-Saharan Africa have implemented free delivery services. For example, the Kenyan government removed all user fees for normal delivery services at public healthcare facilities in 2007 and then additionally removed the fees for caesarean section in 2013[11]. Although FBDs increased significantly since the removal of user fees in 2013, 39% of women in Kenya continue to have homebirths[7]. Other countries that removed user fees for delivery found similar issues of continued use of homebirths[12,13]. Additional strategies are required to further increase the use of FBDs in sub-Saharan Africa.

Women who chose not to deliver at a facility identified poor quality of the healthcare facility as one of their reasons. Mistreatment, abuse, and disrespect of women during childbirth are common practice in sub-Saharan Africa[14–17]. As reported in Tanzania, 70% of participants attested that they received some form of disrespect or abuse while delivering at a facility[18]. Greater than half of those participants in Tanzania experienced physical and verbal abuse, lack of visual and auditory privacy, and ignorance from healthcare providers[18]. A study done in rural Tanzania reported that women who had better perception of the quality of the facilities were 80% more likely to have FBD[19]. Women's perception of healthcare quality are shaped by both direct and indirect experiences of healthcare facilities. These include their previous birthing experience at a facility, their experience during their antenatal care (ANC) at a facility, as well as reports of other mothers who have received ANC or delivered at a facility in their neighbourhoods[20,21].

ANC visits provide an opportunity for mothers to interact with a potential birth facility prior to delivery. For some, ANC may be their first contact with a maternal care facility. The use of ANC is relatively higher than the use of FBDs in sub-Saharan Africa. Among women in sub-Saharan Africa, 80% use ANC at least once for each of their pregnancies[22], while only 56% have FBDs[8]. Therefore, ANC visits may be an ideal point of intervention to increase women's use of FBDs. However, we know relatively little about the relationship between the quality of ANC that women receive at a facility and her use of facilities for delivery. The few studies that explored this relationship in sub-Saharan Africa found contradicting results[23–25], making it difficult to draw any definitive conclusions.

Therefore, this study sought to investigate whether the quality of ANC provided was related to women's intention to use the same facility for delivery. This relationship was examined using a national cross-sectional sample of Kenyan healthcare facilities that provide ANC. To date, this is the first national study in Kenya that has analyzed the relationship between quality of ANC and women's intention for FBD. Studying this

relationship may provide information to the Kenyan government that can be used to increase FBDs.

Thesis structure

This thesis has five chapters. The first chapter provides an introduction to maternal mortality and its association with use of FBDs among women in sub-Saharan Africa. It introduces the concept of quality of ANC as a possible determinant of using facilities for delivery. Chapter 2 is the literature review. It provides an introduction to Kenya, the setting of this study. The chapter presents the current findings on the epidemiology of maternal deaths, factors affecting the use of facilities for delivery, and how quality of ANC is assessed. The findings from the literature are brought together to formulate a rationale and hypothesis for this thesis. Chapter 3 first describes the conceptual framework that guided the choice of variables and analysis for the thesis. Next, operational definitions of the variables and analytical methods are described. Chapter 4 presents the results of the univariate, bivariate, and multivariable analyses. Significant findings from the analyses are highlighted for the reader. Chapter 5 provides an interpretation of the findings, the study's limitations, the possible implications for Kenya, as well as potential areas for future research.

Chapter 2: Literature Review

2 Literature Review

In this chapter, the reader is introduced to Kenya, its political and cultural background, and its healthcare system. Next, the chapter describes the epidemiology of maternal mortality; the statistics, consequences, and causes of maternal deaths. The reader is then provided with a thorough review of the literature on the determinants of facility-based deliveries. Subsequently, this chapter examines quality of antenatal care in sub-Saharan Africa and Kenya; and some of the methods used to assess quality. Finally, this chapter describes the motivation and hypothesis generation for this study.

2.1 Kenya

2.1.1 Background

The Republic of Kenya is situated in eastern Sub-Saharan Africa, bordered by Ethiopia to the north, Somalia to the northeast, Tanzania to the south, Uganda to the west, and South Sudan to the northwest (Figure 2.1)[7]. The southeast region of Kenya forms the coastal line of the Indian Ocean and the southwest region partially lines Lake Victoria[7]. Kenya is situated on the equator which bisects it laterally[7]. Kenya is a former British colony that gained independence on December 12th, 1963, and is now a multi-party state, with the Jubilee Coalition government currently in power[7]. President Uhuru Kenyatta was elected as the fourth president in March 2013[26].

Since independence, the population has grown more than three-fold to 46.8 million in 2016[27,28]. The majority of the people who live in Kenya are Indigenous Kenyans, and a small proportion of non-indigenous groups include Europeans, Asians, and Arabs[29]. The country has two official languages: one is English, and the other is Swahili, a Bantu language spoken in East and Central Africa[29]. There are 42 ethnic groups or tribes, each with its own unique language and culture[27]. Kenyans place a great importance on

family[27,30]. Families are often large in number because the extended family members are also included in their definition of family[27].

Figure 2.1. Map of Kenya

Sources:
Kenya on Map. Premium Times. www.premiumtimesng.com. Published 2017. Accessed December 26, 2017.
Location Map of Kenya. Driving Directions and Maps. www.drivingdirectionsandmaps.com. Published 2017. Accessed December 26, 2017.

Kenya was classified as a lower-middle income country in 2014[31]. The lower-middle income group is defined as those with gross national income of greater than $1,026 per capita but lower than $4,035 per capita[31]. This move into the lower-middle-income category was due, not to an actual increase in the gross domestic product (GDP), but rather because the base year for its calculation changed from 2001 to 2009[32]. Since this was not a gradual growth into a lower-middle income country, most of the problems that Kenya was experiencing as a low-income country remain the same. With only 10% of its

land being arable, and a rapid increase in population, problems of chronic poverty and unemployment continue unresolved[29]. Forty-two percent of the population live below the poverty line[33] (living on less than $1.90 USD per day[34]). Nevertheless, four out of five Kenyans are literate; a high literacy rate for a sub-Saharan African country. This is a major accomplishment by the Kenyan government achieved through implementing free and compulsory primary education and secondary education in 2002 and 2008, respectively[29].

2.1.2 The healthcare system in Kenya

Healthcare service delivery

There are currently six levels of healthcare service delivery, as defined by the Kenyan government[35]: the community (including villages), households, families, and individuals (level 1); dispensaries and clinics (level 2); health centres, maternity facilities, and nursing homes (level 3); primary hospitals (level 4); secondary hospitals (level 5); and tertiary hospitals (level 6) [35]. Communities (level 1) are empowered and educated so that the community can take ownership of healthcare services and commit to healthcare as a community[36]. Dispensaries and clinics (level 2) are the first line of contact for any health-related issue. They provide various preventive services and basic curative services that are individualized and tailored to the community they serve. Dispensaries and clinics are staffed by enrolled community nurses and/or community health workers (CHWs)[35]. Enrolled nurses earn a certificate after 2 years of post-secondary training[36] and CHWs are members of the community, selected by the community to serve as health workers and receive shorter training than other healthcare professionals[37]. Health centres (level 3) serve a larger community, providing preventive and curative services, as well as basic laboratory tests and ambulatory services. They are staffed by clinical officers (accredited non-physician clinician[38]), registered nurses, laboratory technicians, and pharmaceutical technicians[35].

Levels four to six mainly provide curative and rehabilitation services that require greater skills and specialization. Primary hospitals (level 4) are the district hospitals that provide

"maternity, inpatient, emergency surgery, blood transfusion, and laboratory" [35(p24)] services on top of preventive, promotive, and curative services[35]. Patients who require further attention are referred to secondary hospitals (level 5). These hospitals serve as the major referral hospitals for primary district hospitals within close proximity. The highest level of care is provided at the tertiary hospitals (level 6). They are the national referral hospitals that deliver care to much more complex cases that cannot be handled at secondary hospitals. Also, they serve as teaching hospitals for doctors in training[35].

The 2013 master facility list of Kenya lists a total of 9,249 healthcare facilities[36] (Table 2.1). Dispensaries and medical clinics comprise the predominant body of healthcare facilities[36]. The facilities categorized as 'other' include medical centres, faith-based mission hospitals, eye and dental clinics and blood banks[36].

Table 2.1. List of healthcare facilities in Kenya (2013)

Levels	Type	Number of facilities	Percent (%)
Level 2	Dispensary	4,239	45.8
	Medical Clinic	2,943	31.8
Level 3	Health Centre	1,012	10.9
	Maternity and Nursing Home	232	2.5
Level 4	Primary Hospitals	264	2.9
Level 5	Secondary Hospitals	9	9.7×10^{-2}
Level 6	Tertiary Hospitals	3	3.2×10^{-2}
	Other	547	5.9
	Total	**9,249**	**100**

Source: Republic of Kenya: Ministry of Health. *Health Sector Human Resources Strategy 2014-2018*. Nairobi, Kenya; 2014.

Healthcare services funding and access

The healthcare system in Kenya has three groups paying the total health expenditures (THE): the government, households, and donors from outside of Kenya[39]. Individual households, including out-of-pocket payments and private insurance, form the largest

share of the THE at 40%[39]. This is followed by the government and donors that fund 34% and 26% of the THE, respectively[39]. In 2012/13, the government expenditure on healthcare was 6.1% of the total government expenditure, a 1.5% increase since 2005[39]. Healthcare facilities in Kenya are mainly owned by the government (51%), followed by private for-profit (34%) and private not-for-profit (15%)[40].

Lack of healthcare system funding in Kenya has led to shortages of physical and human resources and is a central issue in healthcare. Kenya has 1.8 physicians and 7.9 nurses and midwives per 10,000 individuals[41]. This is less than half of the World Health Organization's (WHO) recommended healthcare worker density of 23 per 10,000 for providing essential care[42]. Furthermore, physical and financial barriers in accessing and utilizing healthcare have caused disparities among different geographical regions, urban and rural areas, and socio-economic groups[43].

Most people cannot afford healthcare services due to the burden of out-of-pocket fees. The government of Kenya is working towards establishing universal healthcare to ease the burden on its users. As a first step, all user fees for primary care at public healthcare facilities were removed in 2013[40]. Nevertheless, travel costs and working hours lost due to long travel still act as financial barriers. In addition to physical and financial barriers, perceptions of quality impede access to healthcare. Kenyans perceive publicly owned healthcare facilities to offer low-quality care and thus they opt to pay for private facilities that are perceived to offer better quality[40]. In order to increase access to healthcare facilities, the government supported the expansion of the private health sector[40]. However, regulating the private sector and issues of health equity continue to challenge the Kenyan government.

2.1.3 Healthcare policies in Kenya

Kenya agreed to participate in meeting the millennium development goals (MDGs) set out by the United Nations (UN) in 2000. The MDGs were intended to address extreme poverty, gender inequity, lack of basic education, poor maternal and neonatal health, human immunodeficiency virus and acquired immune deficiency syndrome (HIV/AIDS)

and other diseases, to maintain a sustainable environment, and to develop global partnerships. Although Kenya was not able to meet its health-related goals for MDGs in 2015, improvements were made in various areas[44]. For example, Kenya was able to reduce the Under Five Mortality Rate from 115 per 1000 live births in 2003 to 74 per 1000 live births in 2008/09 by implementing malaria control practices and providing immunizations for children[44].

Whilst in the fifteen-year project of MDGs, Kenya took on another long-term challenge in 2006, named Kenya Vision 2030 (KV2030) [45]. The KV2030 has three pillars: economic, social, and political. The social pillar seeks to build "a just and cohesive society with social equity in a clean and secure environment" [45(p.1)]. The health sector, under the social pillar, seeks to provide efficient and quality care for achieving health equity and to improve key areas of concern in Kenya, especially maternal and neonatal health[45].

A second policy plan that is currently in place, alongside KV2030, is the Kenya Health Policy (2014-2030). The aim of this policy is to achieve the highest possible health standards and to be responsive to the healthcare needs of the population. It has a long-term goal of achieving universal health coverage with a healthcare standard of middle-income countries. More specifically, the Kenya Health Policy intends to increase life expectancy by 16%, decrease mortality for all causes by 50%, and decrease life-years lost by 25%[46].

2.1.4 Health status in Kenya

Kenya's life expectancy at birth is 60 years (male = 58, female = 62), a significant increase since the 1990s when it was 45.2 years. This increase was largely driven by improvements in under-five mortality and in adult health. Nevertheless, Kenya still suffers from a large number of deaths due to communicable diseases, such as HIV/AIDS, tuberculosis, malaria and diarrheal diseases (Table 2.2). Other major causes of death include conditions during the perinatal period that result in maternal and neonatal deaths.

Moreover, similar to other developing countries, non-communicable diseases have been on the rise due to lifestyle changes and increases in life expectancy. [41]

Table 2.2. Leading causes of death in Kenya (2010)

Rank	Diseases or Injury	Total Deaths (%)
1	HIV/AIDS	29.3
2	Conditions arising during perinatal period	9.0
3	Lower respiratory infections	8.1
4	Tuberculosis	6.3
5	Diarrheal diseases	6.0
6	Malaria	5.8
7	Cerebrovascular diseases	3.3
8	Ischemic heart disease	2.8
9	Road traffic accidents	1.9
10	Violence	1.6

The percentage of total deaths does not add to 100 since this table only lists the top 10 causes of deaths in Kenya.

Source: World Health Organization, Kenya Ministry of Health. *WHO Country Cooperation Strategy Kenya | Medium-Term Support Strategy 2014-2019*.; 2013. www.who.int/countryfocus/cooperation_strategy/ccs_eth_en.pd.

2.2 Epidemiology of maternal deaths in sub-Saharan Africa and Kenya

Maternal death, based on The International Classification of Diseases (ICD)-10, is:

> "The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes."[55(p9)]

2.2.1 Maternal deaths in Kenya

Nine percent of deaths in Kenya are related to pregnancy[41]. This translated to 6,623 maternal deaths reported in 2014[47]. Kenya has a long history of struggling to decrease maternal mortality. In 1990, the maternal mortality rate (MMR) was 687 deaths per

100,000 live births[48]. The country did not see much improvements in MMR even after committing to the UN's MDGs. While the goal was to reduce MMR by 75% from 1990 to 2015, Kenya only saw a 26% reduction in MMR[49]. In fact, the MMR peaked at 768 deaths per 100,000 live births in 2003[48]. The MMR, however, has steadily declined since 2003 due to increasing awareness of safe delivery, safe abortion, and family planning[48,50]. Nevertheless, it is still one of the highest in the world at 510 deaths per 100,000 live births[48]. This is more than two times higher than the world average, and 31 times higher than that of developed countries[4,51].

The Kenyan government has made significant efforts to provide more accessible maternal care in the past decade. In 2007, all user fees for deliveries at public dispensaries and public health centres were abolished. In 2013, Uhuru Kenyatta, the President of Kenya, declared free deliveries as well as free maternal care, including caesarean sections, in all public health facilities.[40]

2.2.2 Consequences of maternal deaths in sub-Saharan Africa and Kenya

Maternal death is not simply the death of one woman, but it is the death of a mother and a wife who provides basic nutrition and healthcare for the members of the household. Mothers also contribute as a labour force who can earn income, do household chores, and grow and harvest food. Therefore, maternal death can have a substantial effect on the children, the family, and society. Research shows that children who lost their mother were more likely to die, especially those under the age of one[52]. A study done in Western Kenya found that only 25 percent of babies who lost their mother survived the first 60 days of life[53]. Furthermore, children in Tanzania were more likely to be stunted (low height for age) in the absence of their mother[54]. The effect of maternal death was greater than the effect of paternal death for both child mortality and stunting in Tanzania[54]. Moreover, children who had lost their mother were more likely to delay their school enrollment or drop out of school earlier[54]. Families usually spend more than their annual household consumption expenditure on the mother's medical treatment and her funeral[53]. In addition, families must reconstruct their roles; for example, relatives need to fill the

gap created by the mother's death[53]. Also, the oldest child usually drops out of school to take on the role of the mother, and some children may be sent to their grandparents[52].

2.2.3 Causes of maternal deaths in sub-Saharan Africa

Maternal deaths can be subdivided into direct or indirect deaths. Direct deaths are those that are caused by obstetric complications due to pregnancy, and iatrogenic complications during treatment, as well as abortions. It also includes deaths due to omission of treatment or provision of incorrect treatment. Indirect deaths are those resulting from previous conditions or conditions developed during pregnancy that are not obstetric in origin, but aggravated due to physiological changes of pregnancy. [55]

The leading cause of maternal deaths is postpartum hemorrhage (Figure 2.2). The excessive loss of blood after giving birth can severely drop the mother's blood pressure and lead to shock and death. The second leading cause is related to hypertension. Chronic hypertension and gestational hypertension can lead to preeclampsia or, if severe, eclampsia that can result in seizures, coma, and death[56]. Other direct causes include unsafe abortion, sepsis due to infections, prolonged or obstructed labour, and complications from surgery[43,55]. Common indirect causes of maternal deaths include malaria, anemia, AIDS, and diabetes[55,57].

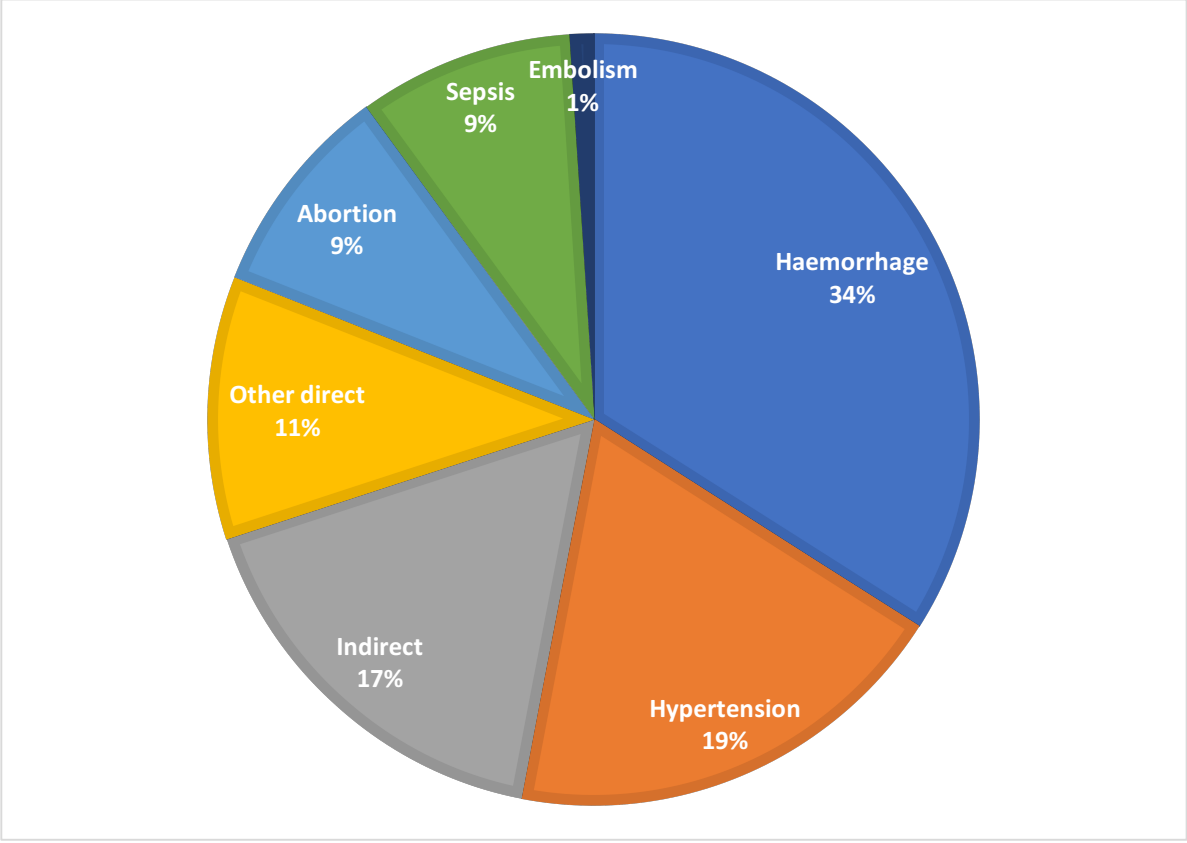
Higher risk of maternal deaths in developing countries is mainly attributable to the higher volume of pregnancies and births a woman has in her lifetime, compared to women in developed countries[3]. While it is possible to prevent maternal deaths with appropriate care, many women do not seek proper maternal care during pregnancy and delivery[50]. Accessing healthcare facilities, especially during childbirth, is key in reducing the MMR.

2.3 Facility-based deliveries

2.3.1 The importance of facility-based deliveries

As previously mentioned, women are exposed to the greatest risk of death during childbirth. The intrapartum period is when 42% of maternal deaths, 32% of stillbirths, and 23% of neonatal deaths occur[4]. Although birth complications are unpredictable, most can be treated when women deliver at a healthcare facility[4]. Facility-based deliveries (FBDs) ensure that women deliver in a safe, hygienic environment, reducing the risk of complications such as sepsis. The greatest merit of FBDs is having a skilled birth attendant (SBA) present during delivery. Facility-based deliveries are almost always assisted by an SBA who are accredited healthcare professionals (including doctors, clinical officers, nurses, and midwives) trained in midwifery skills. By delivering in a facility, SBAs can have access to equipment for providing appropriate medical care during delivery.

Figure 2. 2 Leading causes of maternal mortality in sub-Saharan Africa.



Source: UNICEF. *Countdown to 2015: Maternal, Newborn & Child Survival - Country Profile Kenya*; 2012.

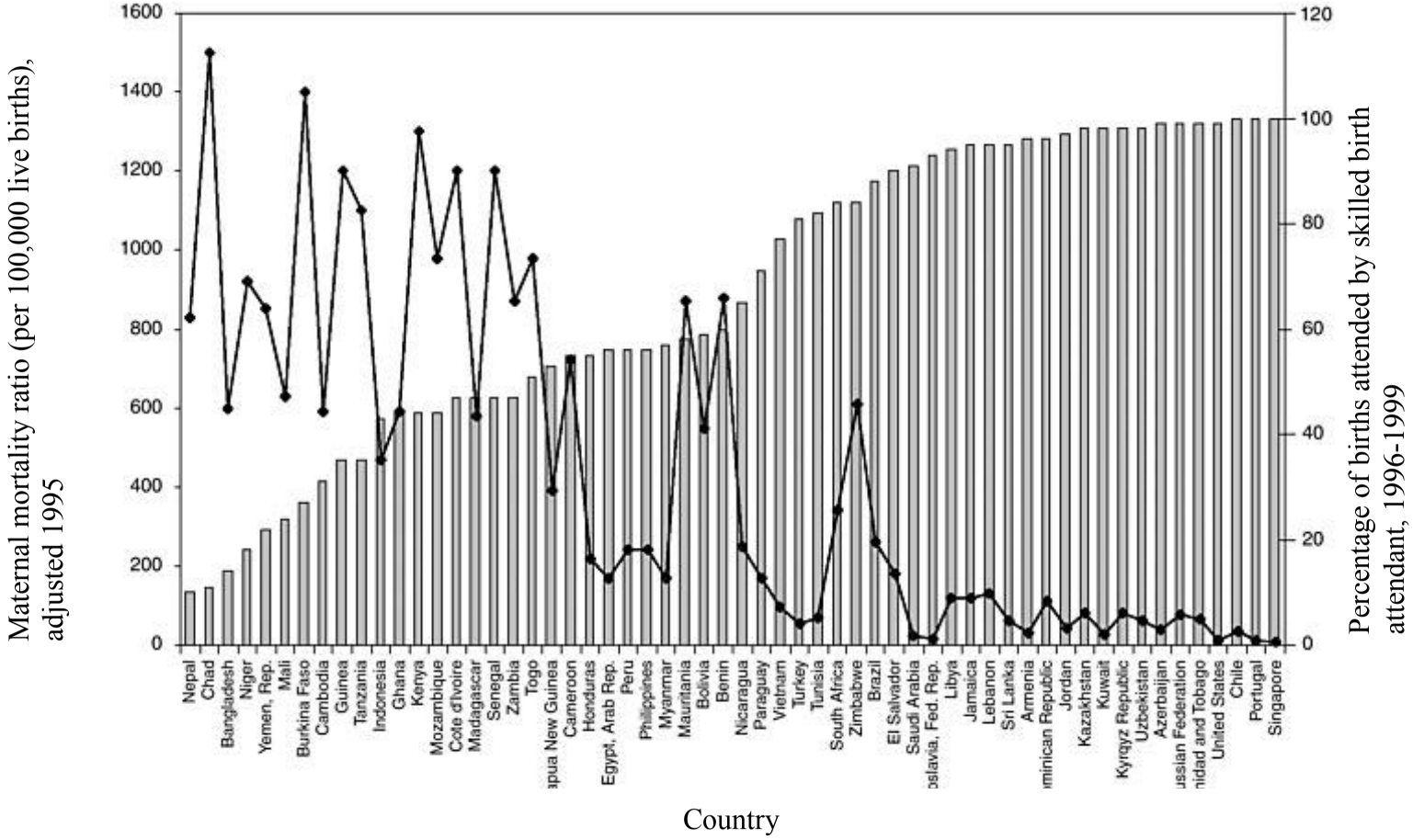
Skilled birth attendants present at childbirth are able to recognize the danger signs of complications and provide care accordingly, or refer to hospitals in emergency situations[6]. As a result, the MMRs across countries were found to be inversely proportional to the percentage of births attended by SBAs (Figure 2.3)[58]. Almost all SBA-assisted births take place at healthcare facilities[7]. Women who deliver outside of healthcare facilities usually deliver at home[7]. They may receive some assistance from traditional birth attendants, families, relatives, or friends, or may have no assistance at all[7]. However, since those providing assistance are not formally trained with midwifery skills, women who deliver at home are exposed to risk of death due to the common birth complications that are treatable with proper care from SBAs[4].

The impact of FBDs reaches into the postnatal period. Delivering at an institution increases the likelihood of receiving postnatal care, which is also associated with better health outcomes for both the mother and the baby. Furthermore, FBDs significantly reduce the risk of neonatal mortality, commonly caused by infections, birth asphyxia, and other complications[59]. Also, women who deliver at healthcare facilities get better newborn care services such as clean umbilical cord care, good thermal care (keeping the baby warm and delaying bath for more than 48 hours), and receiving information on early breastfeeding practices [60].

2.3.2 FBDs in sub-Saharan Africa and Kenya

Globally, 25% of women deliver outside of healthcare facilities[6]. The rate is greater in sub-Saharan Africa, where only half of all deliveries are FBDs[6]. In fact, 90% of births not assisted by an SBA occur in sub-Saharan Africa and in South Asia[6]. In Kenya, FBD usage was 61% in 2014[7], slightly higher than the average usage of 56% in sub-Saharan Africa[8]. This notable increase in FBDs since 2008/2009, when only 44% of women gave birth at facilities[61] can be explained by the implementation of free delivery services in all public healthcare facilities in 2013. Those women in Kenya who did not deliver at a healthcare facility were assisted by SBAs (5%), traditional birth attendants (49%), relatives or friends (33%), or were not assisted at all (13%)[7].

Figure 2. 3 Inverse relationship of MMR and percent of births attended by SBAs



Sources:

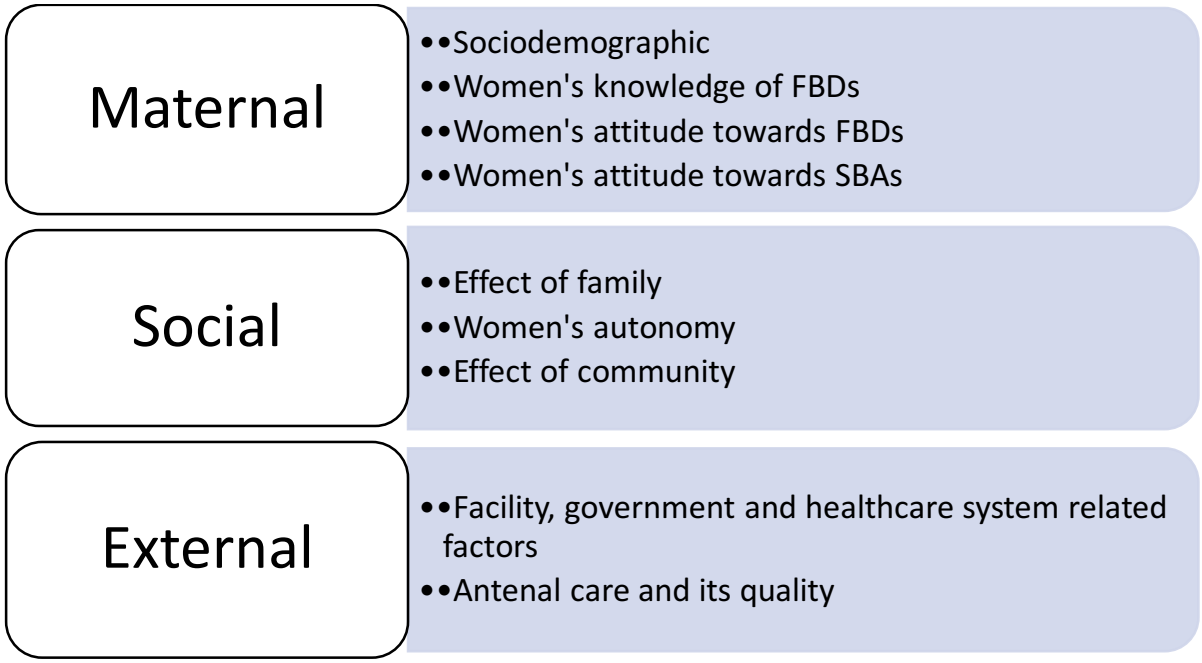
Committee on Improving Birth: Board on Global Health Outcomes. *Improving Birth Outcomes: Meeting the Challenge in the Developing World*. (Lucas AO, Stoll BJ, Bale JR, eds.). Washington, DC: National Academy of Sciences; 2003.

World Bank. *World Development Indicators*. Washington, DC: The World Bank. 2003

2.3.3 Determinants of FBDs

Facility-based deliveries with an SBA has been recognized as the single most important factor in reducing maternal mortality[62]. Since almost all FBDs are assisted by an SBA and almost all SBA-assisted births takes place in facilities, many studies have studied these two matters interchangeably[63]. Therefore, this study will use evidence from studies that have looked at either FBDs or SBAs. The determinants of FBDs studied in sub-Saharan Africa can largely be categorized as maternal factors, social factors, and external factors[63]. Sub-categories of the three factors are listed in Figure 2.4.

Figure 2.4 Categorization of determinants of FBDs



Adapted from: Moyer CA, Mustafa A. Drivers and deterrents of facility delivery in sub-Saharan Africa: a systematic review. *Reprod Health*. 2013;10:40. doi:10.1186/1742-4755-10-40.

Maternal factors*:* Sociodemographic

Women's sociodemographic factors are the most commonly studied determinants of FBDs in sub-Saharan Africa. Women's education, wealth index, and place of residence

are the main sociodemographic determinants of FBDs among women in sub-Saharan Africa and in Kenya. The level of mothers' education was significantly associated with FBDs in many studies[63–67]. In the 2014 Kenyan Demographic and Health Surveys (DHS), a constant increasing trend of FBDs was found with increasing educational attainment of mothers[7]. Women's wealth index also had a similar increasing trend with FBDs in sub-Saharan Africa[63,66,68] and in Kenya[7]. In sub-Saharan Africa, women who live in urban areas were more likely to deliver at healthcare facilities[63]. This effect was also prominent in Kenya, where the percentage of FBDs in 2014 in urban areas was 82%, while in rural areas, it was 50%[7].

Other established sociodemographic factors related to FBDs are age[64,66,68–72] and parity[64,68,73]. Evidence for the association between mothers' age and FBDs are not consistent[64,66,68–72]; however, a systematic review concluded that in sub-Saharan Africa, younger mothers have better odds for delivering at a facility[63]. The systematic review also concluded that FBDs decreased with increasing parity[63], meaning the more children mothers have, the less likely they are to give birth at a healthcare facility. Trends for both age and parity, observed in sub-Saharan Africa, were also observed in the 2014 Kenyan DHS[7] where the relationship between FBD and age, and FBD and parity showed that the more mature and experienced women are with pregnancy, the less likely they are to seek care at a healthcare facility. It is possible that when women are more mature and experienced with delivery, they may perceive deliveries to be easy and seeking healthcare facilities for delivery unnecessary.

Maternal factors*: knowledge of FBDs*

Mothers' knowledge and attitude have also been a focus for many researchers, especially in recent years, when providing quality care became a priority[a]. Knowledge of risk factors associated with unsafe delivery was found to have a profound influence on mothers' decision to deliver with an SBA[74,75]. Studies done in Tanzania and Kenya found that being knowledgeable about pregnancy risk factors resulted in more than three times

a 15–17,20,65,68,71,76,123,132,145,151,152

greater usage of SBAs[74,75]. However, Mwangome and colleagues found that, even after educating Kenyan mothers about the importance of FBDs, some mothers failed to deliver at facilities[9]. Reasons for not delivering at a healthcare facility included distance, not knowing the signs of labour initiation, and expectations for easy delivery[9]. This shows that there are factors other than being knowledgeable that affect mothers' decision-making process concerning their place of delivery.

Maternal factors*: attitude towards FBDs*

A mother's attitude towards FBDs plays a large role in her choice of delivery site. There are various factors that construct a woman's attitude towards FBDs. Attitude is largely affected by how childbirth is viewed by the woman[9,20,76] and her society[9,77]. Previous studies in Nigeria, Zambia, and Kenya have reported that some women perceived childbirth to be easy and therefore they did not find it necessary to deliver at healthcare facilities[9,20,76]. Similarly, some believed that healthcare facilities were a place only for complicated deliveries[9,20,76]. Hence, if the delivery was perceived to be 'normal' then homebirth was thought to suffice[9,20,76]. In Kenya, some women refrained from using healthcare facilities for childbirth because of fear that they may be labelled as having serious problems, like HIV/AIDS[77]. Moreover, they also feared going to healthcare facilities because they may unwillingly be tested for HIV[9]. Women in Kenya were also afraid that they would be forced into unnecessary interventions, such as stitches and surgery[78]. In addition, a Nigerian study reported that in some religions, childbirth is perceived as a natural process and the fate of the mother should depend on God, not on healthcare professionals[20].

Maternal factors*: attitude towards SBAs*

Some women in sub-Saharan Africa refrained from giving birth at healthcare facilities because they were not familiar with SBAs (traditional birth attendants usually lived within the same community as the mothers, so they knew each other well)[76]. In Kenya, some believed that the SBAs at public healthcare facilities treat women harshly during FBDs[78]. Mothers in Tanzania feared that they would be embarrassed and treated harshly

at the facility if their attire reflected their low socioeconomic status[79]. However, the majority of women agreed that healthcare facilities and SBAs provide better and safer service than the service they can receive at home, or from traditional birth attendants[78].

A notable proportion of providers at public healthcare facilities suffer from a bad reputation. Several studies have reported on women's complaints against public healthcare providers, for their rude and disrespectful behaviour[9,18,20,76]. Sando and colleagues conducted a study in Tanzania interviewing 1,914 women after giving birth in a healthcare facility[18]. They reported that 15% of women experienced disrespect or abuse during their childbirth[18]. Some women also complained of abandonment of care (8%) and non-dignified care (6%), mostly during labour[18]. Moreover, a large proportion of mothers, more than 68%, reported that they did not feel fully informed before any care was given to them[18]. Mothers in other parts of sub-Saharan Africa were treated in similar manners[9,76,80]. A qualitative study done in Nigeria quoted a husband about his wife, "She would rather die than accept the medical treatment given with humiliation"[20(p590)]. A study done in Kenya found that the low quality of service prevented 17.3% of women from delivering at a healthcare facility[61]. This was more than three times the percentage of women who were prevented from delivering at a healthcare facility due to the cost of delivery (4.9%)[61].

Social Factors*: family, community, and autonomy*

Because of the strong interaction among family, community and autonomy, the literature on these factors is reviewed together in the following section. Place of childbirth in sub-Saharan Africa is largely affected by the social environment of women, whether it is their family members or the community in which they live[63]. A woman's authority in the household is known to affect her place of childbirth. Studies in sub-Saharan Africa have found that if a woman required permission from her husband for FBD or if she depended on her husband financially, then she was less likely to have an SBA for her delivery[63,76]. Mangeni et al. reported that in Kenya, husbands who were concerned about their wife's pregnancy were more supportive of FBD[73]. However, if other members of the household

did not appreciate the importance of FBDs, then the woman could have difficulty delivering at a healthcare facility even with the permission from her husband[81].

The community also takes part in mothers' decision for FBD. A study done in rural Kenya reported that the community's negative attitude towards FBDs tended to discourage women from seeking facilities for delivery[9]. In rural Uganda, women who give birth on their own, without help, are perceived to be strong, and therefore, respected[82]. Women who deliver at a healthcare facility could face gossip and social devaluation[82]. On the other hand, a Tanzanian study reported that if the community generally had a positive attitude towards FBDs and healthcare providers, women were more likely to deliver at a facility[19]. Moreover, HIV-related stigma within the household and the community also discouraged women from FBDs in rural Kenya[78].

External factors*: facility, government and health system factors*

Because of the strong interaction among facility, government and healthcare system factors, the literature on these factors is reviewed together in the following section. The facility itself and the staff within the facility are important determinants or deterrents of FBDs. The most commonly studied facility factor is distance[63], which may be the single most significant barrier preventing the use of FBDs in sub-Saharan Africa[63,67,68,74,83]. Poor road conditions and long distances, especially when women are pregnant, discourage women from travelling to healthcare facilities for maternal care[9,81,84]. In addition, if labour initiates late at night, it becomes even more difficult to travel to a facility[9,78,84].

Direct and indirect costs associated with FBDs are established barriers in developing countries[9,21,81]. Direct costs are the user fees charged to mothers for the delivery service provided; whereas the indirect cost includes the money required for transportation, and wages lost due to travelling[81]. Governments in sub-Saharan Africa are making efforts to reduce the direct costs associated with deliveries. However, 39% of Kenyan women still chose to deliver outside of healthcare facilities in 2014 after the implementation of free delivery services in 2013[7]. This may be related to concerns about the decline in the quality of childbirth services provided in public healthcare facilities after the

implementation of free maternal care in 2013[40]. Other countries in sub-Saharan Africa are also finding persistent use of homebirths, even after abolishing user fees for FBDs[85,86]. Reasons for not delivering at a healthcare facility even when it was cost-free included, long distance, lack of transportation and support from family members[14–16]. Other factors, as described above, were low anticipated quality of care in public healthcare facilities and fear of getting neglected or receiving poor treatment from SBAs[15,16].

External factors*: Antenatal care*

Antenatal care (ANC) is another frequently studied determinant of FBDs[63]. Antenatal care is essential to maternal health and the WHO recommends that all women access multiple ANC visits throughout the course of each preganancy[87,88]. The WHO in 2016 increased the recommended number of ANC visits from four to eight[88]. Therefore, most of the published studies used four ANC visits as their standard. Reports in sub-Saharan Africa have shown that mothers who receive any ANC are more likely to deliver at a healthcare facility[66,67] and those who attend four or more times have even greater likelihood of delivering at a healthcare facility[15,63,67,68]. In a similar vein, earlier initiation of ANC is also associated with FBDs[89]. Completing four or more ANC visits and early initiation of ANC are thought to be closely related to each other; because having the first ANC visit earlier in the pregnancy will allow more time to complete the rest of the four recommended visits[87]. The contents of the ANC visits are also known to affect women's decision to deliver at a healthcare facility[90,91]. For example, in sub-Saharan Africa, those women who were advised to deliver with an SBA during their ANC visit had greater odds for delivering with an SBA[16,74,79,92].

2.3.4 Summary of FBDs in sub-Saharan Africa and Kenya

Maternal mortality in sub-Saharan Africa can largely be prevented if every childbirth takes place at a healthcare facility with an SBA[4]. Less than half of women in sub-Saharan Africa deliver at a facility[87]. Previous studies have provided evidence that there are multiple factors that affect women's use of FBDs. External factors, such as distance and cost are often the most common points of intervention. However, a large proportion of

women were choosing homebirths even after the removal of user fees for FBDs. This study sought to investigate the possible factors that can shape women's perception toward facilities, providers, and FBDs. Antenatal care, which almost all women in Kenya and sub-Saharan Africa receive during pregnancy was hypothesized to be a critical point of interaction shaping women's perceptions. Therefore, the quality of ANC is the focus of this thesis, and the literature around quality is reviewed in the next section.

2.4 Quality of antenatal care

2.4.1 Quality of maternal and antenatal care

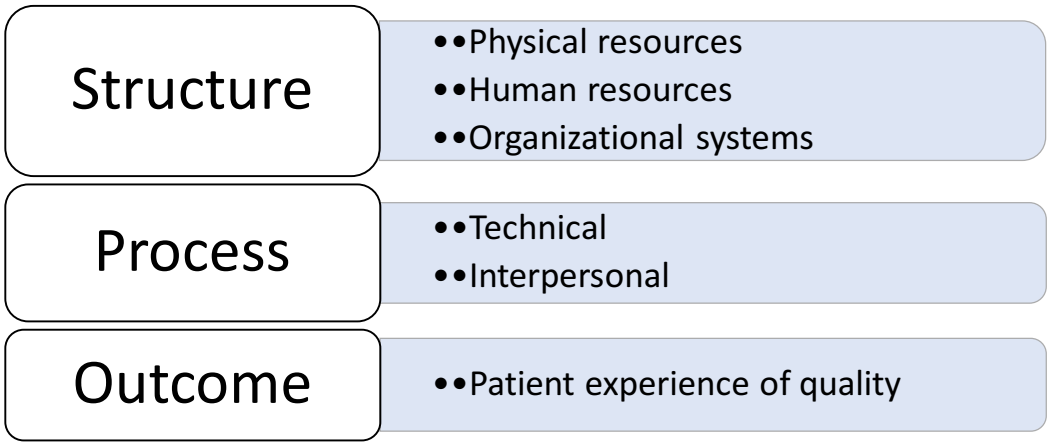
The current definition of quality of care used by the WHO is:

> "The extent to which healthcare services provided to individuals and patient populations improve desired health outcomes. In order to achieve this, healthcare must be safe, effective, timely, efficient, equitable and people-centred." [93(Web)].

Quality of maternal care is being emphasized as the next step for reducing global maternal mortality[93]. Maternal care does not simply mean the care that a woman receives during childbirth. It implies the care received throughout the entire period from ANC and childbirth to the postnatal care. Providing quality maternal care is known to bring better health outcomes for mothers and newborns[5,94]. However, the current quality of maternal care in most parts of sub-Saharan Africa is far below the recommended standards[95]. Substandard quality of care can expose mothers to some risks, even in the presence of healthcare professionals[95]. The WHO and the UN focused on improving access to maternity care until 2015, as the main method to reduce MMR in order to achieve the MDG-5. However, these goals were not met. Entering into the post-MDG era, the WHO has shifted its focus from 'access to care' to 'quality of care'[96]. The shift is expected to bring positive movements to achieve the new Sustainable Development Goals-3 (SDG-3) by 2030[97]. The SDG-3 aims to reduce MMR to 70 per 100,000 live births and to provide safe, effective, and quality services[97].

Assessing quality has been a challenge. Numerous researchers have taken various paths in assessing quality of care. Among them, the most established and foundational framework for quality assessment in healthcare provision is the framework proposed by Donabedian in 1966[98–100]. He proposed that quality of care can be conceptualized as s*tructure, process, and outcome* (Figure 2.5)[98]. The *structure* denotes the material resources, human resources, and the organizational structure of a facility. Material resources include the infrastructural and financial capacity, such as having emergency transport and guidelines for care. Human resources mean the number of staff and their qualifications. Organizational structure represents how facilities are managed, such as organization of staff and review of medical records. The second category is *process*, which denotes what is actually done when patients receive care[98]. It accounts for both the patient's responsibilities in seeking and accepting care and the provider's responsibilities in providing care. This includes technical aspects (making a diagnosis and providing evidence-based treatment), and interpersonal aspects (communicating with patients). The last category is the *outcome*, which includes medical improvements, increase in health-related knowledge, patient's experience or satisfaction and changes in a patient's behaviour. The Donabedian model includes all three elements, *structure*, *process*, and *outcome*, in assessing quality[98].

Figure 2.5 Categorization of quality of care



Adapted from: Donabedian A. Evaluating the quality of medical care. *Milbank Q*. 1966;44(No. 3, Pt. 2):166-203. doi:10.1111/j.1468-0009.2005.00397.x.

The WHO operationalized the Donabedian model and presented the *Standards for Improving Quality of Maternal and Newborn Care in Health Facilities* in 2016 as a guide to providing quality maternal care[5]. The guide utilizes Donabedian's *structure, process, and outcome* as the overarching conceptual framework. It provides eight domains of quality in assessing maternal care at healthcare facilities.

1. Availability of essential physical resources
2. Competent, motivated personnel
3. Actionable information systems
4. Functioning referral systems
5. Respect and preservation of dignity
6. Evidence-based practices for routine care and management of complications
7. Effective communications
8. Emotional support

The WHO's *Standards* provides specific elements to objectively measure quality of maternal care under the eight quality domains[5]. One of the quality measures, for example, is the availability of written, up-to-date clinical protocols for managing pre-eclampsia that is consistent with the WHO guidelines[5]. The WHO's *Standards* document is expected to facilitate more structured and uniform assessment of quality of ANC and other obstetric care. The WHO's *Standards* was utilized in this thesis to assess quality of ANC as reported in Chapter 3.

2.4.2 Antenatal care

Antenatal care is the care provided to expectant mothers throughout their pregnancy for the overall well-being of mothers and babies. The purpose of ANC is to prevent, detect, and manage complications that can arise during pregnancy or pre-existing conditions that worsen with pregnancy[87]. It is also an opportunity to provide guidance to steer women away from unhealthy lifestyles and to inform and promote healthcare seeking behaviours[87]. The WHO recommends ANC for all pregnant women based on ample evidence of its positive effects[87]. Receiving ANC can prevent and treat early pregnancy

complications such as malaria, infections, and diarrhea[94,101]. Moreover, ANC can reduce maternal deaths due to pre-eclampsia and eclampsia, prevent mother-to-child transmission of HIV/AIDS, and improve psychosocial health of mothers[94]. Antenatal care can prevent stillbirths as well as neonatal deaths associated with preterm births, birth asphyxia, low birthweight, tetanus toxoid, and other infections[87,102]. It is estimated that if 90% of women receive proper ANC, then up to 9% of neonatal deaths in Africa can be prevented[102]. In addition, ANC has the potential for being an entry point to other effective care, such as FBDs, receiving postnatal and neonatal care, and family planning[87]. Unfortunately, most women do not receive quality care during ANC, exposing them to risks of complications, stillbirths, and maternal deaths even after receiving ANC[91,103,104]. Realizing the urgent need for quality ANC, researchers have extensively studied the quality of ANC across sub-Saharan Africa and its determinants.

2.4.3 Quality of ANC in sub-Saharan Africa and Kenya

This section is a review of the current literature on the quality of ANC in sub-Saharan Africa and in Kenya. The quality of ANC is described in three components (structure, process, and outcome) based on the Donabedian framework outlined in Figure 2.5. The quality of ANC in sub-Saharan Africa and Kenya based on the current standards outlined by the WHO are presented. In addition, methods commonly used in previous studies to assess quality of ANC are discussed.

Structure

The structural quality of ANC was studied most frequently using facility audit questionnaires. This method of data collection is employed through direct observation of facilities by a third-person observer. The observer completes a set of checklists or questionnaires based on the structural elements available on the day of observation. Studies most often examined facilities for physical and human resources and organizational systems. The Service Provision Assessment surveys (national surveys conducted by the DHS Program) were most commonly used to assess quality of ANC in sub-Saharan Africa[105–109]. Nevertheless, local, smaller scale surveys of facilities were

also frequently found in the literature, but these studies had no standardized methods for assessing quality of ANC[25,110–112].

Structure: Physical resources

Components assessed most readily to evaluate physical resources include the general infrastructure of facilities[b], having basic diagnostic equipment[c], and the availability of drugs such as iron and/or folic acid[d] and tetanus toxoid vaccine[105,110,111]. Studies have shown that the overall availability of infrastructure in sub-Saharan Africa (Kenya, Namibia, Nigeria, Tanzania) is below the adequate level for providing appropriate ANC[23,106,107,110]. For example, a study done in Nigeria found that facilities had, on average, three of the seven basic amenities for providing ANC[23]. These amenities were power, water source, communication equipment, incinerator for safe disposal, cleanliness of facility, transportation within one kilometer of home, and availability of beds[23]. Similarly in Kenya, facilities had less than half of the basic amenities for ANC[106]. The amenities were the availability of water, electricity, generator, telephone, email, and an ambulance[106].

Similar to infrastructural resources, the overall availability of diagnostic equipment was insufficient in facilities of sub-Saharan Africa including Kenya[107,110,113]. A study of seven sub-Saharan African countries (Kenya, Malawi, Namibia, Rwanda, Senegal, Tanzania, and Uganda) reported that only 14% of facilities had all essential equipment for providing ANC[108]. Also, a study done in Kenya reported that facilities had less than seven of eleven essential ANC equipment items (vaginal speculum, individual charts, vitamin K, vitamin A, fetal stethoscope, thermometer, infant scale, and adult weighing scale)[106].

Essential drugs can be found in most ANC facilities of sub-Saharan Africa. Iron and folic acid were available in almost all facilities in Namibia (94%)[106], but the availability was

b 23,106,109,110,114

c 23,25,105–107,109,110,113,114

d 105–107,109–111

slightly lower in other parts of sub-Saharan Africa[106,110,113,114]. Kenya had iron in 45% of facilities[115] and folic acid in 88% of facilities[107]. Daily supplementation of iron and folic acid are recommended to prevent anaemia, neural tube defects, low birth weight, and preterm birth[88]. Facilities in sub-Saharan Africa are relatively well equipped with tetanus toxoid (TT) vaccine. Two shots of TT vaccine are required to prevent neonatal deaths from tetanus[88]. While it is recommended to have TT vaccines available at all times in facilities where ANC is provided, previous studies did not find any country in sub-Saharan Africa that had 100% coverage of TT vaccine[105,110,111]. For example, 86% of facilities in Zambia and 96% of facilities in Kenya had TT vaccine.

Structure: Human resources

In sub-Saharan Africa, skilled health workers (SHWs) who are formally trained to provide maternal care are eligible to deliver routine ANC for women. Their presence in facilities is essential to provide quality ANC and the WHO's recommendation is to have at least one SHW and a staff member present at all times[5]. The majority of SHWs in facilities are nurses or midwives with a small proportion who are doctors[107,111,116]. In Rwanda, 87% of SHWs were nurses[116], and in Zambia, 90.5% were nurses or midwives[111]. In Kenya and Namibia, the probability of having an SHW available at all times was greater for hospitals and healthcare centres than clinics or other similar facilities[106]. Skilled health workers may not be present at a small proportion of facilities (2% of facilities without SHWs in Kenya[107] and 11% in Zambia[111]) due to shortages in human and financial resources.

Structure: Organizational systems

Having an operational managerial system is necessary to provide quality ANC. Management practices such as staff training and quality assurance activities are recommended to be conducted at least once in six months; however, this is rarely the case in sub-Saharan Africa. In Burkina Faso, staff were not trained regularly to update materials[25]. In Kenya, many facilities lacked protocols or teaching aids to support staff training[105]. Approximately half of facilities in Nigeria, Kenya, and Namibia had routine

meetings for managerial and administrative purposes[23,106]. Also, in these three countries, less than half of clinics and small facilities alike had systems to obtain client opinion nor did they have regular quality assurance activities such as reviewing maternal and neonatal deaths or near-misses[23,106].

Process

Process elements of quality of ANC were studied more often than structural elements presumably because of the relative ease in accessing this information. There are two methods in collecting these data: one is through women's recall of their ANC and the other is through direct observation of ANC consultations. The first method is usually employed when conducting surveys at individual households. The DHS surveys were most often used by researchers for their robust data and nationally representative sample. The quality of ANC was usually quantified using additive indices created from mothers' recall of essential services received during their ANC visit. The results from this type of data collection and analysis gave insight on the technical aspects in the process of providing evidence-based ANC. The second method, direct observation, is collected through non-participating direct observation of ANC consultations. Studies had a third person observer to take note of the procedures performed during ANC consultations through direct observation[25,106–108,114]. One study used audio-recorded ANC consultations instead of having an observer[113]. Some researchers created scores using additive indices and some compartmentalized individual domains of quality. This method, in general, assessed quality of ANC in much greater detail, compared to the first method of individual household surveys. Also, the observation method assessed quality of ANC from a third person's perspective, thereby providing a measure of quality based on standardized criteria; whereas, the first method has a risk of subjectivity as it is assessed through women's report of their experience.

Process: Technical

The technical attributes studied by researchers are fundamentally the routine ANC services that are performed by providers and received by women during ANC. Routine

ANC includes (1) taking obstetric and medical history of women, (2) performing laboratory tests, (3) physical examination of the mother and the baby, (4) treating and managing conditions, (5) providing preventive care and (6) health education and counselling[87,88]. The evidence concerning each of these services is described below; overall quality of ANC in the technical aspect of service provision is extremely low[25,107,111,116]. For example, in Rwanda, less than 3% of facilities provided all essential ANC procedures in 2007[116]. Disparities in the provision of routine ANC services was also found among different levels of care in Kenya[107] and Zambia[111].

(1) Obstetric and medical history of women: On the first ANC visit, providers are required to take and record a full history of women; including an obstetric, medical, and psychosocial history[87]. Facilities in sub-Saharan Africa perform moderately in taking this medical history of women; approximately half of facilities in Tanzania[110] and Brukina Faso were found to take an adequate history[25].

(2) Performing laboratory tests: Among the four ANC visits, the first ANC visit is when all routine laboratory exams should be conducted. A blood sample is assessed for haemoglobin levels for anemia and to determine blood group and rhesus factor[87]. Urine is often tested for proteinuria, diabetes, and bacteriuria[87]. Sexually transmitted infections such as syphilis and HIV are also recommended to be tested on the first ANC visit[87]. The percentage of facilities offering blood tests ranged from 57% (Rwanda)[116] to 82% (Nigeria)[117] and urine tests ranged from 23% (Zambia)[111] to 82% (Nigeria) [117], highlighting the variations in critical tests that need to be carried out during ANC.

(3) Physical examination of mother and baby: The physical examination of both the mother and her fetus should be a routine part of each ANC visit and should include blood pressure (BP) measurements and examination of fetal growth and movement[87]. BP measurements were obtained at least once during ANC for almost all women (87%) in sub-Saharan Africa[24]. Fetal growth examination has not been studied often by researchers; rather, monitoring women's weight was studied more often. Weight of the mother is monitored for malnutrition and for excessive weight gain[118]. While it is not part

of the recommendations from the WHO anymore[118], 80% of women in sub-Saharan Africa had their weight measured over the course of their ANC visits. [111,112,116,119]

(4) Treating and managing conditions: Routine ANC includes treatment and management of conditions that are found after the initial history, laboratory tests, and physical examinations. Women are commonly treated for parasites, HIV and other STIs, and bacteriuria[87]. Some studies have incorporated provision of anti-parasitic drugs as a component of their score in assessing overall ANC quality[103,111,117,120]. The anti-parasitic drug was reported to have received by 21% of Nigerian women who used ANC facilities at least once in five years preceding 2013[117].

(5) Providing preventive care: Preventive measures in routine ANC refer to the provision of TT vaccine, iron and folate supplements, and intermittent preventive treatment for malaria during pregnancy (IPTp). One dose of TT vaccine is recommended to be provided on each of the first and second ANC visits. The percentage of women receiving TT vaccine is generally high in most parts of sub-Saharan Africa with approximately 84% of women receiving at least one TT injection[24]. However, Kenya showed a very low coverage of 44%[106]. Similarly, iron and folate supplements were found to be given to greater than 90% of women in Nigeria[117], Namibia[106], and Zambia[111], but to less than 20% of women in Kenya[106]. Provision of IPTp was less frequently included as an element of quality of ANC, but from two studies, it was found that Nigeria provided IPTp to 38% of women and Zambia to 89% of women, depicting a large gap in provision of IPTp within sub-Saharan Africa.

(6) Health education and counselling: Health education and counselling are provided at all four visits of ANC with emphasis on different aspects of health at different stages. For example, on the first two ANC visits, women are mainly given education on self-care to promote healthy eating and a healthy lifestyle during pregnancy[87]. The last two ANC visits are focused on the education of postnatal and neonatal care, and family planning[87]. ANC providers also educate women about the danger signs related to pregnancy and prepare mothers for childbirth. This is recommended to be given at all four ANC visits[87];

as a result, studies most often assessed education of danger signs during pregnancy[103,117,119–122] and birth preparation plans[e] to assess quality of health education and counselling during ANC. Chukwuma et al. reported that 61% of women in Africa, on average, were told about complications that may arise during pregnancy[24]. For birth preparation plans 74% of women in Zambia[111] and 62% of women in Kenya[35] were counselled during ANC.

Process: Interpersonal

The interpersonal relationship that ANC providers build with their patients plays a critical role in the overall experience of ANC. As a guideline to building a good relationship, the WHO suggests that providers communicate effectively with their ANC patients and that care is provided with respect and in a way that ensures the dignity of women. Although widely recognized as important[5,87], only a few studies have incorporated the interpersonal domain in assessing quality of ANC in sub-Saharan Africa[107,110,119,123]. As a measure of effective communication and provider interaction, McNabb[119] and Kambala[123] assessed whether the patients were encouraged to ask questions. They found that 56% of women in Nigeria[119] and 63% of women in Malawi[123] were encouraged to ask questions. The privacy of the examination room was very high, with 97% of women having privacy during consultations in Kenya[107] and 81% in Tanzania, in public facilities[110]. Other attributes used to study interpersonal quality of ANC include making women feel comfortable[110], explaining procedures[110,123], seeking consent[123], and using visual aids[107].

Outcome: Patient's evaluation of quality

Avedis Donabedian stated in 1988 that "patient satisfaction should be as indispensable to assessments of quality as to the design and management of health care systems" [100(p.1746)]. In recent years, patients' perspective on quality is being emphasized as an essential component of quality assessment in low and middle income countries[124]. The assessment of quality based on a patient's experience may be one of the most complex methods for assessing quality of care because the patient's evaluation of quality can be affected by a

e 103,106,111,117,119–122

multitude of elements including their previous experience and their expectations of care. Despite this complexity, studies in sub-Saharan Africa have examined quality of ANC from the patient's perspective. The main method of data collection for patient evaluation of quality was interviewing women after their ANC visit[106,123,125]. Studies often assessed perceived quality of ANC using women's overall satisfaction of care[125,126]. Studies have also assessed perceived quality of ANC in discrete dimensions such as interpersonal relations, conditions of examination rooms, and nursing care services[69,106,123]. Studies done in sub-Saharan countries (Kenya, Malawi, Namibia and Nigeria) consistently found that women expressed satisfaction with the overall quality of ANC[69,106,123,125,127]. However, those studies also found that a patient's satisfaction was not reflective of the observed quality of ANC. This phenomenon is thought to be caused by women's inadequate knowledge of the proper standards of care, and therefore their low expectations of ANC quality, resulting in them to be satisfied with substandard quality of care[127].

2.5 The effect of quality of ANC on women's use of FBDs

Some studies have researched the effect of quality of ANC on women's use of facilities for delivery. A study that investigated this relationship was conducted in a rural region of Burkina Faso[25]. This study by Nikiema et al. did not find a significant association between the quality of ANC and FBDs[25]. A Nigerian study by Gage and colleagues also did not find any significant association between ANC service readiness in local government areas and their corresponding FBD levels[23]. Gage's study was able to find, however, that management practices at facilities were associated with FBDs[23]. Chukwuma and colleagues recently published a study of 28 African countries on the effect of quality of ANC on women's use of facilities for delivery using the DHS[24]. They analyzed the factors affecting continued usage of SBAs for delivery among women who received ANC in Africa (defined as SBA retention)[24]. Among women who attended ANC at least once, SBA retention was greater when women received higher quality of ANC[24].

Among the three studies described above, two have reported that quality of ANC did not have an effect on women's use of FBDs and one study reported that it did. The differences in the results may be due to the different methods each study used to assess quality of ANC and to determine women's use of FBDs. Nikiema's study used facility audits and non-participating observation of ANC consultations to assess structure and process aspects of quality[25]. Gage's study used facility audits to assess the structural capacity and managerial practices[23]. These two studies measured quality of ANC through direct observation which is considered the gold standard for assessing quality based on the current standards of service provision[128]. However, Chukwuma's study based their quality of ANC assessment through mothers' recall of their receipt of ANC services in the past five years[24]. This imposes a risk of recall bias. In addition, due to this method of quality assessment, the quality of ANC assessed was restricted to only the technical aspects in the process of providing care[24]. Also, Chukwuma's data was collected through personal interviews with women in Africa and can also result in social desirability bias, where women may be reluctant to complain about their experiences of ANC visits[24].

The three studies also differed on how they assessed FBDs and how they linked the use of FBDs to the quality of ANC data. Nikiema's study linked quality of ANC at individual facilities with its corresponding obstetrical coverage in the area[25]. They estimated the obstetrical coverage by taking the ratio of the number of childbirths at a facility and the number of childbirths expected in its catchment area[25]. In comparison, Gage linked facility audit questionnaire to women's household surveys using the local government areas of where women lived[23]. This caused them to aggregate the individual facility data on quality of ANC into local government areas[23]. The two studies were only able to estimate the effect of quality of ANC on FBDs using aggregate data. They were not able to study the quality of ANC provided to each woman and its effects on her use of FBDs. Chukwuma's study did not face difficulties in linking quality of ANC and the use of FBDs since they were both self-reported by the participants[24].

The three studies by Nikiema, Gage, and Chukwuma portray the difficulties in assessing the relationship between quality of ANC provided to women and their use of FBDs. The

studies, as a collection, could not draw one conclusion for the relationship between the quality of ANC and women's use of FBDs; however, these studies suggest that quality of ANC has the potential to affect women's perceived quality of obstetric facilities and providers, thereby affecting women's use of facilities for delivery. Building on this theory, it is possible that the effect of quality may be more prominent if women intentionally choose to deliver at their ANC facility after receiving good quality of ANC.

2.6 Women's intention for FBD

Women's intentions for FBD can be an ideal method of studying the reasons why women intentionally choose certain locations for delivery over others. One advantage of studying women's intention for FBD is that it is not affected by uncontrollable obstacles that women face even after having intended and planned to deliver at a facility. The most prominent obstacle that was identified in a study done in Kenya was the abrupt onset of labour, especially at night, which prohibited women from delivering at a facility regardless of their previous intentions[84,129]. However, a disadvantage is that intention is not a direct measure of FBD, and therefore, it may not reflect the actual use of facilities for delivery. Nevertheless, "intentions are the most immediate antecedents of any behaviour that is under voluntary control"[130(p.40)] and therefore, they can capture the motivation behind choosing a specific facility for delivery. Women's intention for FBD was studied in Kenya by Creanga and colleagues[84] and in Nigeria by Exley and colleagues[129].

Creanga analyzed women's intentions to deliver in Nyanza province, Kenya[84]. This was a prospective cohort study, where their focus was on women's intention-behaviour discordance, in relation to women's sociodemographic and health-related characteristics[84]. The researchers found that women 35 years or older, had greater odds of discordance compared to women at 25-29 years of age[84].Women with higher education and knowledge of free delivery care had lower odds of discordance[84]. They also found that at baseline, when women were less than 20 weeks pregnant, their intentions for FBD was 96%. Intention decreased to 89% at 30-35 weeks, and 77% of women actually delivered at a facility in the end.

Exley's study of women's intention to deliver at a facility was a retrospective qualitative study; three years after the implementation of the Nigerian Midwives Service Scheme in 2009[129]. The researchers reported that the implementation brought positive improvements in women's perceived quality of maternal care. Positive changes in mothers' perceived quality of healthcare facilities and providers acted as a positive driver in initial intentions for FBD[129]. However, the authors were not able to find a significant increase in the actual number of births at healthcare facilities due to a number of barriers including sudden onset of labour, financial and transportation barriers, and absence of a healthcare provider at night[129].

While researchers have shown that women's preference for place of delivery is largely affected by their perception of those facilities and their staff[17,71], no studies have examined the relationship between the quality of ANC and women's intention for FBD. The literature does not address how different aspects of quality of ANC affect women's intention to return to their ANC facility for delivery. Therefore, this study sought to examine the relationship between the quality of ANC received by expectant mothers and their intended use of the same ANC facility for delivery.

2.7 Rationale, Significance, and Hypothesis

2.7.1 Rationale and significance

Maternal mortality continues to be a threat in many developing countries including Kenya[50]. The majority of maternal deaths are known to be preventable through appropriate maternal care, especially during the intrapartum period[4]. For over a decade, the WHO has recommended a minimum of four ANC visits for women living in resource-poor settings (in 2016, they released new guidelines for ANC that recommend eight contacts)[88,131]. In sub-Saharan Africa, mothers rarely complete four ANC visits. The WHO reported that only 49% of mothers in sub-Saharan Africa completed four ANC visits in 2014[50]. The percent coverage of four or more ANC visits in Kenya is better at 58%, as reported by the 2014 KDHS[7].

Although women may not complete all four ANC visits, almost all mothers in Kenya (93%) receive two to three ANC visits for every pregnancy[7]. This means that women in Kenya have at least two to three contacts with healthcare facilities during their pregnancy, providing an opportunity to develop their perception toward the ANC facility. Previous studies have shown that prior interactions with healthcare providers influence women's decision to choose home deliveries over facility deliveries[f]. Therefore, receiving good quality of ANC may positively affect their perceptions and conversely receiving bad quality of ANC may negatively affect their perceptions.

The literature is inconclusive in drawing a conclusion about the effect of quality of ANC on women's use of FBDs in sub-Saharan Africa. The effect of quality of ANC on FBDs is expected to occur when women intentionally choose to deliver at a facility due to the positive experience they had during their ANC visit. Therefore, studying women's intention for FBD can better demonstrate this effect than the actual usage of facilities for delivery. Studying women's intention for FBD can reveal some key determinants related to women's initial healthcare-seeking behaviour that may become masked by barriers such as the sudden onset of labour at night, causing women to necessarily choose homebirths.

This study will be the first to examine quality of ANC and its association with women's intention to return to their ANC facility for delivery in Kenya. This study will address this current knowledge gap and increase our understanding of the influence ANC can have on mothers' decision to deliver at healthcare facilities. This study will examine which aspects of ANC quality act as a determinant of a mother's decision to return for childbirth at the same facility. This will also reveal if other common determinants of FBDs can affect women's intention for FBDs. The findings from this study are likely to be applicable to Kenya's neighbouring countries in sub-Saharan Africa that share similar problems with low usage of facilities for delivery. Stakeholders, including hospitals,

f 9,17,18,20,71,76,78,79,84,129

government officials, and the WHO, may find this study provides important knowledge on how women's intentions for FBD are shaped during pregnancy.

2.7.2 Hypothesis

Among women in Kenya who use ANC services, those who received better quality of ANC will be more likely to express their intention to deliver at the facility where they received their ANC, provided that the facility offers delivery services.

Chapter 3: Methods

3 Methods overview

This chapter describes the conceptual framework for this study and the individual variables used in the framework. This chapter next provides a description of the dataset and the sampling design used to collect data for this study. Next, it provides a description of how each variable was created from the dataset. The chapter will conclude with the details on how these variables were analyzed for univariate, bivariate and multivariable analyses.

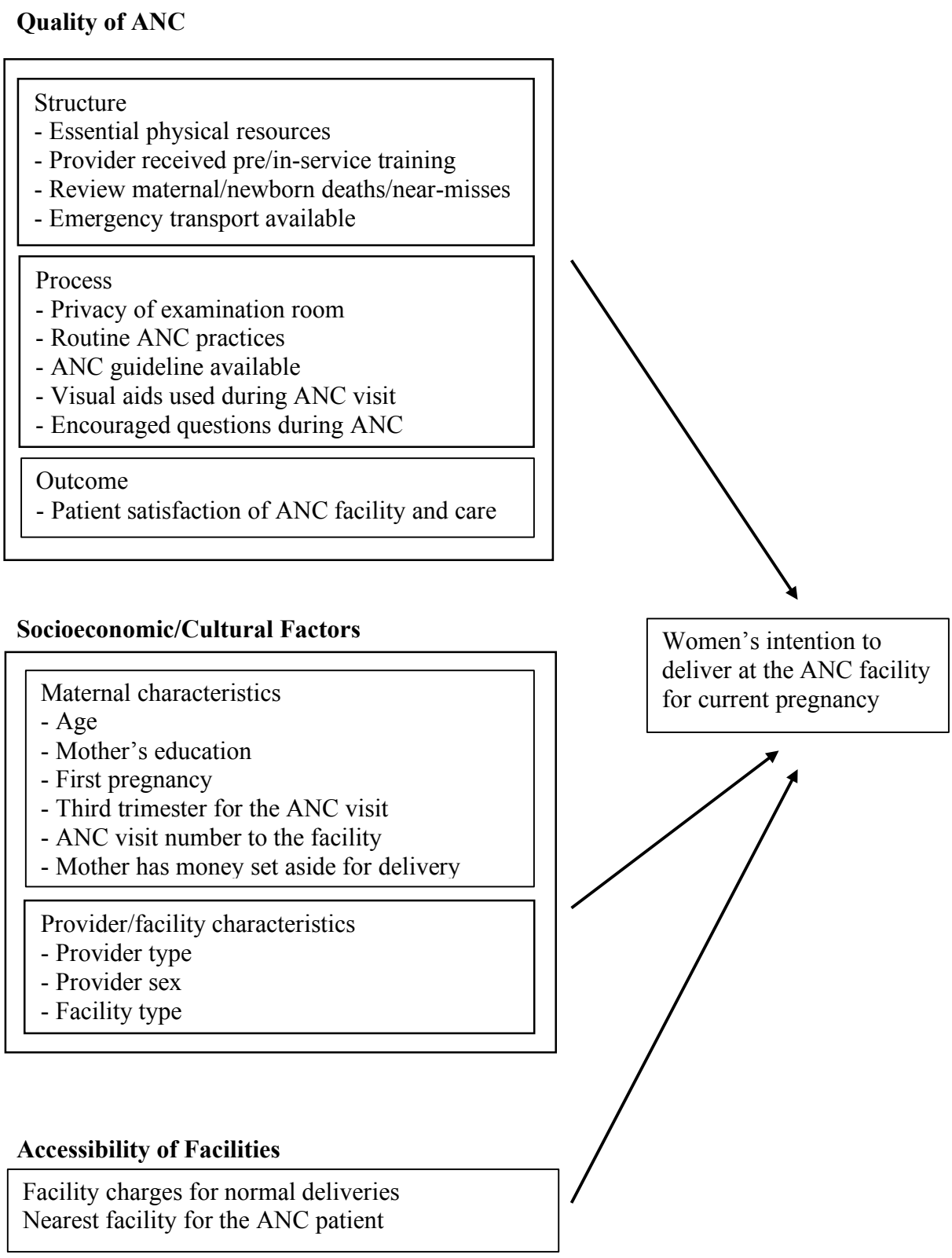
3.1 Conceptual framework

The conceptual framework (Figure 3.1) links the effect of quality of ANC on women's intention to return to their ANC facility for delivery. The quality of ANC was categorized into *structure*, *process* and *outcome* using the Donabedian Model[100]. The quality measures within each category were driven from the WHO's *Standards for Improving Quality of Maternal and Newborn Care in Health Facilities* published in 2016 (Section 2.4.1)[5]. The seven quality domains from the WHO's *Standards* used in this study to measure quality of ANC are:

1. Availability of essential physical resources
2. Competent, motivated personnel
3. Actionable information systems
4. Functioning referral systems
5. Respect and preservation of dignity
6. Evidence-based practices for routine care and management of complications
7. Effective communications

The WHO's *Standards* document was developed for uses in maternal and neonatal care in their entirety, from ANC to delivery and postnatal and neonatal care[5]. This provided

Figure 3. 1. Conceptual framework



the most up-to-date and appropriate tool for assessing quality of ANC in Kenyan facilities. For the purposes of this study, only the quality measures for ANC were used. Among those, quality measures that were previously studied by others were chosen. Other factors that could possibly affect the outcome were included in the model: socioeconomic and cultural factors and accessibility to facilities. They were chosen based on evidence from previous studies of their effects on FBDs.

3.1.1 Outcome

Women's intention to deliver at their ANC facility was the outcome for this study. This variable was used to study the effect of quality of ANC on women's intended use of FBDs.

3.1.2 Quality of ANC

Structure

1) Essential physical resources: Having adequate physical resources ensures that ANC is provided in a safe and hygienic environment with adequate equipment to provide essential services. The physical resources in the ANC examination rooms were assessed to capture the quality domain of (1) 'Availability of essential physical resources' from the WHO's *Standards*.

2) Provider received pre/in-service training in past three years: ANC must be provided by a skilled health worker (SHW). Provision of ANC by providers who received pre/in-service training in past three years was assessed for the quality domain, (2) Competent, motivated human resources, from the WHO's *Standards*. Although human resources could be represented by the total number of staff or the number of ANC providers, this is closely related to the facility type. Lower level facilities, such as dispensaries, can provide high quality care even with one or two healthcare providers. The WHO's *Standards* points out that SHWs should have up-to-date training on the current methods and standards of care. Therefore, instead of counting the number of SHWs, this study assessed whether SHWs received any training in past three years.[5]

3) Review maternal/newborn deaths/near-misses: In this study, having regular meetings for reviewing maternal and neonatal deaths was used as a measure of the quality domain, (3) 'Actionable information systems', from the WHO's *Standards*. It states that every health facility should have systems to collect data for analysis and provide feedback based on the analysis. This is to actively monitor and improve quality for ANC patients. [5]

4) Emergency transport available: For emergency obstetric cases that require focused care, patients must be referred to a higher-level facility to receive acute care. Having an emergency transport was used in this study to assess the (4) 'Functional referral systems' domain of quality from the WHO's *Standards*[5]. Although having an emergency transport is not directly related to ANC, the presence of emergency transport, observed by mothers during their ANC visit, can have an effect on their decision to return to the ANC facility for delivery.

Process

1) Privacy of examination room: Women who receive ANC should always feel that their privacy is respected and their confidentiality is assured. Visual and auditory privacy of examination rooms were assessed for the quality domain, (5) 'Respect and preservation of dignity', from the WHO's *Standards*[5]. Although physical environment for privacy can be seen as a structural quality, for the purposes of this study, it was deemed more important in the process of providing ANC.

2) Routine ANC practices: Providing evidence-based care allows women to receive the best quality of ANC based on current recommendations. Antenatal care services that are recommended to be provided routinely for women were assessed to capture the quality domain, (6) 'Evidence-based practices for routine care and management of complications', from the WHO's *Standards*.[5]

3) ANC guideline available: The WHO's *Standards* suggest that facilities should have up-to-date ANC guidelines available at all times for providers to consult when needed. The (6) 'Evidence-based practices for routine care and management of complications'

domain of quality was further assessed in this study through the availability of ANC guidelines at facilities. [5]

4) Visual aids used during ANC: Written or pictorial aids can assist providers in educating women during ANC consultations. The use of visual aids while providing ANC was assessed in this study as a measure of the (7) 'Effective communication' quality domain from the WHO's *Standards*.[5]

5) Encouraged questions during ANC: Effective communication allows women to have a good understanding of the care that they receive and to participate in the process of making informed decisions. The quality domain of (7) 'Effective communication' from the WHO's *Standards* was further assessed in this study by examining whether women were encouraged to ask questions during their ANC visit[5]. This was assessed in this study as it illustrates that the provider attempted to make sure that mothers left the ANC consultation without any knowledge gap or uncertainties of the care that they received.

Outcome

1) Patient satisfaction with ANC facility and care: As an overall assessment of patient experience, their satisfaction with the ANC visit was measured in this study. This measure was considered to best reflect women's personal perspective on the overall quality of ANC that they received.

3.1.3 Socioeconomic/cultural factors

Maternal Characteristics

Women's use of facilities for delivery is affected by sociodemographic[63–67] and pregnancy-related factors[64,68,73]. Women's age reflects their general demographics and maturity and education reflects women's socioeconomic status. Having money available for delivery was a proxy measure for women's wealth[63] and birth preparedness[15,68,70,132]. First pregnancy reflected women's parity and how experienced they are in

pregnancy[64,68,73]. The gestational stage of women was found to affect women's intention for FBD[84] and therefore, was assessed in this study by whether women were in their third trimester or not for their ANC visit. Completing all four ANC visits is known to increase FBD usage so the number of ANC visits to the same facility was included in the model as well[63].

Provider Characteristics

Provider type and sex were included in the model to study the effect of provider characteristics on women's intention to return to their ANC facility for delivery. Provider type[76] and sex[25] were previously shown in the literature to affect women's preference and use of FBDs.

Facility type

Facility type was included in the model as this is known to affect both quality of ANC and use of FBDs[107]. This variable was included to control for possible confounding effect.

3.1.4 Accessibility of facilities

Cost and distance were assessed for accessibility of facilities. The cost of normal delivery at individual facilities was assessed as a measure of direct cost implemented to women for FBD. Distance to facility was not directly measured in metrics, but was collected as whether the facility was the nearest facility for mothers.

3.2 Data source

This study was a secondary analysis of the Kenya Service Provision Assessment (KSPA), a cross-sectional survey, completed in 2010[35]. The 2010 survey is the third KSPA conducted in Kenya, the previous two were completed in 1999[133] and 2004[134]. The Service Provision Assessment (SPA) is part of the international Demographic and Health Survey (DHS) Program that assists resource-poor countries in collecting and evaluating

nationwide data on population, health, and nutrition[35]. The DHS Program is funded by major international organizations, including the United States Agency for International Development (USAID)[35]. It has been responsible for producing high-quality, standardized surveys that allow for within-country and between-country comparisons[135]. Since 1984, the DHS Program has assisted over 90 countries to conduct more than 300 surveys, the majority of which are the DHS Household Survey[136]. The SPA survey has been carried out in 15 countries, for a total of 24 surveys.

The SPA is a nationwide cross-sectional survey of a sample representing all healthcare facilities in the country[35]. The SPA survey aims to provide an understanding of the health system performance; nationally and provincially[35]. The survey is designed to make a general assessment of facilities that offer maternal and neonatal health, child health or reproductive health services, as well as services for certain infectious diseases, namely, sexually transmitted infections, HIV/AIDS, tuberculosis, or malaria[35]. The focus of the SPA is to assess healthcare facilities based on availability, service readiness, adherence to standard practices, and quality of service provided[137]. This is made possible by having multiple means of data collection: Facility Audit Questionnaires, Health Worker Interviews, Observation of Consultations and Client Exit Interviews[35].

The Facility Audit Questionnaire mainly covers the infrastructure and resource aspects of the facility; for example, the number of employees, power and water supply, availability of medicine, and having regular staff meetings. These data are collected through direct observation of the facility by the examiner and through consulting staff in the facility who could best answer the questionnaire. The Health Worker Interview is collected through direct interviews with service providers regarding their educational background and their views on supervision and work environment. The KSPA survey also observed patient-provider consultations during ANC, which recorded whether the provider adhered to accepted standards of care commonly promoted and supported by various programmes, governments, and development partners. The patients who had their consultation observed were further requested to participate in Client Exit Interviews, where they were

asked a series of questions reflecting their experience of the consultation and the facility in general.[35]

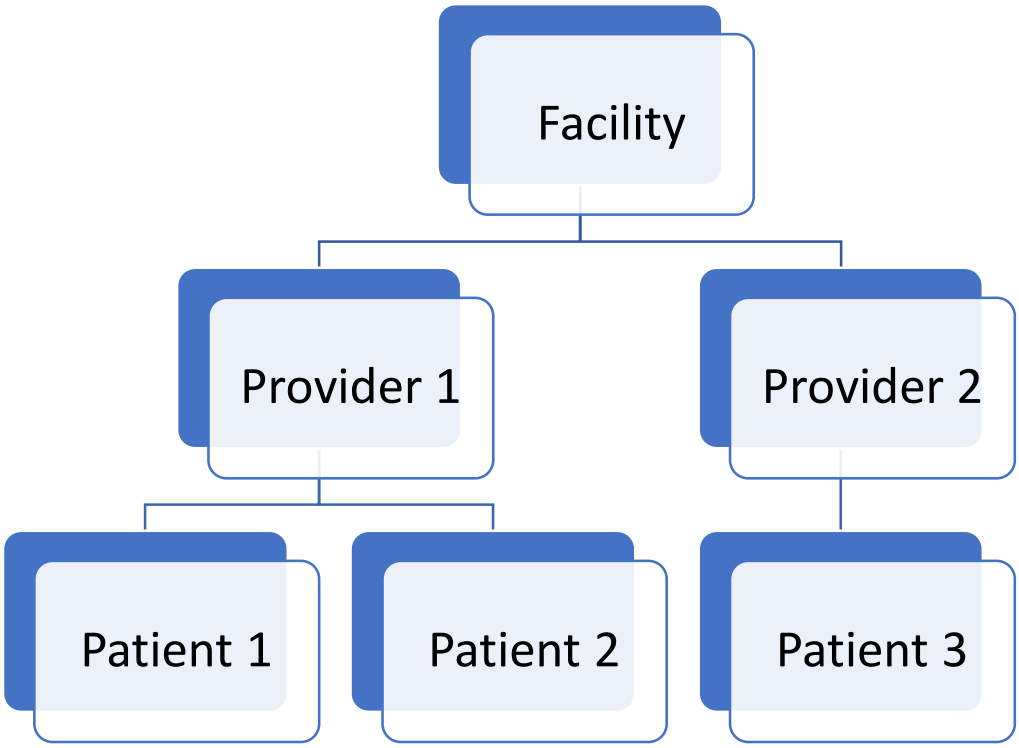
The KSPA was implemented by Kenya's National Coordinating Agency for Population and Development (NCAPD) in collaboration with the Ministry of Health and Kenya Bureau of Statistics, and with technical support from ICF Macro. The NCAPD recruited and trained experienced survey implementers with healthcare or science background. The survey implementers were placed into teams and were given supervision throughout the process for quality assurance of data collection from all facilities. The data were collected from a representative sample of 695 facilities across Kenya, from all different levels of care, from January 2010 to May 2010. For most facilities, data collection was usually completed in one day; however, if a specific service of interest was not offered on the day of the visit, interviewers returned when it was offered. The survey implementers made sure, for each section of the questionnaire, that the most knowledgeable person working in the facility was chosen to answer the survey.[35]

3.3 Sampling design

The KSPA used a multilevel sampling strategy. Facilities were sampled randomly. Providers were selected within the facilities sampled and each patient sampled at the facility was associated with a provider, creating the hierarchical multilevel sampling structure shown in Figure 3.2.

Figure 3.3 describes the sampling of the facilities. Facilities that were included in the SPA were randomly selected using the Master Facility List of all 6,192 functioning health facilities in Kenya at the time of survey implementation. In total, 703 facilities were selected; however, eight facilities were excluded in the final analysis due to unsuccessful data collection. "Hospitals, maternity facilities and stand-alone voluntary counselling and testing (VCT) facilities were oversampled" and "all three national referral hospitals and all eight provincial hospitals in Kenya were included" [35(p.4)]. In total, 695 facilities were included in the 2010 KSPA, representing approximately 11% of all facilities in Kenya.

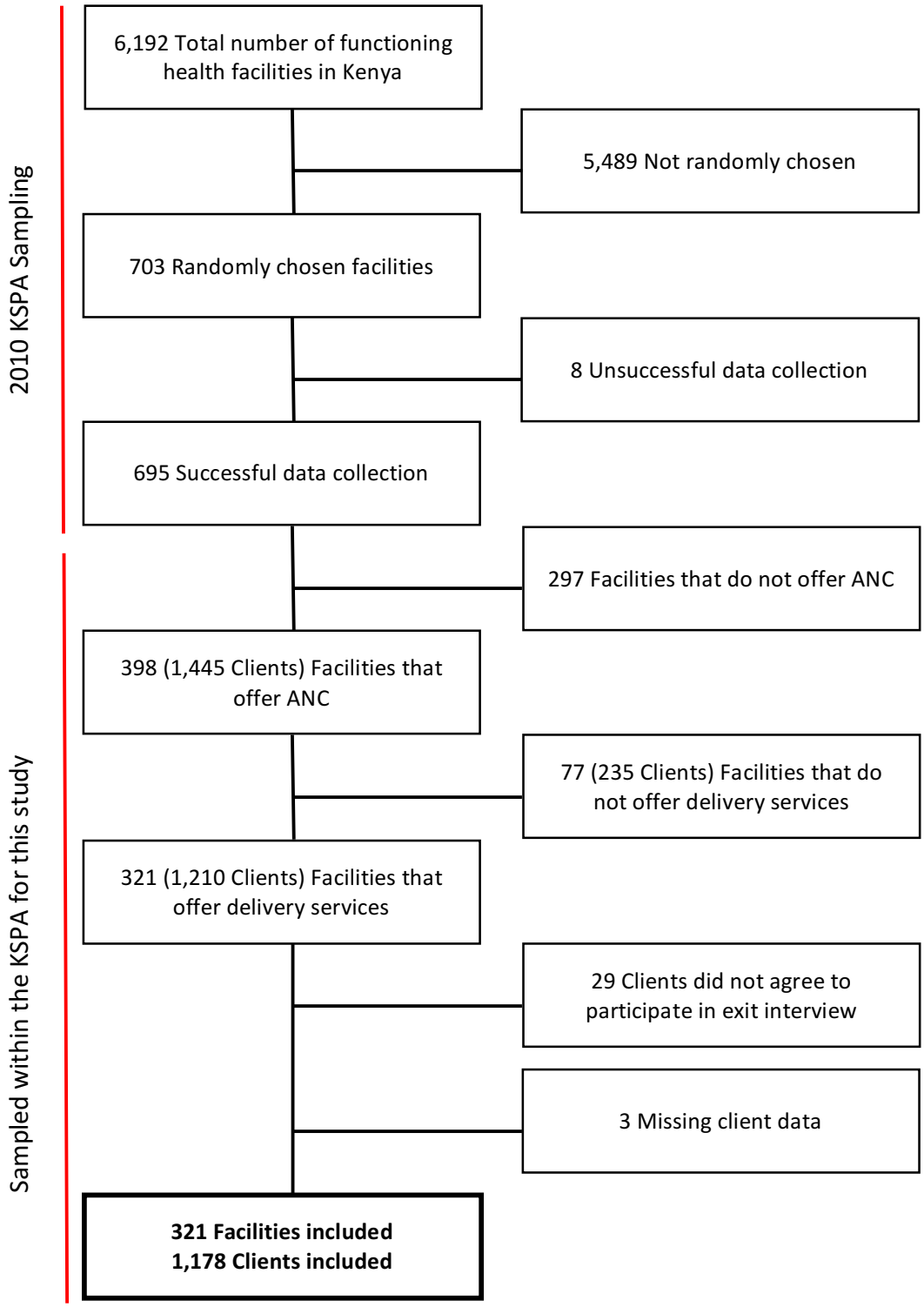
Figure 3. 2. Multilevel sampling strategy used in the 2010 KSPA



Weights were provided in the SPA to account for oversampling so that the sample represents the true distribution of facilities and of women in Kenya.[35]

Healthcare providers who provided the services for Observation of Consultations in the KSPA (ANC, child health, family planning, and certain infectious diseases) were sampled. The survey implementers aimed to interview an average of eight providers from each facility. If there were less than eight providers, then all of the providers were interviewed. If there were more than eight providers eligible for interview, "efforts were made to interview [up to] eight providers"[35]. Priority was given to those providers whose consultation with clients were observed; this included observations for ANC, child health, family planning, and certain infectious diseases. If there were fewer than eight providers whose consultations were observed, other healthcare providers in the facility

Figure 3. 3. Sampling strategy flowchart



Source: National Coordinating Agency for Population and Development (NCAPD) [Kenya], Ministry of Medical Services (MOMS), [Kenya], Ministry of Public Health and Sanitation (MOHPS) [Kenya], Kenya National Bureau of Statistics (KNBS) [Kenya], ICF Macro. KSPA 2010. 2011.

who met the eligibility criteria were randomly selected to meet the goal of interviewing eight providers per facility. Weights were provided in the SPA to account for oversampling or under-sampling of providers due to the sampling design of facilities and availability of providers at the time of data collection.[35]

Observations of consultations were chosen based on a systematic selection strategy. A maximum of five patient consultations were to be observed for each provider to a maximum of 15 consultations from each facility. Patients were systematically selected in intervals based on the number of expected clients on the day of the data collection. For example, if 10 patients were scheduled for antenatal care, then every other patient was observed. This was done for ANC, child health, and family planning consultations. All clients who were observed for their consultation were asked for an exit interview; however, not all patients agreed to participate. Patient weights provided in the SPA were based on oversampling of facilities.

3.3.1 Inclusion and exclusion criteria (Figure 3.2)

For this thesis, a subset of the KSPA was used. This included only facilities that provided ANC care and delivery care. First, a total of 398 facilities were identified that successfully collected ANC Observations. This information was available in the Facility Audit Questionnaire dataset as the data collectors listed the type of questionnaires completed at a facility[35]. Second, ANC facilities were identified that also offered delivery care. This was done by choosing ANC facilities that answered 'yes', the "facility offers delivery or C-section services"[35] in the Facility Audit Questionnaire. Next, clients were chosen if they had both ANC Observation and Client Exit Interview collected successfully. Among the 695 facilities surveyed, 297 facilities were excluded because they did not provide ANC, and 77 facilities were excluded as delivery service was not offered. A final count of 321 facilities that provided both ANC and delivery services were included for this study. Consequently, of the 1,445 clients observed for ANC, 235 were excluded because their ANC facility did not offer delivery services. Among the

1,210 individuals who were observed for ANC consultation, 29 did not give permission to continue to Client Exit Interview, and therefore, were excluded for analysis.

3.3.2 Analytical methods for the sampling design

In order to account for the multistage sampling design of the KSPA, *surveyset* command was used in Stata 14.[138] This command takes into account the nesting structure of the survey due to cluster sampling, where patients are nested in providers and providers are nested in facilities. Furthermore, it also adjusts for oversampling of hospitals, maternities, and stand-alone VCT centres using probability weights, so that the distribution of sampled facilities represents the true distribution in Kenya. Failing to adjust for the sampling design can result in underestimation of standard errors. Moreover, without the application of sampling weights, the findings cannot be generalized to Kenya, as a nation.

Although there were two sampling units (the primary sampling unit is facilities, and the secondary sampling unit is providers), the secondary sampling unit was not taken into account when *surveyset* was applied. This is because only one ANC provider was sampled from most ANC facilities (average of 1.17 providers per facility)[130].

3.4 Description of variables

The 2010 KSPA questionnaires used to extract the variables for this study can be found in Appendix 1.

The operational definitions of the dependent variable (women's intention to deliver at their ANC facility) and the independent variables (quality of ANC, socioeconomic/cultural factors, and accessibility of facilities) are outlined in Table 3.1. The methods used to operationalize each variable are discussed in the following section.

3.4.1 Dependent variable

The outcome variable was defined as women's intention to return to their ANC facility for delivery. This was collected during the ANC Client Exit Interview. The question was

"Have you decided where you will go for the delivery of your baby?"[35]. If yes, women were further probed to answer if their plans are to deliver in a facility or at home. Responses were recoded as: 1 'Intending to deliver at this facility'; 0 'Not intending to deliver at this facility (Responses = "At other health facility", "At home", "At TBA's home", "Other", and "Don't know"). (Table 3.1) [35]

Table 3.1. Description of dependent and independent variables

Variable	Range	Explanation
Dependent variable		
Intention to deliver at the ANC facility	0, 1	0 – Woman does not intend to deliver at the facility where she received ANC 1 – Woman intends to deliver at the facility where she received ANC
Independent variables		
Quality of Care		
Structure		
Essential physical resources	0, 1	0 –Facility does not have all essential resources for ANC in exam room 1 –Facility has all essential resources for ANC in the exam room
Provider received pre/in-service training in past three years	0, 1	0 – Provider did not receive any training in past three year 1 – Provider received pre-/in-service training in past three years
Review maternal/newborn deaths/near-misses	0, 1	0 – Facility does not review maternal/newborn deaths/near-misses 1 – Facility reviews maternal/newborn deaths/ near-misses
Emergency transport available	0, 1	0 – Facility does not have an emergency transport 1 – Facility has an emergency transport
Process		
Privacy of examination room	0, 1	0 - Private room is not available 1 - Private room is available
Routine ANC practices	0, 1	0 – Less than three routine care given during ANC consultation (Routine care = Provider discussed: nutrition during pregnancy, danger signs, breastfeeding, family planning, and delivery plans) 1 – Three or more routine care given during ANC consultation
Availability of ANC guideline	0, 1	0 – ANC guideline is not available in the facility 1 – ANC guideline is available in the facility

Table 3.1. Continued

Variable	Range	Explanation
Visual aids used during ANC	0, 1	0 – Visual aid not used during ANC consultation 1 – Visual aid used during ANC consultation
Encouraged questions during ANC	0, 1	0 – Provider did not encourage patients to ask questions 1 – Provider encouraged patients to ask questions
Outcome		
Patient satisfaction of ANC facility and care	0, 1	0 – Patients were not very satisfied 1 – Patients were very satisfied
Socioeconomic/Cultural Factors		
Maternal Characteristics		
Age (years)	Cont.	Continuous variable, Range (14 to 53)
Mother's education	0 – 2	0 – Never attended school 1 – Primary or post-primary 2 – Secondary or above
First pregnancy	0, 1	0 – Woman had previous pregnancy experience 1 – Current pregnancy is the first pregnancy for woman
Third trimester	0, 1	0 – Woman is not at her third trimester for the current ANC visit 1 – Woman is at her third trimester for the current ANC visit
Money available for delivery	0, 1	0 – Woman does not have enough money available for delivery 1 – Woman has enough money available for delivery
ANC visit number to the facility for current pregnancy	Cont.	Continuous variable, Range (1 to 5)
Provider and Facility Characteristics		
Provider type	0, 1	0 – Not a nurse 1 – Nurse
Provider sex	0, 1	0 – Male 1 – Female
Facility type	0 – 2	0 – Dispensary or clinic 1 – Health centre or maternity 2 – Hospital
Accessibility of Facilities		
Cost of normal deliveries	0, 1	0 – Facility does not charge for normal delivery services 1 – Facility charges for normal delivery services
Nearest facility from home	0, 1	0 – ANC facility is not the closest facility from home for woman 1 – ANC facility is the closest facility from home for woman

Independent Variables

3.4.2 Quality of ANC variables

Structure

1) Essential physical resources

The data to create the Essential Physical Resources variable were collected from the Facility Audit Questionnaire. Each of the following eight items (a to h) were either "observed" or not observed ("reported, not seen", "not available", or "don't know"). The variable, Essential Physical Resources, was assigned '1' if 'All observed in examination room', and otherwise ('Not all observed in examination room'), '0' was assigned. [35]

a) Hand hygiene[g]
b) "Disposable latex gloves"
c) "Disinfectant [e.g., Hibitane, Alcohol]"
d) "Sharps Container ("Safety box")"
e) "Spotlight for pelvic exam (flashlight/torch or exam light acceptable)"
f) "Foetal stethoscope (Pinard)"
g) "Examination Couch"
h) "Blood pressure apparatus" (Manual or Automatic)

2) Provider received pre/in-service training

Healthcare providers were asked in the Health Worker Interview, "During the past 3 years have you received any pre- or in-service training on subjects related to antenatal or postnatal care?" If the provider answered "Yes", '1' was assigned and otherwise, ("No"), '0' was assigned. [35]

3) Review of maternal/newborn deaths/near-misses

[g] Hand hygiene was considered good if "*Running water (piped)*" or "*Other running water (Bucket with tap or pour pitcher)*" was observed and "*Hand-washing soap/liquid soap*" and "*Hand disinfectant*" were also observed. Formulation of this variable was drawn from the 2010 KSPA report.[35]

A knowledgeable staff was asked "Does the facility participate in regular reviews of maternal or newborn deaths or "near-misses"?" in the Facility Audit Questionnaire. If the answer was "Yes, for mothers only", "Yes, for newborns only", or "Yes, for both", then '1" was assigned, and otherwise ("No, does not participate"), '0' was assigned. [35]

4) Emergency transport available

The availability of emergency transport was noted by the observer in the Facility Audit Questionnaire. If "a functional ambulance or other vehicle for emergency transport for clients" was observed, then '1' was assigned, and otherwise ("Yes, reported not seen", "No", and "Don't know"), '0' was assigned. [35]

Process

1) Privacy of examination room

Privacy of examination rooms was captured in the Facility Audit Questionnaire, where the observer assessed whether the examination rooms had privacy. If a "private room" was "Observed", then '1' was assigned, and otherwise ("Reported not seen" or "Not available"), '0' was assigned. [35]

2) Routine ANC practices

Routine ANC practices provided to women was a composite variable based on the receipt of five recommended health education and counselling services. They were recorded for successful service provision during the ANC Observation. The formulation of the variable is as follows:

a) "danger signs as risk factors for which the woman should return to the facility"[h]

[h] The dangers signs that were assessed are "Vaginal bleeding", "Fever", "Excessive tiredness or breathlessness", "Swollen hands and face", "Severe headache or blurred vision", "Persistent cough", and "Loss of, or excessive fetal movement".

- If at least one danger sign was discussed, it was considered to be discussed.

b) "nutrition (i.e., quantity or quality of food to eat) during pregnancy"
c) "exclusively breastfeeding the infant for up to 6 months"
d) "family planning for use after delivery"
e) "advised or counselled about delivery"[i]
    - Any advice to give birth at a facility was considered to be good advice.

Assigning '1' for individual services when provided, an overall 'Routine ANC care' variable that ranged from 0 to 5 was created. When the distribution of the variable was studied, the mean of this score was 2.18. Instead of making the assumption of equal intervals and equal weights to keep the variable as a score[139], this variable was dichotomized using the mean[140].Thus, creating a binary variable with '0' meaning less than three routine ANC practices and '1' meaning three to five routine ANC practices. [35]

3) Availability of ANC guidelines

Availability of ANC guidelines was captured through the Facility Audit Questionnaire which noted the availability of "guidelines or protocols for antenatal care". If they were "observed", then '1' was assigned, otherwise ("reported not seen", "not available", or "don't know"), '0' was assigned.

4) Visual aids used during ANC

The use of visual aids during ANC consultation was noted by the observer during the ANC Observation. If the observer noted that the provider used "visual aids for health education or counselling during the consultation", then '1' was assigned, and otherwise ("No" or "Don't know"), '0' was assigned. [35]

5) Encouraged questions during ANC

[i] "Advised the client where she will deliver", "Advised the client to prepare for delivery (e.g. set aside money, arrange for emergency transportation)", and "Advised the client to use a skilled health worker during delivery".

Encouraging ANC clients to ask question was captured in the ANC Observation. If the observer noted that the ANC provider "asked whether the client had any questions and encouraged questions", '1' was assigned, and otherwise ("No" or "Don't know"), '0' was assigned. [35]

Outcome

Patient satisfaction of ANC facility and care

Patient satisfaction of the ANC facility and the care they received was asked near the end of the Client Exit Interview. The interviewer asked "In general, which of the following statements describes best your opinion of the services given today at this facility". If mothers were "Very satisfied", '1' was assigned and otherwise ("More or less satisfied" or "Not satisfied")[j], '0' was assigned. [35]

3.4.3 Socioeconomic/cultural factors

Maternal Factors

1) Mother's Age

Mother's age was collected in the Client Exit Interview. The question asked was "How old were you at your last birthday?" This variable was captured as age in years and kept as continuous. Those who answered "Don't know" were recoded as missing. [35]

2) Mother's education

Mother's level of education was collected in the Client Exit Interviews. They were first asked *"*Have you ever attended school?" If they answered "No", they were categorized as 'Never attended school'. If they answered "Yes", they were asked "What is the highest level of school you attended?" The original responses were combined into new categories to account for small cell sizes (Table 3.2). [35]

[j] The responses "More or less satisfied" and "Not satisfied" were combined into, "not very satisfied", because "Not satisfied" was only composed of 2% of responses, which could cause sparse data bias[153].

Table 3.2. Categorization of mother's education.

New categories	Original answer
'Never attended school'	Patient have not attended school
'Primary or post-primary'	"Primary" "Post-primary/vocational"
'Secondary or above'	"Secondary/A-level" "College (Middle level)" "University

3) First pregnancy

During the ANC Observation, the observer asked the provider "…whether this is the client's first pregnancy". The provider responded either that it is the "first pregnancy" coded as '1', or "not first pregnancy" coded as '0'. This variable was used directly to capture whether it was the first pregnancy for the sampled women. [35]

4) Third trimester

Progression of pregnancy was represented by whether the women were in their third trimester or not. This information was initially collected from the ANC Observation, where the observer "ask[ed] the provider how many weeks pregnant the client is". The number of "weeks of pregnancy" was recorded. "Don't know" was also an answer choice and this was recoded as missing. The number of weeks was grouped into 'Yes', in third trimester, if it was greater than or equal to 28 weeks and 'No' if less than 28 weeks. [35]

5) ANC visit number

Patient's visit number was noted by the observer during the ANC Observation. The observer "ask[ed] the provider whether this is the client's 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, or 5^{th} visit for antenatal care at this facility for this pregnancy". Patient's visit number was coded as numbers 1, 2, 3, 4, and 5, respectively. The variable was assumed to be continuous. [35]

6) Money available for delivery

During the Client Exit Interview, women were asked "Do you have money set aside for the delivery?". If women answered that they had "Enough money", then '1' was assigned, and otherwise, ("No" or "Yes, but not enough"), '0' was assigned. [35]

Provider characteristics

1) Provider type

During the Health Worker Interview, the interviewee was asked "What is your current professional/technical/medical qualification?". There were 18 choices including "specialist", "medical officer (non-specialist)", "Registered nurse", "Social worker" and "HIV counselor/lay counselor". For the purposes of this study, they were categorized as 'nurses' or 'others'. The 'nurses' included "*BSc Nurse*", "*Registered nurse*", and "*Enrolled nurse*". [35]

2) Sex of provider

Sex of providers were identified by the observer as "*Female*" or "*Male*" during the Health Worker Interview. [35]

Facility type

Table 3.3. Categorization of facility type

New categories	Original answers
'Hospital'	"National referral hospital" "Provincial hospital" "District hospital" "Sub-district hospital" "Other hospital"
'Health centre or maternity'	"Health centre" "Maternity"
'Clinic or dispensary'	"Clinic" "Dispensary"

The "Type of facility" was identified in the Facility Audit Questionnaire. The original categories in the Facility Audit Questionnaires and the newly created categories for this study are shown in Table 3.3. [35]

3.4.4 Accessibility of facilities

Cost of normal delivery

The cost of normal delivery was identified using the Facility Audit Questionnaire, which the observer asked "Is there a fee for normal delivery?". The staff could answer "Yes", "No", or "Don't know". The cost of normal delivery was dichotomized to 'cost' if answered "Yes" or 'no cost' if answered "No". The category "Don't know" was considered as missing. [35(p.436)]

Nearest facility from home

The closeness of facilities from the respondent's home was found in the Client Exit Interview. During the Client Exit Interview, women were asked "Is this the closest health facility to your home?". Women answered "Yes", "No", or "Don't know", where "Don't know" was considered as missing. [35(p.541)]

3.4.5 Missing data

Missing values were kept as missing to preserve more samples for univariate and bivariate analyses. The sample size for each variable was reported explicitly in the table for univariate statistics.

3.5 Statistical analyses

3.5.1 Merging of datasets

The data from four surveys (Facility Audit Questionnaire, Health Worker Interview, ANC Observation, and ANC Client Exit Interview) of the 2010 KSPA were pooled together into one dataset for analysis. Pooling of the dataset followed the same nesting

structure used to sample ANC patients; patients nested in providers, and providers nested in facilities. The Facility Audit Questionnaire dataset was first merged onto Health Worker Interview dataset, assigning facility level variables to individual healthcare providers. They were matched based on the unique numbers assigned to each facility; numbers that were also given to providers to identify from which facility they were sampled (code 'facil'). Many-to-one merge was carried out using Stata 14 (code 'merge m:1') [138] so that more than one provider was allowed to take on the same facility's characteristics.

The provider-facility merged dataset was then merged with the patient-level ANC observation/Client Exit Interview dataset, assigning provider and facility level variables to patient observations and interviews. This was done by identifying unique providers on both provider dataset and patient dataset. Provider numbers were only unique within each facility, so unique provider numbers were created by combining the two ('gen provider=hline*facil'). Many-to-one merge was carried out once again to match more than one patient to each provider.

3.5.2 Univariate analyses

Univariate analyses of the dataset were first performed to better understand the distribution of the dependent and the independent variables. Frequency tables were used to describe categorical variables; means and standard deviations (SD) were used for continuous variables. The *surveyset* command in Stata 14 data was used for the univariate analyses of independent and dependent variables to account for oversampling of certain types of facilities[138]. Also, some of the facility and provider characteristics are shown at their level of data collection without survey weights to present the distribution of raw data in each level.

3.5.3 Multilevel analyses

In order to account for the effect of the nested sampling scheme, multilevel regression was used. The patients were nested within providers and providers were nested within

facilities, creating two levels of clusters, facility level and provider level. Since providers and patients were not randomly sampled from the entire population, but rather from within clusters, the clustering of samples can affect the outcome. Therefore, the relationship of each independent variable and the outcome was studied using multilevel logistic regression. This method assumes that there is a random effect caused by the clustering, and adds this random effect portion to the usual fixed-effect regression analysis. As mentioned earlier, only the facility level was considered for multilevel analyses since only one ANC provider was sampled for almost all facilities.

Bivariate Analyses

Bivariate analyses of the dependent and independent variables were performed using multilevel logistic regression. Significance of the relationship was tested using Student's t-test statistic. For categorical variables with more than two categories, Wald test was performed to get the overall significance of the variable on the outcome. Significance was measured at α=0.05. The *surveyset* data was used throughout the analyses using *svy: melogit* command in Stata 14. [138]

Multivariable Analyses

Multivariable analysis was performed to model the relationship of quality of ANC on women's intention to deliver at their ANC facility, adjusting for the covariates. Multivariable analysis allowed for studying the effect of each independent variable on the outcome, while controlling for other independent variables. Multilevel mixed-effects logistic regression was used to study this relationship. Student's t-test statistic was used to test the significance of each relationship at α=0.05. The *surveyset* data was used for this analysis as well, using *svy: melogit* command in Stata 14. [138]

The equation for modeling binary outcomes using logistic regression is as follows:

Equation 3.1. $$\log\frac{p}{1-p} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n + R$$

The log of odds ratio (probability of the outcome divided by probability of not having the outcome) is fitted into a linear model, with independent variables ($x_1, x_2, \ldots, x_n$), regression coefficients ($\beta_1, \beta_2, \ldots, \beta_n$), y-intercept ($\beta_0$) and residual or error (R).[141,142] The independent variables include all quality of ANC variables and covariates. The β coefficients were found using the *Maximum Likelihood* principle, which determines the relationship that most likely predicts what was already observed, using known independent and outcome values[141]. The y-intercept represents the value when all independent variables equal to zero. The residual, or error, denotes the unexplained variability of the dependent variable that is not explained by the y-intercept and beta-coefficients[142]. The residual, R, is the unexplained effect caused by the clustered sampling frame, and it is considered to vary randomly from one cluster to another[142]. For interpretation purposes, the inverse of log (raised to the power of e^x) was performed on both sides of the equation and the odds ratios associated with each independent variable, controlling for other independent variables, are reported in the results[141].

3.5.4 Model assumptions and model collinearity

There were several assumptions made to use the multivariable model. First was that the model was correct, meaning that the logit of the outcome variable can be modeled using linear relationship of the independent variables (Equation 3.1)[141]. Likelihood ratio test was used to determine if the multilevel logistic regression was a better fit than a simple logistic regression. While the final analysis was carried out using survey weights, Stata 14 did not have a function to provide the likelihood-ratio test for model fit with the survey weights. This is because the likelihood-ratio test assumes that cases are independent, but in survey data, they are not independent. Therefore, model fit was tested using multilevel logistic regression (code 'melogit') without survey weights. Similarly, the intraclass correlation coefficient (ICC) was not available for multilevel model with survey weights; therefore, the ICC was derived from the multilevel model without survey weights. In addition, 'melogit' in Stata 14 assumes that the random effect (facility-level variance) in the multilevel mixed-effects is normally distributed and the dependent variable is assumed to follow a Bernoulli distribution conditional on the random effect.[143]

The model also assumes that it is asymptotically unbiased, meaning that when the study is repeated multiple times so that the sample size n approaches infinity, then the *Maximum Likelihood* estimate of coefficients and y-intercept, $\widehat{\beta}_j$, will approach the true β_j.[141]

Chapter 4: Results

4 Results overview

This chapter presents an overview of the distribution of facilities and providers sampled for the dataset. It also presents the univariate analysis of the dependent variable (women's intention to return to their ANC facility for delivery) and the independent variables (quality of ANC, socioeconomic/cultural factors, and accessibility of facilities). The bivariate, and multivariable analyses of the independent variables on women's intention to deliver at their ANC facility are also presented in this chapter.

4.1 Univariate analyses

4.1.1 Distribution of sampled ANC facilities in Kenya

This is an unweighted result of the distribution of facilities sampled for this study. A total of 321 facilities that offered both ANC and delivery services were included in this study (Table 4.1). Facilities were sampled quite uniformly across the provinces, but Western province was sampled the most and Nairobi and North Eastern provinces were the least. A majority of the facilities that offered ANC and delivery services were owned by the government (66.7 %), followed by private organizations (18.1 %) with the remaining 15.3 % owned by mission/faith-based organization. Also, ANC and delivery services were available across all levels of care; hospitals, health centres/maternities, and clinics/dispensaries. Hospitals made up the majority of the sampled facilities because all hospitals in Kenya were sampled.

4.1.2 Distribution of sampled ANC healthcare providers in Kenya

This is an unweighted distribution of the sampled healthcare providers in this study. Among those providers who provided ANC at facilities that offered both ANC and delivery services, female providers (78.1 %) outnumbered male providers (21.9 %) (Table 4.2). Providers' age ranged from twenties to fifties, with the least number of

Table 4.1. Distribution of facilities (non-weighted)

	Frequency (n)	Percentage (%)
Province (n=321)		
Nairobi	25	7.8
Central	36	11.2
Coast	36	11.2
Eastern	47	14.6
North Eastern	26	8.1
Nyanza	48	15.0
Rift Valley	48	15.0
Western	55	17.1
Operating Authority (n=321)		
Public	214	66.7
Private not for profit/NGO	4	1.2
Private for profit	54	16.8
Mission/Faith-based	49	15.3
Facility Type (n=321)		
Dispensary/ Clinic	28	8.7
Health Centre/ Maternity	89	27.7
Hospital	204	63.6

Table 4.2. Distribution of healthcare providers (non-weighted)

	Frequency (n)	Percentage (%)
Sex (n=375)		
Male	82	21.9
Female	293	78.1
Age (years) (n=373*)		
≤ 29	68	18.2
30 – 39	133	35.7
40 – 49	101	27.1
≥ 50	71	19.0
Technical Qualification (n=375)		
Specialist	10	2.7
Doctor	14	3.7
Nurse	312	83.2
Midwife	34	9.1
Other	5	1.3

*Data not collected

providers who were in their twenties. The majority of providers were nurses (83.2 %), that included registered nurses, Bachelor of Science nurses, and enrolled nurses. Providers under the category 'other' included obstetricians, medical or clinical officers, registered or enrolled midwives, and very few numbers of nurse assistants and nutritionists.

4.1.3. Distribution of the dependent variable

A total of 1,446 women were sampled for the original dataset; but, 1,178 women were included in this secondary analysis after applying the inclusion and exclusion criteria. Once survey weights were applied, the sample size decreased to 911 (Table 4.3). Among sampled women, 59.5 % answered that they intend to return to the same facility for delivery.

4.1.4 Distribution of quality of ANC variables

Table 4.3 reports the distribution of the quality of ANC variables. Among patients who attended ANC, 38.8 % received care at a facility with all essential physical resources. Furthermore, 54.7 % of women received care from a provider who received training in ANC within the past three years. Among mothers in the sample, 32.2 % received ANC from a facility that reviewed maternal or newborn deaths or near-misses regularly. For emergency transport, 17.3 % of facilities had vehicles for emergency. The private examination room was available for most women who received ANC (94.4 %). Three to five routine ANC services were provided to 40.6 % of women. ANC guideline was available in the ANC facility for 77.3 % of women. Visual aids were not used during ANC for most mothers (91.9 %). Among the ANC consultations observed, 63.6 % of mothers were encouraged to ask questions, and 36% were not. For patient experience of overall quality of services provided at the ANC facility, 86% of mothers answered that they were very satisfied with their ANC visit.

Table 4.3. Univariate analyses of variables (weighted)

Variable	Frequency (n)	Percentage (%)
Dependent variable		
Intention to return to the same facility for delivery (n=910)		
No	369	40.5 %
Yes	541	59.5 %
Independent variables		
Quality of ANC		
Structure		
Essential physical resources (n=896) [+]		
Not all observed in examination room	548	61.2 %
All observed in examination room	348	38.8 %
Provider received pre/in-service training in ANC/PNC past 3 years (n=911)		
No	413	45.3 %
Yes	498	54.7 %
Review maternal/newborn deaths/near-misses (n=911)		
No	618	67.8 %
Yes	293	32.2 %
Emergency transport available (n=910)		
No	753	82.7 %
Yes	157	17.3 %
Process		
Privacy of examination room (n=910)		
No	51	5.6 %
Yes	859	94.4 %
Routine ANC practices (n=908)		
less than 3 practices	539	59.4 %
3 to 5 practices	369	40.6 %
Availability of ANC guideline (n=911)		
No	207	22.7 %
Yes	704	77.3 %
Visual aids used during ANC (n=905)		
No	832	91.9 %
Yes	73	8.1 %
Encouraged questions during ANC (n=911)		
No	331	36.4 %
Yes	580	63.6 %
Outcome		
Patient satisfaction of ANC facility and care (n=908)		
Not very satisfied	126	13.8 %
Very Satisfied	782	86.2 %

Table 4.3. Continued

Variable	Frequency (n)	Percentage (%)
Socioeconomic/Cultural Factors		
Maternal Characteristics		
Age (years) (n=908)	Mean = 25.2	SD = 6.0
Mother's Education (n=910)		
Never attended school	74	8.2 %
Primary/post-primary	591	64.9 %
Secondary or above	245	26.9 %
First Pregnancy (n=908)		
No	683	75.2 %
Yes	225	24.8 %
Third Trimester (n=910)		
No	203	22.3 %
Yes	707	77.7 %
ANC visit number to the facility (n=911)	Mean = 2.2	SD = 1.1
Mother has money set aside for delivery (n=911)		
No, not enough money	540	59.3 %
Yes, enough money	371	40.7 %
Provider and facility characteristics		
Provider type (n=910)		
Not a nurse	137	15.1 %
Nurse	773	84.9 %
Provider Sex (n=911)		
Male	245	26.9 %
Female	666	73.1 %
Facility type (n=911)		
Clinic/Dispensary	456	50.1 %
Health Centre/Maternity	351	38.5 %
Hospital	104	11.4 %
Accessibility of Facilities		
Cost of normal delivery (n=911)		
Facility does not charge for normal delivery services	395	43.4
Facility charges for normal delivery services	516	56.6
Nearest facility for the ANC patient (n=908)		
No	184	20.3 %
Yes	724	79.7 %

*Missing values if data not collected or data lost in data entry and processing stage

[+]This variable was drawn from facility and applied to individuals, thereby amplifying the missing values to 43. The true missing values at the facility level is 12. The high number of missing values for this variable is because this variable is a composite variable formed to represent an overall condition of examination room.

4.1.5 Distribution of socioeconomic/cultural factors

The distribution of maternal, facility, and provider characteristics are also presented in Table 4.3. The mean age of women who received ANC in the sample was 25.2 years; it ranged from 14 to 53 years. The majority of women had up to primary or post-primary education (64.9 %). Only 8.2 % of women in the sample never attended school. For most women who visited the ANC facility, it was not their first pregnancy (75.2 %). Furthermore, most women in this sample were in their third trimester of pregnancy (77.7 %). The average number of ANC visits in this sample was 2.2. The majority of women who participated in this study did not have enough money set aside for delivery (59.3%). Most of the providers were nurses and only 15.1 % of women received ANC from a non-nurse healthcare provider. Among women in this dataset, most received their ANC from a female healthcare provider (73.1 %). Also, 50.1 % received ANC from a clinic or a dispensary, 38.5 % from a health centre or a maternity, and 11.4 % from a hospital.

4.1.6 Distribution of variables for accessibility of facilities

The majority (56.6 %) of participants attended facilities that required a payment for normal deliveries. Among the sampled women, 75.3% attended the nearest facility from their home for their ANC.

4.2 Bivariate analyses

Each independent variable was analyzed for its individual effect on women's intentions to return to their ANC facility for delivery. Analyses employed multilevel logistic regression, adjusting for sampling weights and cluster sampling method. (Table 4.4)

4.2.1 Quality of ANC

The bivariate analyses of quality of ANC variables on the outcome, women's intention to return to their ANC facility for delivery are shown in Table 4.4. Some quality of ANC variables showed statistically significant associations. Women who received their ANC

Table 4.4. Bivariate analyses (weighted)

Variable	Unadjusted OR	95% Confidence Interval
Quality of ANC		
Structure		
Essential physical resources		
Not all observed in examination room	Ref.	-
All observed in examination room	1.13	0.18 – 7.06
Provider received pre/in-service training in ANC/PNC past 3 years		
No	Ref.	-
Yes	0.60	0.13 – 2.71
Review maternal/newborn deaths/near-misses		
No	Ref.	-
Yes	6.77*	1.24 – 37.09
Emergency transport available		
No	Ref.	-
Yes	3.51	0.89 – 13.85
Process		
Privacy of examination room		
No	Ref.	-
Yes	0.10*	0.01 – 0.81
Routine ANC practices		
less than 3 practices	Ref.	-
3 to 5 practices	1.27	0.53 – 3.04
Availability of ANC guideline		
No	Ref.	-
Yes	0.17	0.03 – 1.03
Visual aids used during ANC visit		
No	Ref.	-
Yes	3.62	0.91 – 14.33
Encouraged questions during ANC		
No	Ref.	-
Yes	1.06	0.37 – 3.04
Outcome		
Patient satisfaction of ANC facility and care		
Not very satisfied	Ref.	-
Very Satisfied	1.34	0.46 – 3.91

Table 4.4 Continued

Variable	Unadjusted OR	95% Confidence Interval
Socioeconomic/Cultural Factors		
Maternal Characteristics		
Age (years)a	0.98	0.91 – 1.06
Mother's education		
Never attended school	Ref.	-
Primary/post-primary	0.23	0.04 – 1.17
Secondary or above	0.20	0.02 – 1.63
First Pregnancy		
No	Ref.	-
Yes	1.96	0.56 – 6.82
Third trimester		
No	Ref.	-
Yes	0.38*	0.17 – 0.82
ANC visit number to the facility	1.20	0.80 – 1.80
Mother has enough money set aside for delivery		
No, not enough money	Ref.	-
Yes, enough money	0.62	0.19 – 1.97
Provider and facility characteristics		
Provider type		
Not a nurse	Ref.	-
Nurse	0.08*	0.01 – 0.82
Provider sex		
Male	Ref.	-
Female	0.89	0.20 – 4.08
Facility type		
Clinic/Dispensary	Ref.*	-
Health Centre/Maternity	7.62	1.09 – 54.13
Hospital	18.82	2.47 – 143.34
Accessibility of Facilities		
Cost of normal delivery		
Facility does not charge for normal delivery services	Ref.	-
Facility charges for normal delivery services	2.77*	1.15 – 63.26
Nearest facility for the ANC patient		
No	Ref.	-
Yes	2.96	0.82 – 10.64

Note: adjusted and weighted for sampling methodology.
[+] Adjusted Wald test for overall significance of the categorical variable
* $P < 0.05$

from facilities that review maternal/newborn deaths/near-misses had 6.77 times greater odds of intending to return to the ANC facility for delivery. Privacy of examination room was also statistically significant, with women who received ANC from a facility with both auditory and visual privacy, having 90% lower odds of expressing their intention to return to their ANC facility for delivery. Other quality of care variables did not have a statistically significant relationship with the outcome.

4.2.2 Socioeconomic/cultural factors

Only one maternal characteristic had a statistically significant association with the outcome. Mothers in the third trimester of pregnancy had 62% lower odds of intending to return to their ANC facility for delivery. Other maternal characteristics had no association with the outcome.

Provider type showed a significant relationship with women's intention to return to their ANC facility for delivery. If women received ANC from a nurse, they had 92% less odds of intending to return to the same facility for delivery compared to women who received ANC from a provider with other qualifications. The sex of provider was not significantly associated with the outcome.

Those women who received ANC at a health centre or at a maternity centre had 7.62 times greater odds of intending to deliver at the same facility, compared to women who received their ANC at a clinic or a dispensary. The effect was greater for women who had their ANC at a hospital. Those women had 18.8 times greater odds of intention to deliver at their ANC facility, compared to women who received ANC at a clinic or a dispensary.

4.2.3 Accessibility of facilities

The cost of normal deliveries was positively associated with women's intention to deliver at their ANC facility. Those women who went to an ANC facility that required some cost for normal delivery services had 2.77 greater odds for intending to return to their ANC facility for delivery. Nearness of facility was not associated with the outcome.

4.3 Multivariable analysis (Table 4.5)

Table 4.5. Multivariable analysis (weighted)

Variable	OR	95% Confidence Interval
Quality of ANC		
Structure		
Essential physical resources		
Not all observed in examination room	Ref.	-
All observed in examination room	1.18	0.26 – 5.35
Provider received pre/in-service training in ANC/PNC past 3 years		
No	Ref.	-
Yes	0.53	0.13 – 2.18
Review maternal/newborn deaths/near-misses		
No	Ref.	-
Yes	2.61	0.51 – 13.44
Emergency transport available		
No	Ref.	-
Yes	0.85	0.24 – 3.04
Process		
Privacy of examination room		
No	Ref.	-
Yes	0.49	0.05 – 5.03
Routine ANC practices		
less than 3 practices	Ref.	-
3 to 5 practices	0.77	0.30 – 1.97
Availability of ANC guideline		
No	Ref.	-
Yes	0.17	0.02 – 1.21
Visual aids used during ANC visit		
No	Ref.	-
Yes	4.38	0.89 – 21.58
Encouraged questions during ANC		
No	Ref.	-
Yes	1.08	0.28 – 4.11
Outcome		
Patient satisfaction of ANC facility and care		
Not very satisfied	Ref.	-
Very Satisfied	1.61	0.46 – 5.72

Table 4.5. Continued

Variable	OR	95% Confidence Interval
Socioeconomic/Cultural Factors		
Maternal Characteristics		
Age (years)	0.96	0.87 – 1.07
Mother's Education [+]		
Never attended school	Ref[+]	-
Primary/post-primary	0.13	0.01 – 1.36
Secondary or above	0.11	0.01 – 1.68
First Pregnancy		
No	Ref	-
Yes	1.42	0.36 – 5.61
Third trimester		
No	Ref	-
Yes	0.23*	0.07 – 0.80
ANC visit number to the facility	1.74*	1.06 – 2.86
Mother has money set aside for delivery		
No, not enough money	Ref	-
Yes, enough money	0.36	0.08 – 1.69
Provider and facility characteristics		
Provider type		
Not a nurse	Ref.	-
Nurse	0.13	0.02 – 1.03
Provider Sex		
Male	Ref.	-
Female	0.46	0.09 – 2.27
Facility type [+]		
Clinic/Dispensary	Ref [+]*	-
Health Centre/Maternity	3.02	0.19 – 71.52
Hospital	3.56*	1.96 – 292.84
Accessibility of Facilities		
Cost of normal delivery		
Facility does not charge for normal delivery services	Ref.	-
Facility charges for normal delivery services	3.09	0.37 – 26.04
Nearest facility for the ANC patient		
No	Ref	-
Yes	7.31*	1.62 – 33.01
Intra-class correlation coefficient**	0.32	0.22 – 0.44
LR-test vs. Logistic model = 22.44**	<0.001	

Note: adjusted and weighted for sampling methodology.
[+] Adjusted Wald test for overall significance of the categorical variables
* P < 0.05
**ICC and LR-test were calculated using a non-weighted multilievel model

4.3.1 Multivariable analysis results

Intraclass correlation coefficient

The ICC, representing the effect due to clustering of samples from each facility, was 0.32. This implies that 32% of the variation in women's intention to return to their ANC facility for delivery is due to the facilities where women received their ANC.

Model goodness-of-fit test

The multilevel logistic regression was tested for its effectiveness in representing the relationship between the dependent and independent variables. The likelihood ratio test of multilevel logistic regression against ordinary logistic regression (non-multilevel) showed high significance of $p < 0.001$. This indicated that multilevel model represents the relationships better than the ordinary logistic regression.

Quality of ANC

Quality of ANC variables were not significantly associated with women's intentions. The overall significance of quality of ANC was checked using the Wald test on all of the quality of ANC variables. This, too, was not significant ($p=0.10$).

Socioeconomic/cultural factors

For socioeconomic/cultural factors, three variables were significant. Two of the maternal factors were significantly associated with the outcome. Being in the third trimester of gestation was associated with 77% lower odds of intending to return to the same facility for delivery. In addition, one additional ANC visit to the same facility was associated with 1.74 (95% CI 1.06, 2.86) times greater odds for women's intention to deliver at the ANC facility. Other maternal factors were not significantly associated with the outcome. The type of facility showed a significant relationship with the outcome. Mothers who received their ANC from a hospital had 3.56 (95% CI 1.96, 292.84) times greater odds of intending to deliver at the same facility, compared to mothers who received their ANC from a clinic or a dispensary. The Wald test on this variable reported that facility type,

with all three categories, was overall significantly associated with women's intention to deliver at the same facility.

Accessibility of facilities

Mothers who answered that they received ANC at the nearest facility from home were 7.31 (95% CI 1.62, 33.01) times more likely to intend to return to their ANC facility for delivery, compared to mothers who received ANC care at a facility that was not the nearest facility from home.

Chapter 5: Discussion

5 Discussion overview

This chapter provides a brief summary and interpretations of the results. The quality of ANC is discussed first, followed by socioeconomic/cultural factors and accessibility of facility factors that had a significant effect on women's intention to return to their ANC facility for delivery. The discussion will then move to contributions of the study to the literature and policy implications. Finally, the limitations of the study will be discussed followed by the conclusion.

5.1 Summary of findings

The objective of this study was to examine the relationship of quality of ANC care in Kenyan healthcare facilities with women's intention to return to their ANC facility for delivery. The hypothesis was that better quality would result in higher odds of women returning to their ANC facility to deliver their babies. The study found instead, that the quality of ANC did not affect women's intention to return to their ANC facility for delivery. This study examined different aspects of quality of ANC; however, none of these were associated with the outcome. There were other factors that were associated with women's intention to deliver at the same ANC facility. Women who were in the third trimester had lower odds for having an intention to return to their ANC facility for delivery. Increasing number of ANC visits to the facility was positively associated with women's intention to return to their ANC facility for delivery. The odds of women's intention to return to deliver at their ANC facility decreased if the ANC facility was a clinic or a dispensary, the lowest level of care. Finally, if women received ANC at a facility that was the nearest facility from their home, women had greater odds of intending to return to their ANC facility for delivery.

5.2 Interpretation of findings

5.2.1 Quality of ANC was not associated with women's intention to return to their ANC facility for delivery

In this study, neither individual components of quality of ANC nor the overall quality of ANC was associated with women's intention to return to their ANC facility for delivery. This finding is consistent with two studies on this topic (Gage[23] and Nikiema[25]). Gage's analysis of facility's readiness to provide ANC (structural quality) and delivery services did not affect regional rate of facility-based delivery (FBD) usage. Nikiema also found similar results in Burkina Faso using a score to analyze the overall quality of ANC at facilities. However, the findings from this thesis are in disagreement with Chukwuma's study on 28 African countries that reported a positive relationship between the number of ANC services received and women's use of FBDs[24].

A pattern was observed in the literature regarding quality of obstetric care in general. Women's preference, choice, or intention for FBD was found to be affected by quality of ANC or quality of maternal care in general if reported by women[17,21,24,68,71], as exemplified in Chukwuma's study[24]. Whereas, the observer's assessment of quality of ANC or maternal care at facilities generally had little or no effect on women's use of the facility for FBDs[23,25,83], demonstrated in Gage's study[23]. This implies that there is some discordance between the observer's evaluation of quality and women's perspective of quality of ANC. Evidence supporting this argument can be found in works that studied women's satisfaction, which depicts women's perceived quality of care. Poor quality of ANC, when observed by a third person, did not lead to low satisfaction among women in Kenya, Namibia, and Nigeria[106,125]. In fact, this thesis also found that Kenyan women were predominantly satisfied with the care they received, while quality of ANC was found to be substandard by Lee et al. using the same dataset[106]. The discordance in women's perception or satisfaction with ANC quality and the observer's assessment of quality requires more attention from researchers. This could mean that researchers are not fully understanding the needs of women and their perception of quality. This could also mean that the women's assessment of quality is a better predictor of their intended use of healthcare facilities for delivery, than an observer's assessment of quality of ANC.

This study is in agreement with the pattern observed in the literature regarding the assessment of quality from a third person's perspective (structure and process). However, patient satisfaction, in this study, was not associated with women's intention to deliver at the same facility. Patient satisfaction was a measure of quality in the outcome domain, and was used to represent women's personal experience of the overall quality of care. Whether it was an observer's assessment of quality or the personal experience of quality, this study found that quality of ANC was not associated with women's intention to use the same facility for delivery. There are three explanations for this result that will be discussed below in detail. 1) It is possible that, for the Kenyan women sampled in this study, their experience during ANC truly did not have any association with their intention to deliver at the same facility. 2) A second possibility is that the quality of ANC assessment was not able to capture the full spectrum of quality and therefore, did not reveal the true relationship of quality of ANC and women's intention to use the same facility for delivery. 3) Lastly, there could have been some correlation within the variables in this study, concealing the true relationship of quality of ANC and women's intention to return to the ANC facility for delivery.

1) The result of this study can imply that the sampled Kenyan women did not find quality of ANC important in intending to return to the ANC facility for delivery. There are a number of factors, such as physical and social barriers, that come into play when it comes to deciding where to give birth and these factors may be more influential than the quality of ANC they received. For women in Kenya, especially for those living in rural areas, physical barriers, such as distance and road conditions, can be a critical factor when deciding their delivery site. Other cultural and social norms could also have affected more profoundly in their intended place of delivery. This includes being labeled in the community as having serious health concerns[82], such as HIV/AIDS[78]. It is also possible that, because women's intention was assessed at the end of a visit, it may not have been known at the time of the Exit Interview. In sub-Saharan Africa, women are usually not the decision-makers of the household. Therefore, it may be, especially for women at their first ANC visit, that the intention to deliver at the same facility would only be made once women have a chance to discuss their experience with their husband. This argument is

supported by a qualitative study which reported that husbands do decide the place of delivery, partly based on women's report of their experience during ANC[129].

2) Quantifying quality of care is a complex task. Although this study sought to assess quality of ANC thoroughly in various dimensions, it is possible some aspects of quality that may have impacted women's intention to return to their ANC facility for delivery were not captured in whole or in part. There were limitations in studying some key quality of ANC variables previously studied by other groups, due to the cross-sectional nature of the KSPA. The appropriate delivery of ANC occurs over the course of four visits. Therefore, a true measure of quality of ANC should take place over the four ANC visits that women make during the course of her pregnancy. Some studies, also of a cross-sectional design, have overcome this difficulty by asking women about the quality of ANC services they received throughout pregnancy after they delivered their baby[111,117,120]. However, this was not how the KSPA data were collected, nor the purpose of this study in the assessment of ANC quality. Women who participated in ANC Observation and Client Exit Interview for the KSPA were at different stages of pregnancy and therefore, for some, it was their first visit and for some, it was their second, third, or fourth visit. Antenatal care should be provided according to the trimester and the visit number. For example, taking women's history is only done on the first ANC visit[87], thus not taking women's history on the fourth ANC visit could not be considered as poor quality. Similarly, it is possible that women in their fourth visit have received all (two) of their Tetanus toxoid (TT) injections[88], but from a different facility. Although the KSPA collected information on the number of TT injections received during ANC Observation, it was not specified if the injections took place at the same facility or at a different facility. Since the purpose of this study was to find an association between the quality of ANC provided at a specific facility and women's intention to return to the same facility for delivery, only the experience from that facility were included for assessing quality of ANC.

3) The findings of this study of no association between quality of ANC and women's intention to deliver at the same facility may have been due to correlations within

variables. Other variables examined in this study could have been correlated with quality of ANC variables, decreasing the effect of quality of ANC on women's intention to return to the ANC facility for delivery. The structural aspects of quality were suspected to have some correlation with facility type, as a Nigerian study reported on the association between attending hospitals and receiving good quality of ANC[117]. A chi-square test was carried out for individual structural quality variables against facility type and it was found that the variables, "Review maternal/newborn deaths/near-misses" and "Emergency transport available", were significantly associated with facility type (Appendix 1). The correlation found between "Review maternal/newborn deaths/near-misses" and "Facility type" may be the reason why "Review maternal/newborn death/near-misses" variable was found significant in the bivariate analysis (Table 4.4), but not significant in the multivariable analysis (Table 4.5). The "Emergency transport available" variable was not significant in either the bivariate or the multivariable analyses.

5.2.2 Socioeconomic/cultural factors significantly associated with women's intention to return to their ANC facility for delivery

Third trimester

The gestational stage of women's pregnancy was found to have an effect on women's intention to return to their ANC facility for delivery. There are few possibilities of why this may be the case. A woman early in her pregnancy may not have much idea of where she wants to deliver and she may be answering that she will deliver at the same facility due to reasons such as social desirability bias. However, once she gets closer to her due date, she will have a better idea of where she is preparing to deliver and would give a less biased answer. Furthermore, a woman's intention may change from early to late in pregnancy. Supporting this argument, Creanga and colleagues reported that in a prospective cohort study, Kenyan women's intention to deliver at a health facility decreased by 7% from baseline (<21 weeks) to follow-up (30-35 weeks)[84]. This may be due to lack of support from family members[15,16,68,73,132], or having low autonomy within the household to make a decision[76,144]. Other barriers include financial[9,70,72,84] and transportation[15,65,84,129,144,145] barriers.

Number of ANC visits to the facility

The number of ANC visits to the same facility was shown to have a positive association with women's intention to return to their ANC facility for delivery. This is consistent with previous studies done in sub-Saharan Africa. ANC visit number was found to be a significant determinant of SBA usage and facility delivery in Ghana[15,120] and Burkina Faso[25]. The association between the number of ANC visits and women's intention to return to their ANC facility for delivery can be explained in two ways. The first is that, as women return to the same facility for multiple ANC visits, they are able to build a positive relationship with the provider, thus affecting their intentions to return to the same facility for delivery. This is supported by a study done in Zambia where one of the reasons why women had better attitudes toward traditional birth attendants was because they were familiar with each other[76]. A second possibility for the association between the number of ANC visits and women's intention to return to their ANC facility for delivery is women's initial attitude toward receiving healthcare. Women who use ANC more often may have a more receptive attitude toward receiving healthcare in general and intend to use facilities for delivery, with no preference for a specific facility due to its quality. The second argument is supported by Oladapo and Osiberu's study, which reported that the frequency of ANC visits was not associated with women's overall satisfaction of the quality of ANC[126]. Their study suggests that women may use the same facility repetitively for ANC even if they are not satisfied. This could imply that women may intend to return to their ANC facility for delivery even though the quality of ANC was not satisfactory. This may be because of convenience, easier access, or having no other choice to go to a different facility due to longer distances that are inconceivable for women to travel.

Facility type

The type of facility where women received their ANC had an association with women's intention to return to their ANC facility for delivery. The odds ratio in multivariable analysis, referenced against clinic/dispensary, was 3.02 for health center/maternity and 3.56 for hospital. This implies that women preferred to return to their ANC facility for

delivery if it was a hospital, a health center, or a maternity when compared to a clinic or a dispensary. In the literature, studies have shown that higher-level facilities generally have better quality of ANC in sub-Saharan Africa[117,120]. However, quality of ANC was controlled in the multivariable analysis, and yet, facility type was shown to have an association with women's intention to return to the ANC facility for delivery. This suggests that Kenyan women may have better perceptions of higher-level facilities, regardless of quality of care[107,110]. Therefore, they may be more inclined to deliver at a health center, a maternity, or a hospital than a clinic or a dispensary. Their perception of higher-level facilities might be affected by the poor referral system in Kenyan facilities. In cases of emergency, primary facilities should be able to effectively transfer patients to higher-level facilities. However, primary care facilities in Kenya currently experience limitations in transferring patients[146]. This is also supported by this thesis, as only 17.3% of facilities had emergency transport available for transferring patients (Table 4.3). Therefore, women in this study may have felt that it was safer to admit themselves to higher-level facilities in the first place, in case of emergency.

5.2.3 Accessibility of facilities significantly associated with women's intention to return to their ANC facility for delivery

Nearest facility from home

Distance to facility is one of the greatest barriers that women face in accessing institutions for delivery[16,68,72,145,147]. This was once again demonstrated in this thesis. Mothers who received their ANC at the facility nearest to their home were significantly more likely to intend to deliver at the same facility. While previous studies have found that distance is a determinant of using facilities for delivery, this study additionally found that women's intention for delivery site is also based on distance. This finding implies that women, or their decision maker, tend to choose the nearest facility from their home for delivery, regardless of its quality of care. The difficulties in accessing facilities may be due to the fact that only 63% of Kenyan residents have access to a government healthcare facility within an hour of distance[148]. The results from this study emphasizes the issue of improved access to maternal care for increasing FBD usage.

5.3 Study contributions and policy implications

This study is the first national study in sub-Saharan Africa, to our knowledge, that examined the association between the quality of ANC and women's intention to return to their ANC facility for delivery. Since this is a national study, the results from this study can be generalized to the larger Kenyan population. This is one of the few studies that have identified components of quality according to Donabedian's quality of care framework of structure, process, and outcome[106,110]. This is the second known study in Kenya to examine pregnant women's intentions to deliver at a health facility[84]. While Creanga and colleagues addressed women's intention-behavior discordance for place of delivery, their focus was more on maternal factors associated with the discordance[84]. This study focused on women's initial intention to deliver at the facility where they received ANC, to determine if their preference to deliver at the ANC facility had a relationship with the quality of ANC provided. In addition, to our knowledge, there are no studies done in sub-Saharan Africa that reported on the possible effect facility type can have on women's intention to return to their ANC facility for delivery[63]. This suggests new directions for future research.

While this study did not find a relationship between the quality of ANC provided to women and their intention to deliver at the same facility, it revealed some external factors associated with this intention to deliver among Kenyan women. Women's intention to deliver at the facility where they received ANC was driven by facility type and their distance from the facility. Women in Kenya did not want to return to the same facility for delivery when it was a dispensary or a clinic, the lowest level of care; whereas, women were more inclined to return to the same facility if it was the closest facility from home. These results suggest that there are some critical changes that must be made in Kenya regarding women's perception of healthcare facilities. Dispensaries and clinics represent almost 80% of healthcare facilities in Kenya[36], acting as the first-line of care in many communities providing easy access to care[35]. Yet, this study suggests that mothers refrain from delivering at these facilities, even when controlling for its distance, due to poor perception of these facilities. Therefore, it is critical to improve women's perception of dispensaries and clinics, so that mothers can be confident admitting themselves to

primary care facilities. In order for women's perception to improve, the actual quality of care should improve. Furthermore, it is critical to establish a good referral system between lower level facilities to higher level facilities. Also, this system should be promoted so that mothers can be assured that in case of emergency, they will surely be referred to a hospital even when they initially admitted themselves to a lower-level facility. In addition, the cost for emergency referrals, such as using the ambulance, should be covered by the government so that women can use dispensaries and clinics without worrying about the extra cost that may arise in emergency situations. Appendix 3 provides a policy brief.

5.4 Limitations

There were several limitations to this study. The 2010 KSPA was collected mainly to assess the physical capacity of facilities in Kenya and how they manage and provide services. Therefore, some of the maternal factors that are known to affect women's use of FBDs[63] were not available. Examples of these variables include women's socio-economic status, marital status, urban or rural residence, women's autonomy, and knowledge and attitude toward FBDs. Social factors that were not measured in this study could have been a key factor influencing women's intentions to return to their ANC facility for delivery. A woman's social autonomy in her household can impact whether she is able to decide for her place of birth[149]. Also, having low social autonomy can mean that she may not be able to utilize financial resources on her own. Therefore, her intention for place of delivery may not reflect her true intentions. In this case, women's answers for their intended place of delivery in the 2010 KSPA may not have fully reflected the true effect that quality of ANC can have on women's intentions.

Another limitation of this study was that the ANC patient surveys were conducted as interviews, which can cause social desirability bias. Among all patients who were sampled in the KSPA, 59% of women answered that they will deliver at the facility where they received ANC. Also, another 21% answered that they will deliver at another facility, resulting in 80% of women planning to deliver at a health facility. This rate is

19% higher than the actual facility delivery rate in Kenya[61]. This higher rate could be a result of social desirability bias that may have caused women to answer that they are intending to deliver at a healthcare facility, even though they had no intentions. The higher rate of women's intention to deliver at a healthcare facility could also indicate that there are some barriers that women must overcome after they have decided their place of delivery. Some of these barriers include sudden onset of labour, greater difficulties in reaching facilities due to weather, and difficulties in attaining funds[84].

The risk of social desirability bias was not limited to Client Exit Interviews, but was also possible in both the Facility Audit Questionnaire and the ANC Observations. The healthcare facility and the providers both could have presented themselves during the observation period in a more desirable manner since a third person was making observations. This could have resulted in higher quality of ANC provided to women compared to the facility's usual quality of ANC. This may have biased the results if facilities usually provided poor quality of ANC and/or had bad reputations based on this poorer quality, which could have affected women's intention to deliver at the facility.

Some technical and analytic limitations were also present in the study. There were missing data and too few observations for some variables in the 2010 KSPA. Of the 911 women originally included in this study, only 880 women had all of the data available for multivariable analysis, resulting in 4.4 % of missing data. In addition, some variables, such as provider type or facility type, were categorized into broader categories because there were not many observations in the categories presented in the original 2010 KSPA dataset. This grouping of categories may have caused residual confounding in the multivariable analysis. Furthermore, this study used multilevel logistic regression with survey weights. This was a conservative method of analyzing this type of dataset[150], and thus resulted in large standard errors in some variables, such as facility type.

5.5 Future research

Validation studies for assessing quality of ANC are suggested for the future. There are

many studies that analyzed quality of ANC in developing countries, but with different methods in data collection and analysis. Having a standardized method to measure and analyze quality of ANC can allow better synthesis of the results across different studies. Especially conducting a validation study of the SPA survey for assessing quality of ANC can simultaneously reveal the quality of ANC across the 15 different countries where the SPA surveys were collected. Then, a validated measure for quality of ANC using the SPAs can be employed to further study the relationship between quality of ANC and women's intention to return to their ANC facility for delivery in the 15 countries. This will allow researchers and stakeholders to easily compare the results from different countries in sub-Saharan Africa and assess what may cause some of the differences in the results. This could reveal findings related to the geography, climate, culture, religion, and healthcare systems of the different countries.

Discordance between an observer's assessment of quality of ANC and women's assessment of quality of ANC was suggested from the results of this thesis, and from the synthesis of previous studies. Currently, there are no known studies in sub-Saharan Africa that have explicitly studied this discordance in the quality of ANC assessed from different perspectives. Studying this discordance can reveal which of the quality domains shows the most prominent discordance and determine the cause of the discordance and how to minimize the gap. This can also lead to developing better methods to assess quality of ANC so that it can reflect both observer's perspectives and women's perspectives of quality. Assessing quality of ANC from both perspectives will allow researchers to understand quality from both the current world standards and the local women's standards.

5.6 Study conclusions

This study sought to find an association between the quality of ANC provided to women in Kenya and their intended use of the same facility for delivery. This association was not established through this study. Women's intention to deliver at their ANC facility was not driven by the quality of ANC provided. External factors that were associated with women's use of their ANC facility for delivery were facility type and whether it was the

closest facility from their home. This suggests that the low rate of FBD usage in Kenya may not be due to the quality of ANC provided to women, but to their perception of lower-level facilities and their ease of accessing facilities. Going back to the initial question (Section 2.7.1) of why 93% of Kenyan women receive ANC at least two to three times, but only 59% have FBDs, this study proposed that the discordance in the usage of the two services may be resolved by two improvements. One is increasing women's perception of lower level facilities, the most accessible levels of care. The second is establishing a good referral system between lower level facilities to higher level facilities to assure women of the safety in using lower level facilities. These may be the key elements in increasing FBD coverage and lowering maternal mortality in sub-Saharan Africa and Kenya.

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Appendix 1. 2010 KSPA Questionnaire

The following are the pages extracted from the 2010 Kenya Service Provision Assessment Survey. Only the pages that provided the questions for formulating the dependent and the independent variables are shown. They are from all four sections of the 2010 KSPA: Facility Audit Questionnaire, Health Worker Interview, ANC Observation, and Client Exit Interview.

2010 KENYA SERVICE PROVISION ASSESSMENT SURVEY
COVER SHEET

1. Facility Identification

001 NAME OF FACILITY _____

002 LOCATION OF FACILITY (TOWN/CITY/VILLAGE) _____

003 PROVINCE . . . . . [ ][ ]

004 DISTRICT . . . . . [ ][ ][ ]

005 FACILITY NUMBER . . . . . [ ][ ][ ][ ][ ]

006 TYPE OF FACILITY

NATIONAL REFERRAL HOSPITAL	01
PROVINCIAL HOSPITAL	02
DISTRICT HOSPITAL	03
SUB-DISTRICT HOSPITAL	04
OTHER HOSPITAL	05
HEALTH CENTRE	06
CLINIC	07
DISPENSARY	08
MATERNITY	09
STAND-ALONE HTC/VCT	10

007 MANAGING AUTHORITY (OWNERSHIP)

GOVERNMENT/LOCAL MUNICIPALITY	1
NGO/PRIVATE NOT FOR PROFIT	2
PRIVATE-FOR-PROFIT	3
MISSION/FAITH-BASED	4

008 ADJACENT FACILITY

YES	1
NO	2

009 INPATIENT ONLY

YES	1
NO	2

2. Information about Interview

010 DATE: . . . . . DAY . . . . . [ ][ ]
MONTH . . . . . [ ][ ]
YEAR 2 0 1 0

011 Name of the Team Leader _____ TEAM LEADER CODE . . . . . [ ][ ]

012 INTERVIEWER VISITS:

	Visit 1	Visit 2	Visit 3
DATE:			

RESULT CODES (LAST VISIT):
1 = COMPLETED
2 = RESPONDENT NOT AVAILABLE
3 = REFUSED
4 = PARTIALLY COMPLETED
6 = OTHER _____ (SPECIFY)

RESULT CODE . . . . . [ ]

CHECKED BY:

TEAM LEADER _____/__/__/____
INITIALS, DATE

CENTRAL EDITOR _____/__/__/_
INITIALS, DATE

CHECKLIST FOR QUESTIONNAIRES

TEAM LEADER:
USE THIS CHECKLIST TO ORGANISE YOUR DATA COLLECTION IN THE FACILITY.

REMEMBER, EVEN IF A SPECIFIC SERVICE IS NOT OFFERED AT A FACILITY, STILL A QUESTIONNAIRE (WITH THE APPROPRIATE "NO SERVICES" CODE CIRCLED) NEEDS TO BE RETURNED TO YOU.

	SECTION NUMBER	DESCRIPTION OF SERVICE	CHECK (√) FOR EVERY QRE COMPLETED
01	1	OPD AND HIV/AIDS GENERAL INFORMATION	
02	2a	VACCINE LOGISTICS	
03	2b	CHILD HEALTH SERVICES	
04	3a	FAMILY PLANNING (FP) SERVICES	
05	3b	CONTRACEPTIVE SUPPLIES	
06	4	ANTENATAL-POSTNATAL CARE (ANC-PNC)	
07	5	DELIVERY - NEWBORN CARE	
08	6	SEXUALLY TRANSMITTED INFECTIONS (STI)	
09	14	HEALTH MANAGEMENT INFORMATION SYSTEM (HMIS)	
10	15	LABORATORY AND OTHER DIAGNOSTICS (LAB)	
11	16	MEDICATION AND SUPPLIES (MEDS)	
12	17	TUBERCULOSIS DIAGNOSIS AND TREATMENT (TB)	
13	18	COUNSELLING AND TESTING (CT)	
14	19	ANTIRETROVIRAL THERAPY (ART)	
15	20	PREVENTION OF MOTHER-TO-CHILD TRANSMISSION (PMTCT)	

IN THIS SECTION, PLEASE PUT THE TOTAL NUMBER OF OBSERVATIONS (OBS) AND CLIENT EXIT INTERVIEW (CEI) QUESTIONNAIRES COMPLETED FOR EACH OF THE FOUR AREAS (ANC, FP, SC, STI) AND THE TOTAL NUMBER OF HEALTH WORKER INTERVIEWS (HWI)

Number of questionnaires completed:	**Questionnaire Type** OBS	CEI
ANC OBSERVATION & CLIENT EXIT INTERVIEWS		
FAMILY PLANNING OBSERVATION & CLIENT EXIT INTERVIEW		
SICK CHILD OBSERVATION & CLIENT EXIT INTERVIEWS		
STI OBSERVATION & CLIENT EXIT INTERVIEWS		
OBSERVATION OF DELIVERIES		
HEALTH WORKER INTERVIEWS		
MATERNAL HEALTH PROVIDER KNOWLEDGE QUESTIONNAIRES		
NEONATAL HEALTH PROVIDER KNOWLEDGE QUESTIONNAIRES		

134	Please tell me the *most* common means of transport used by patients who are referred from other facilities to this facility for emergency services.	AMBULANCE. . . . . 01 PRIVATE CAR/BUS. . . . . 02 PUBLIC CAR/BUS. . . . . 03 MOTORCYCLE. . . . . 04 BICYCLE. . . . . 05 PEOPLE CARRY/PUSH OR PULL PATIENT. . . . . 06 ANIMALS CARRY/PULL PATIENTS. . . . . 07 OTHER (SPECIFY)_____ . 96 NEVER RECEIVE REFERRALS . . . . 95 DON'T KNOW 98	
135	Does this facility have a functional ambulance or other vehicle for emergency transportation for clients? IF YES, ASK TO SEE THE AMBULANCE OR VEHICLE.	YES, OBSERVED . . . . . 1 YES, REPORTED NOT SEEN . . . . . 2 NO . . . . . 3 DON'T KNOW 8	 → 138 → 138
136	Is fuel available today? ACCEPT REPORTED RESPONSE FROM KNOWLEDGEABLE RESPONDENT.	YES. . . . . 1 NO. . . . . 2 DON'T KNOW. 8	
138	Does this facility have a generator for electricity? This may be a back-up or stand-by generator. IF YES, ASK TO SEE THE GENERATOR	YES, OBSERVED. . . . . 1 YES, REPORTED NOT SEEN. . . . . 2 NO. . . . . 3 DON'T KNOW. 8	 → 140 → 140
139	Is the generator functional and is there fuel today? ACCEPT REPORTED RESPONSE FROM KNOWLEDGEABLE RESPONDENT.	YES, FUNCTIONAL WITH FUEL . . . 1 YES, FUNCTIONAL, NO FUEI. . . . . 2 NOT FUNCTIONAL . . . . . 3 DON'T KNOW 8	
140	Does this facility ever obtain electricity from a source other than a generator? PROBE FOR THE RIGHT ANSWER	YES, CENTRAL SUPPLY. . . . . 1 YES, SOLAR OR OTHER SOURCE. 2 YES, BOTH CENTRAL SUPPLY AND SOLAR. . . . . 3 NO. 4	 → 142
141	Is the electricity (not including any backup generator) always available during the times when the facility is providing services, or is it sometimes interrupted-for more than 2 hours?	ALWAYS AVAILABLE . . . . . 1 SOMETIMES INTERRUPTED 2	
142	What is the *most commonly used* source of water for the facility *at this time?*	PIPED INTO FACILITY . . . . . 01 PIPED ONTO FACILITY GROUND . . 02 PUBLIC TAP/STANDPIPI . . . . . 03 TUBEWELL/BOREHOLE . . . . . 04 PROTECTED DUG WELI . . . . . 05 UNPROTECTED DUG WEL . . . . . 06 PROTECTED SPRING . . . . . 07 UNPROTECTED SPRINC . . . . . 08 RAINWATER . . . . . 09 BOTTLED WATER . . . . . 10 CART W/SMALL TANK/DRUM . . . . 11 TANKER TRUCK . . . . . 12 SURFACE WATER (RIVER/DAM/LAKE/POND) . . . . . 13 OTHER (SPECIFY)_____ 96 DON'T KNOW . . . . . 98 NO WATER SOURCE 00	→ 144 → 144 → 145

NO.	QUESTIONS	CODING CLASSIFICATION			GO TO
429	FOR EACH OF THE FOLLOWING ITEMS, CHECK TO SEE WHETHER ITEM IS EITHER IN THE ROOM WHERE THE EXAMINATION IS CONDUCTED OR IN AN ADJACENT ROOM.				
	ITEMS FOR INFECTION CONTROL AND CONDITIONS FOR EXAMINATION	(a) AVAILABILITY			
		OBSERVED	REPORTED, NOT SEEN	NOT AVAILABLE	
01	RUNNING WATER (PIPED)	1 → 04	2	3	
02	OTHER RUNNING WATER (BUCKET WITH TAP OR POUR PITCHER)	1 → 04	2	3	
03	WATER IN BUCKET OR BASIN (WATER REUSED)	1	2	3	
04	HAND-WASHING SOAP/LIQUID SOAP	1	2	3	
05	HAND DISINFECTANT	1	2	3	
06	SINGLE-USE HAND DRYING TOWELS	1	2	3	
07	WASTE RECEPTACLE WITH LID (PEDAL BIN) AND PLASTIC BIN LINER	1 → 11	2	3	
08	OTHER WASTE RECEPTACLE (NOT PEDAL BIN) WITH PLASTIC BIN LINER	1 → 11	2	3	
09	WASTE RECEPTACLE WITH LID (PEDAL BIN) WITHOUT PLASTIC BIN LINER	1 → 11	2	3	
10	WASTE RECEPTACLE WITHOUT LID AND WITHOUT PLASTIC BIN LINER	1	2	3	
11	SHARPS CONTAINER ("SAFETY BOX")	1	2	3	
12	DISPOSABLE LATEX GLOVES	1 → 14	2	3	
13	DISPOSABLE NON-LATEX GLOVES	1	2	3	
14	DISINFECTANT [E.G., HIBITANE, ALCOHOL]	1	2	3	
15	DISPOSABLE NEEDLES	1	2	3	
16	AUTO-DISABLE SYRINGES (2, 3 OR 5 ml)	1	2	3	
17	DISPOSABLE SYRINGES (2, 3 OR 5 ml)	1	2	3	
18	PRIVATE ROOM	1 → 21	2	3	
19	AUDITORY PRIVACY	1	2	3	
20	VISUAL PRIVACY	1	2	3	
21	MACKINTOSH/PLASTIC ON ANY SURFACE	1	2	3	

NO.	QUESTIONS	CODING CLASSIFICATION						GO TO
		(A) AVAILABILITY				(B) FUNCTIONING		
430	EQUIPMENT AND SUPPLIES	OBSERVED	REPORTED, NOT SEEN	NOT AVAILABLE	DON'T KNOW	YES	NO	DON'T KNOW
	NOTE THE AVAILABILITY AND CONDITION OF OTHER EQUIPMENT. EQUIPMENT MAY BE IN EXAMINATION ROOM, AN ADJACENT ROOM, OR ROOM WHERE MEASURE IS TAKEN.							
01	Foetal stethoscope (Pinard)	1	2	3	8			
02	Adult weighing scale	1→b	2→b	3 ↵ 03	8 ↵ 03	1	2	8
03	Vaginal speculum (s)	1	2	3	8			
04	Vaginal speculum (m)	1	2	3	8			
05	Vaginal speculum (l)	1	2	3	8			
06	Thermometer	1→b	2→b	3 ↵ 07	8 ↵ 07	1	2	8
07	Infant weighing scale	1→b	2→b	3 ↵ 08	8 ↵ 08	1	2	8
08	Facility provided minute timer	1→b	2→b	3 ↵ 09	8 ↵ 09	1	2	8
09	Personal watch with seconds hand	1→b	2→b	3 ↵ 10	8 ↵ 10	1	2	8
10	Individual card/record for infant	1	2	3	8			
11	SP/Fansidar	1	2	3	8			
12	Iron tablets	1	2	3	8			
13	Folate tablets	1	2	3	8			
14	De-worming medicine	1	2	3	8			
15	Vitamin A	1	2	3	8			

431	NOTE THE AVAILIBILITY OF PROTOCOLS AND TEACHING MATERIALS.	OBSERVED	REPORTED, NOT SEEN	NOT AVAILABLE	DON'T KNOW
01	Guidelines or protocols for antenatal care	1	2	3	8
02	Guidelines for Syndromic Approach or Dx for STIs	1	2	3	8
03	Other guidelines and protocols for reproductive health (e.g., maternal, neonatal health)	1	2	3	8
04	Visual aids for client education on subjects related to pregnancy or antenatal care	1	2	3	8

431A	Are there any active traditional birth attendants (TBAs) working with this facility?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	 → 432 → 432
431B	Do the TBAs refer women to this facility?	YES . . . . . 1 NO 2	
432	Are there any active community health workers (CHWs) working with this facility?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	 → 434 → 434
433	Do the CHWs refer women to this facility?	YES . . . . . 1 NO 2	

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
507	At night, what level of provider is commonly on duty to conduct deliveries? IF DIFFERENT LEVELS ARE COMMONLY AVAILABLE, CIRCLE ALL RELEVANT LEVELS.	OBSTETRICIAN/ GYNECOLOGIST. . . . . A MEDICAL OFFICER. . . . . B CLINICAL OFFICERS. . . . . C R. NURSE. . . . . D R. MIDWIFE. . . . . E E. NURSE. . . . . F E. MIDWIFE. . . . . G NURSE AIDES. . . . . H OTHER _____ X (SPECIFY) DON'T KNOW. . . . . Z	
508	During normal working hours, what level of provider is commonly available to conduct complicated deliveries? IF DIFFERENT LEVELS ARE COMMONLY AVAILABLE, CIRCLE ALL RELEVANT LEVELS.	OBSTETRICIAN/ GYNECOLOGIST. . . . . A MEDICAL OFFICER. . . . . B CLINICAL OFFICERS. . . . . C R. NURSE. . . . . D R. MIDWIFE. . . . . E E. NURSE. . . . . F E. MIDWIFE. . . . . G NURSE AIDES. . . . . H OTHER _____ X (SPECIFY) DON'T KNOW. . . . . Z	
509	Does this facility have any routine user-fees or charges for delivery services? This includes any fees, including those for registration, mother-baby card, medicines, or laboratory investigations?	YES . . . . . 1 NO. 2	→ 512

		(a) FEES			(b) AMOUNT IN KSH
510	Please tell me if any of the following user-fee or charging practices are ever applied by this facility for delivery services:	YES	NO	DON'T KNOW	
01	Is there a fee for normal delivery?	1 → 01b	2 → 02	8 → 02	
02	Is there a fee for the package of ANC and delivery services?	1 → 02b	2 → 03	8 → 03	
03	Is there a fee to take care of a sick newborn?	1	2	8	
04	Are there any fees or charges for medicines?	1	2	8	
05	Are there fees for laboratory or other diagnostic tests?	1	2	8	
06	Are discounts or exemptions from fees allowed for some clients?	1	2	8	

511	Are the official fees posted or displayed so that the client can easily see them? IF YES, VERIFY BY ASKING TO SEE WHERE FEES ARE POSTED	YES, ALL FEES POSTED . . . . . 1 YES, SOME, NOT ALL FEES POSTED . . . . . 2 NO POSTED FEES 3	
512	Is there a register where client information from attended births is recorded, i.e., a delivery register? IF YES, ASK TO SEE THE REGISTER.	YES, OBSERVED . . . . . 1 YES, REPORTED, NOT SEEN 2 NO 3	→ 519 → 519

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
513	SCAN THE REGISTER FOR THE PAST 3 MONTHS AND CIRCLE THE RESPONSE FOR EACH TYPE OF INFORMATION ROUTINELY RECORDED FOR DELIVERIES. SEARCH ALL APPLICABLE REGISTERS/RECORDS MAINTAINED ROUTINELY.	BIRTH OUTCOME FOR INFANT. . . . . A MATERNAL OUTCOME. . . . . B TYPE OF DELIVERY. . . . . C MOTHER'S AGE. . . . . D GESTATIONAL AGE. . . . . E IF ANC RECEIVED. . . . . F HIV STATUS OF MOTHER. . . . . G NEWBORN WEIGHT. . . . . H IF PARTOGRAPH USED. . . . . I NONE OF ABOVE. . . . . Y	
514	INDICATE THE MOST RECENT DAY AND MONTH WHEN A DELIVERY WAS ATTENDED IN THIS FACILITY.	DAY. . ☐☐ MONTH. ☐☐ DK. . . . . 98 DK. 98	
515	How many women delivered at this facility during the previous 12 completed months? (EXCLUDE CAESAREAN SECTIONS)	NUMBER OF DELIVERIES . . ☐☐☐☐☐ DON'T KNOW. 99998	
516	How many of these deliveries (of Q.515) were registered as having had complications during labor and/or delivery?	NUMBER OF COMPLICATED DELIVERIES . . ☐☐☐☐☐ DON'T KNOW. 99998	
517	How many home-deliveries were conducted and reported to this facility by ***community midwives*** during the past 12 months?	NUMBER OF DELIVERIES . . ☐☐☐☐☐ DON'T KNOW. . . . . 99998 NO HOME DELIVERIES. 99995	
517A	**CHECK Q515,Q516, OR Q517: IS DATA RECORDED ?** **YES** ☐ **NO** ☐ →		**519**
518	INDICATE THE NUMBER OF MONTHS OF DATA REPRESENTED IN PREVIOUS QUESTIONS.	MONTHS OF DATA. . . . . ☐☐ DON'T KNOW 98	
519	What percentage of deliveries in your catchment area are conducted by this facility? In other words, what is your estimated annual coverage rate?	% COVERAGE. . . . . ☐☐☐ NO CATCHMENT AREA DEFINED. . 995 → 521 DON'T KNOW. . . . . 998 → 521	
520	RECORD THE SOURCE OF INFORMATION FOR THE ESTIMATED DELIVERY COVERAGE.	WRITTEN REPORT . . . . . A GRAPH/CHART . . . . . B OTHER _____ X (SPECIFY) SOURCE NOT KNOWN . . . . . Z	
521	Are there any meetings where labour and delivery service statistics are discussed with staff from this facility, such as looking at changes in patterns or other items relevant to client services? IF YES, ASK TO SEE MINUTES OF A RECENT MEETING	YES, MINUTES SEEN. . . . . 1 YES, MINUTES NOT SEEN. . . . . 2 NO . . . . . 3 → 524	
522	Is there any evidence of looking at service data for monitoring and evaluation? IF YES, ASK TO SEE ANY REPORTS, WALL GRAPHS OR CHARTS THAT SHOW SERVICE DATA HAS BEEN REVIEWED. CIRCLE ALL RELEVANT TYPE OF REPORTS OBSERVED.	OBSERVED WRITTEN REPORT/MINUTES. . . . . A WALL CHART/GRAPH. . . . . B OTHER _____ X (SPECIFY) NO OBSERVED EVIDENCE. . . . . Y → 524	
523	ASSESS THE MOST RECENT DATE WHERE THERE IS EVIDENCE OF DATA BEING REVIEWED.	WITHIN THE PAST 3 MONTHS . . . 1 MORE THAN 3 MONTHS AGO . . . 2 DON'T KNOW 8	
524	Does the facility participate in regular reviews of maternal or newborn deaths or “near-misses”?	YES, FOR MOTHERS ONLY. . . . . 1 YES, FOR NEWBORNS ONLY. . . . . 2 →525A YES, FOR BOTH. . . . . 3 NO, DOES NOT PARTICIPATE. . . . . 4 → 526	
525	How often are reviews of maternal deaths or "near-misses" carried out?	EVERY: ☐☐ WEEKS ONLY WHEN CASE OCCURS. . . . . 53 DON'T KNOW. 98	

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
560	MONTH AND YEAR OF LAST CAESAREAN SECTION? TAKE THE DATE FROM THE REGISTER OR REPORT FORM.	MONTH ☐☐ YEAR ☐☐☐☐ DK . . . . 98 DK 9998	
561	Does this facility have a health worker who can repair obstetric fistulae?	YES . . . . . 1 NO . . . . . 2 → 565 DON'T KNOW . . . . . 8 → 565	
562	Is there a register where fistula repair data is recorded? IF YES, ASK: May I see the register?	YES, OBSERVED . . . . . 1 YES, REPORTED, NOT SEEN 2 → 565 NO . . . . . 3 → 565	
563	RECORD THE NUMBER OF FISTULAE REPAIRED AT THIS FACILITY DURING THE PAST 12 COMPLETED MONTHS.	NUMBER OF FISTULAE REPAIRED . ☐☐☐☐ DON'T KNOW . . . . . 9998 → 565	
564	RECORD THE NUMBER OF MONTHS OF DATA REPRESENTED IN PREVIOUS QUESTION.	MONTHS OF DATA. . . . . ☐☐ DON'T KNOW 98	
565	Is this facility able to extract retained products of conception when necessary? IF YES, ASK TO SEE THE EQUIPMENT USED.	YES . . . . . 1 NO . . . . . 2 → 570	

566 CHECK WHETHER THE EQUIPMENT IS IN THE DELIVERY ROOM OR AN ADJACENT ROOM.

	EQUIPMENT	(a) AVAILABILITY				(b) FUNCTIONING		
		OBSERVED	REPORTED, NOT SEEN	NOT AVAILABLE	DON'T KNOW	YES	NO	DON'T KNOW
01	Manual vacuum aspirator	1 → b	2 → b	3 → 02	8 → 02	1	2	8
02	Dilatation and curettage (D&C) kit	1	2	3	8			
03	Other _____	1 → b	2 → b	3 → 567	8 → 567	1	2	8

567	Has manual vacuum aspiration (MVA) been used to remove retained products of conception by this facility during the past 3 months?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	
568	Has D & C been used to remove retained products of conception by this facility anytime during the past 3 months?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	
	CERVICAL SCREENING		
570	Does this facility offer any services for screening changes in a woman's cervix to detect pre-cancerous and cancerous lesions? IF YES, WHICH SERVICES? PROBE: Anything else?	PAP SCREENING . . . . . A VISUAL INSPECTION . . . . . B HPV TEST . . . . . C OTHER _____ X (SPECIFY) NO . . . . . Y → 572 DON'T KNOW . . . . . Z	
571	If a woman is identified with a cervical pre-cancer (e.g., dysplasia), how is she commonly managed? Is she treated at, this facility, referred elsewhere, or both?	TREATED AT THIS FACILITY. . . . . A REFERRED WITHIN DISTRICT. . . . . B REFERRED OUTSIDE DISTRICT. . . . . C OTHER _____ X (SPECIFY) DON'T KNOW. . . . . Z	
572	AT THIS POINT, CHECK IF EITHER Q500 OR Q552 IS "1" [FACILITY OFFERS DELIVERY OR C-SECTION SERVICES]	YES . . . . . 1 NO . . . . . 2 → **END**	

Observation of Antenatal-Care Consultation

1. Facility Identification

QTYPE | O | A | N |

Name of the facility: _____

Location of the facility: _____

FACILITY NUMBER . . . . . | | | | | |

2. Provider Information

Provider category:
- SPECIALIST. 01
- MEDICAL OFFICER 09
- CLINICAL OFFICER 10
- BACHELLOR SCIENCE NURSE 11
- REGISTERED NURSE 12
- REGISTERED MIDWIFE 13
- ENROLLED NURSE 14
- ENROLLED MIDWIFE 15
- NURSE AIDE 16

PROVIDER CATEGORY | | |

SEX OF PROVIDER: (1=Male; 2=Female)

SEX OF PROVIDER . . . . . | |

PROVIDER SERIAL NUMBER [FROM STAFF LISTING FORM]

PROVIDER SL NUMBER . . . . . | | |

3. Information About Observation

Date: _____

DAY . . . . . | | |

MONTH . . . . . | | |

YEAR . . . . . | 2 | 0 | 1 | 0 |

Name of the observer: _____

OBSERVER CODE . . . . . | | |

Client code: _____

CLIENT CODE . . . . . | | | |

4. Observation of Antenatal-Care Consultation

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
	BEFORE OBSERVING THE CONSULTATION, OBTAIN PERMISSION FROM BOTH THE SERVICE PROVIDER AND THE CLIENT. MAKE SURE THAT THE PROVIDER KNOWS THAT YOU ARE NOT THERE TO EVALUATE HIM OR HER, AND THAT YOU ARE NOT AN "EXPERT" TO BE CONSULTED DURING THE SESSION. **READ TO PROVIDER:** Hello. I am [NAME OF OBSERVER]. I am representing the Ministries of Health and NCAPD. We are conducting a study of all health facilities in Kenya with the goal of finding ways to improve the delivery of services. I would like to observe your consultation with this client in order to understand how ANC services are provided in this facility. Information from this observation is confidential. Neither your name nor that of the client will be recorded. The information acquired during this observation may be used by the MOH or other organizations to improve services, or for research on health services; however, neither your name nor the names of your clients will be entered in the database. Do you have any questions for me? If at any point you feel uncomfortable you can ask me to leave. However, we hope you won't mind our observing your consultation. Do I have your permission to be present at this consultation? _____ Interviewer's signature (Indicates respondent's willingness to participate) DAY __ MONTH __ YEAR 2010		
100	RECORD WHETHER PERMISSION WAS RECEIVED FROM THE PROVIDER.	YES . . . . . 1 NO 2	→ **END**
	READ TO CLIENT: Hello, I am_____. I am representing the Ministries of Health and NCAPD. We are conducting a study of health services in health facilities in Kenya. I would like to be present while you are receiving services today, in order to better understand how ANC services are provided in this facility. We are not evaluating the [NURSE/DOCTOR/PROVIDER] or the facility. And although Information from this observation may be provided to researchers for analyses, neither your name nor the date of services will be provided on any shared data, so your identity and any information about you will remain completely confidential. Please know that whether you decide to allow me to observe your visit is completely voluntary and that whether you agree to participate or not will not affect the services you receive. If, at any point, you would prefer I leave please feel free to tell me. After the consultation, my colleague would like to talk with you about your experience here today. Do you have any questions for me? Do I have your permission to be present at this consultation? _____ Interviewer's signature (Indicates respondent's willingness to participate)		
101	RECORD WHETHER PERMISSION WAS RECEIVED FROM THE CLIENT.	YES . . . . . 1 NO 2	→ **END**
102	RECORD THE TIME THE OBSERVATION STARTED	__ : __	

NO.	QUESTIONS	CODING CLASSIFICATION				GO TO
104	RECORD WHETHER THE PROVIDER ASKED ABOUT OR THE CLIENT MENTIONED ANY OF THE FOLLOWING FACTS:	YES	NO	NA	DK	
01	Client's age	1	2		8	
02	Medications the client is taking	1	2		8	
03	Date client's last menstrual period began	1	2		8	
04	Number of prior pregnancies client has had	1	2		8	
105	RECORD WHETHER THE PROVIDER OR THE CLIENT DISCUSSED ANY OF THE FOLLOWING ASPECTS OF THE CLIENT'S PRIOR PREGNANCIES:					
01	Prior stillbirth(s)	1	2	5	8	
02	Infant(s) who died in the first week of life	1	2	5	8	
03	Heavy bleeding, during or after delivery	1	2	5	8	
04	Previous assisted delivery (caesarean section, ventouse, or forceps)	1	2	5	8	
05	Previous abortions	1	2	5	8	
06	Previous multiple pregnancies	1	2	5	8	
07	Previous prolonged labor	1	2	5	8	
08	Previous pregnancy induced hypertension	1	2	5	8	
09	Previous pregnancy related convulsions	1	2	5	8	
106	RECORD WHETHER THE PROVIDER ASKED ABOUT OR THE CLIENT MENTIONED ANY OF THE FOLLOWING FOR CURRENT PREGNANCY:					
01	Vaginal bleeding	1	2		8	
02	Fever	1	2		8	
03	Headache or blurred vision	1	2		8	
04	Swollen face or hands	1	2		8	
05	Tiredness or breathlessness	1	2		8	
06	Whether the client has felt the baby move	1	2		8	
07	Persistent cough for 2 weeks or longer	1	2		8	
08	Client's knowledge of her HIV status	1	2		8	
09	Whether there are any other symptoms or problems the client thinks might be related to this pregnancy	1	2		8	

NO.	QUESTIONS	CODING CLASSIFICATION			GO TO
107	RECORD WHETHER THE PROVIDER PERFORMED THE FOLLOWING PROCEDURES:	YES	NO	DK	
01	Take the client's blood pressure	1	2	8	
02	Weigh the client	1	2	8	
03	Examine conjunctiva/palms for anaemia	1	2	8	
04	Examine legs/feet/hands for oedema	1	2	8	
05	Examine for swollen glands	1	2	8	
06	Palpate the client's abdomen for fetal presentation (or conduct ultrasound)	1	2	8	
07	Palpate the client's abdomen for uterine height (or conduct ultrasound)	1	2	8	
08	Listen to the client's abdomen for fetal heartbeat	1	2	8	
09	Examine the client's breasts	1	2	8	
10	Conduct vaginal examination/exam of perineal area	1	2	8	
11	Perform or refer for anaemia test	1	2	8	
12	Perform or refer for blood grouping	1	2	8	
13	Perform or refer for urine test	1	2	8	
14	Perform or refer the client for a syphilis test	1	2	8	
15	Perform HIV test	1	2	8	
16	Refer for HIV test	1	2	8	
17	Provide counselling related to HIV test	1	2	8	
18	Refer for counselling related to HIV test	1	2	8	
19	Look at the client's health card/booklet (either before beginning the consultation or while collecting information or examining the client)	1	2	8	

NO.	QUESTIONS	CODING CLASSIFICATION			GO TO
108	RECORD WHETHER THE PROVIDER GAVE THE CLIENT ANY OF THE FOLLOWING TREATMENTS OR COUNSELLING:	YES	NO	DK	
01	Prescribed or gave iron pills or folic acid (IFA) or both	1	2 → 05	8 → 05	
02	Explained the purpose of iron or folic acid	1	2	8	
03	Explained how to take iron or folic-acid pills	1	2	8	
04	Explained side effects of iron pills	1	2	8	
05	Prescribed or gave a tetanus toxoid (TT) injection	1	2 → 07	8 → 07	
06	Explained the purpose of the TT injection	1	2	8	
07	Prescribed or gave Mebendazole	1	2 → 09	8 → 09	
08	Explained the purpose of Mebendazole	1	2	8	
09	Prescribed or gave anti-malarial prophylaxis	1	2 → 15	8 → 15	
10	Explained the purpose of the preventive treatment with anti-malaria medications	1	2	8	
11	Explained how to take the anti-malarial medications	1	2	8	
12	Explained possible side effects of malaria pills	1	2	8	
	DIRECT OBSERVATION:				
13	Observed that the 1st dose of IPT is given in the facility	1	2	8	
14	Importance of further doses of IPT explained	1	2	8	
15	Importance of using ITN explained explicitly	1	2	8	
16	Given voucher for ITN/given ITN free of charge	1 → 109	2	8	
17	ITN purchased by the client	1	2	8	
109	RECORD WHETHER THE PROVIDER GAVE THE CLIENT ANY OF THE FOLLOWING ADVICE OR COUNSEL ABOUT PREPARATIONS:	YES	NO	DK	
01	Discussed nutrition (i.e., quantity or quality of food to eat) during pregnancy	1	2	8	
02	Informed the client about the progress of the pregnancy	1	2	8	
	Mentioned the following danger signs as risk factors for which the woman should return to the facility	YES	NO	DK	
03	Vaginal bleeding	1	2	8	
04	Fever	1	2	8	
05	Excessive tiredness or breathlessness	1	2	8	
06	Swollen hands and face	1	2	8	
07	Severe headache or blurred vision	1	2	8	
08	Persistent cough	1	2	8	
09	Loss of, or excessive fetal movement	1	2	8	

NO.	QUESTIONS	CODING CLASSIFICATION			GO TO
110	RECORD WHETHER THE PROVIDER ADVISED OR COUNSELED ABOUT DELIVERY IN ANY OF THE FOLLOWING WAYS:	YES	NO	DK	
01	Asked the client where she will deliver	1	2	8	
02	Advised the client to prepare for delivery (e.g. set aside money, arrange for emergency transportation)	1	2	8	
03	Advised the client to use a skilled health worker during delivery	1	2	8	
04	Discussed with client what items to have on hand at home for emergencies (e.g., sterile blade)	1	2	8	
05	Discussed importance of immunisation for the newborn	1	2	8	
06	Discussed care for the newborn (i.e., warmth, hygiene and early initiation of breastfeeding)	1	2	8	
07	Discussed early initiation and prolonged breastfeeding	1	2	8	
111	RECORD WHETHER THE PROVIDER ADVISED EXCLUSIVELY BREASTFEEDING THE INFANT FOR UP TO 6 MONTHS.	1	2	8	
112	RECORD WHETHER THE PROVIDER DISCUSSED FAMILY PLANNING FOR USE AFTER DELIVERY	1	2	8	
113	RECORD WHETHER THE PROVIDER ASKED WHETHER THE CLIENT HAD ANY QUESTIONS AND ENCOURAGED QUESTIONS.	1	2	8	
114	RECORD WHETHER THE PROVIDER USED ANY VISUAL AIDS FOR HEALTH EDUCATION OR COUNSELLING DURING THE CONSULTATION.	1	2	8	
115	RECORD WHETHER THE PROVIDER WROTE ON THE CLIENT'S HEALTH CARD.	YES . . . . . 1 NO . . . . . 2 NO HEALTH CARD USED. . . . . 3 DON'T KNOW 8			
116	ASK THE PROVIDER HOW MANY WEEKS PREGNANT THE CLIENT IS.	WEEKS OF PREGNANCY . . . . . ☐☐ DON'T KNOW 98			
117	ASK THE PROVIDER WHETHER THIS IS THE CLIENT'S 1ST, 2ND, 3RD, 4TH OR 5TH VISIT FOR ANTENATAL CARE **AT THIS FACILITY FOR** THIS PREGNANCY.	FIRST VISIT. . . . . 1 SECOND VISIT. . . . . 2 THIRD VISIT. . . . . 3 FOURTH VISIT. . . . . 4 FIFTH OR MORE VISIT 5			
118	ASK THE PROVIDER WHETHER THIS IS THE CLIENT'S FIRST PREGNANCY.	FIRST PREGNANCY. . . . . 1 NOT FIRST PREGNANCY. 2			

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
119	RECORD THE OUTCOME OF THE CONSULTATION. [RECORD THE OUTCOME AT THE TIME THE OBSERVATION CONCLUDED]	CLIENT GOES HOME . . . . . 1 CLIENT REFERRED (TO LAB OR OTHER PROVIDER) AT SAME FACILITY. . . . . 2 CLIENT ADMITTED TO SAME FACILITY. . . . . 3 CLIENT REFERRED TO OTHER FACILITY . . . . . 4 DON'T KNOW 8	
120	RECORD THE TIME THE OBSERVATION ENDED.	. . . . . ☐☐ : ☐☐	
	Observer's comments:		

MEASURE *DHS* SERVICE PROVISION ASSESSMENT

Exit Interview for Antenatal Care Client

1. Facility Identification

QTYPE | X | A | N |

Name of the facility: _____

Location of the facility: _____

FACILITY NUMBER . . . . . | | | | | |

AGREES

2. Information About Interview

DATE: _____	DAY		| MONTH		| YEAR	2	0	1	0
Name of the interviewer: _____	INTERVIEWER CODE		
Client code: _____	CLIENT CODE			

3. Information About Visit

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
	READ TO CLIENT: Hello, I am_____. As my colleague mentioned, we are representing the Ministries of Health and NCAPD. We are conducting a study of health services in all health facilities in KENYA. In order to improve the services this facility offers, we would like to ask you some questions about your experience here today. Please know that whether you decide to allow this interview or not is completely voluntary and will not affect services you receive during any future visit. You may refuse to answer any question, and you may stop the interview at any time. Information from this interview may be provided to researchers for analyses, but neither your name nor the date of services will be on any shared information, so your identity will remain completely confidential. Do you have any questions for me? Do I have your permission to continue with the interview? _____ Interviewer's signature (Indicates respondent's willingness to participate)	DAY __ MONTH __ YEAR 2010	
100	May I begin the interview now?	AGREES . . . . . 1 CLIENT REFUSES 2	→ **END**
101	RECORD THE TIME THE INTERVIEW STARTED.	. . . . . __ : __	
102	Do you have an antenatal-care card/book, or an immunisation card with you today? IF YES: ASK TO SEE THE CARD/BOOK.	YES . . . . . 1 NO, CARD KEPT WITH FACILITY . . . . . 2 NO CARD/BOOK USED 3	 → 106 → 106
103	CHECK ANTENATAL-CARE CARD/BOOK, OR IMMUNISATION CARD. INDICATE WHETHER THERE IS ANY NOTE OR RECORD OF THE CLIENT HAVING RECEIVED TETANUS TOXOID.	YES, 1 TIME. . . . . 1 YES, 2 TIMES. . . . . 2 YES, 3 OR MORE TIMES. . . . . 3 NO. . . . . 4 DON'T KNOW. 8	
104	HOW MANY WEEKS PREGNANT IS THE CLIENT, ACCORDING TO THE ANC CARD?	# OF WEEKS. . . . . __ D.K. = 98	
105	DOES THE CARD INDICATE THE CLIENT HAS RECEIVED IPT? (IF NON MALARIOUS AREA, CIRCLE "NOT APPLICABLE")	YES, 1 DOSE ..... 1 YES, 2 DOSES ..... 2 YES, 3DOSES ..... 3 YES, 4 DOSES ..... 4 NO ..... 5 NOT APPLICABLE ..... 6 DON'T KNOW/UNCLEAR 8	
106	How many weeks pregnant do you think you are? IF RESPONSE IS IN MONTHS, CALCULATE WEEKS, USING 4 WEEKS PER MONTH.	WEEKS . . . . . __ D.K. = 98	
107	Is this your first pregnancy?	YES . . . . . 1 NO 2	
108	Is this your first antenatal visit at this facility for this pregnancy? IF THIS IS NOT THE 1ST VISIT, ASK: How many times have you visited this antenatal clinic for this pregnancy?	FIRST VISIT. . . . . 1 SECOND VISIT. . . . . 2 THIRD VISIT. . . . . 3 FOURTH VISIT. . . . . 4 MORE THAN 4 VISITS. 5	

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
109	During this visit, or previous visits, did the provider give you iron pills, folic acid or iron with folic acid, or give you a prescription for them? SHOW THE CLIENT AN IRON PILL, A FOLIC-ACID PILL, OR A COMBINED PILL.	YES, THIS VISIT ONLY 1 YES, THIS/PREVIOUS VISIT 2 YES PREVIOUS VISIT ONLY 3 NO . . . . . 4 DON'T KNOW 8	→ 111 → 114 → 114
110	ASK TO SEE THE CLIENT'S IRON/FOLIC ACID/IRON WITH FOLIC ACID PILLS.	SAW PILLS . . . . . 1 SAW PRESCRIPTION . . . . . 2 NO PILLS OR PRESCRIPTION SEEN 3	
111	During this visit or previous visits, has a provider explained to you how to take the iron pills?	YES, THIS VISIT . . . . . A YES, PREVIOUS VISIT . . . . . B NO . . . . . Y DON'T KNOW . . . . . Z	
112	During this or previous visits, has a provider discussed with you the side effects of the iron pill?	YES, THIS VISIT . . . . . A YES, PREVIOUS VISIT . . . . . B NO . . . . . Y DON'T KNOW . . . . . Z	
113	Please tell me any side effects of the iron pill that you know of.	NAUSEA . . . . . A BLACK STOOLS . . . . . B CONSTIPATION . . . . . C OTHER _____ X (SPECIFY) DON'T KNOW . . . . . Z	
114	During this or previous visits, has a provider given or prescribed any anti-malarial pills for you? SHOW THE CLIENT TABLET OF SP-BASED DRUGS	YES, THIS VISIT . . . . . 1 YES, THIS/PREVIOUS VISIT 2 YES, PREVIOUS VISIT . . . . . 3 NO . . . . . 4 DON'T KNOW 8	→ 116 → 117 → 117
114A	Did you swallow the anti-malaria pills or you still have it with you?	SWALLOWED. . . . . 1 STILL HAVE IT. 2	→ 117
115	ASK TO SEE THE CLIENT'S ANTI-MALARIAL PILLS.	SAW PILLS. . . . . 1 SAW PRESCRIPTION. . . . . 2 NO PILLS OR PRESCRIPTION SEEN. 3	
116	Did a provider explain to you how to take the anti-malarial pills?	YES, THIS VISIT . . . . . A YES, PREVIOUS VISIT . . . . . B NO . . . . . Y DON'T KNOW . . . . . Z	
117	Do you own an ITN, that is a net that has been treated with an insecticide to protect you from mosquito bites?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	
118	During this visit or a previous visit, did a provider offer you an ITN free of charge or offer to sell you one? IF THE CLIENT WILL PICK UP OR BUY THE ITN WITHIN THE FACILITY, THAT COUNTS AS PROVIDER OFFERING THE ITN.	YES, OFFERED FREE NOW 1 YES, OFFERED FREE IN PREVIOUS VISIT 2 YES, OFFERED FOR SALE NOW (THIS VISIT) 3 YES, OFFERED FOR SALE IN PREVIOUS VISIT 4 NO, NOT OFFERED 5	

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
119	During this visit or previous visits, has a provider asked you whether you had ever received a tetanus toxoid (TT) injection?	YES, THIS VISIT . . . . . A YES, PREVIOUS VISIT . . . . . B NO . . . . . Y DON'T KNOW . . . . . Z	
120	Have you ever received a tetanus toxoid (TT) injection, including one you may have received today? IF YES: Including any TT injection you received today, how many times in total during your lifetime have received a tetanus toxoid injection? (INJECTION MAY HAVE BEEN RECEIVED EITHER AT THIS FACILITY OR ELSEWHERE.)	NUMBER OF TETANUS INJECTIONS RECEIVED [ ][ ] NEVER . . . . . 96 DON'T KNOW 98	
121	During this visit or previous visits, has a provider discussed things you should have in preparation for this delivery? This may include planning in case of emergency, things you should bring to a facility, or things you should prepare at home for this delivery.	YES . . . . . 1 NO 2	
122	Please tell me any things you know of that you should have in preparation for your delivery. CIRCLE ALL RESPONSES YOU MAY PROBE WITHOUT USING SPECIFIC ANSWERS GIVEN ON RIGHT (E.G., "ANYTHING ELSE?")	EMERGENCY TRANSPORT . . A MONEY . . . . . B DISINFECTANT . . . . . C STERILE BLADE/SCISSORS TO CUT CORD . . . . . D OTHER _____ X (SPECIFY) DON'T KNOW . . . . . Z	
123	Do you have money set aside for the delivery? IF YES, PROBE	YES, ENOUGH . . . . . 1 YES, BUT NOT ENOUGH . . . . 2 NO 3	
124	During this visit or previous visits, has a provider talked with you about any signs of complications (danger signs) that should warn you of problems with the pregnancy?	YES, THIS VISIT . . . . . A YES, PREVIOUS VISIT . . . . . B NO . . . . . Y DON'T KNOW . . . . . Z	→ 127 → 127
125	Please tell me any signs of complications (danger signs) that you know of. CIRCLE ALL RESPONSES YOU MAY PROBE WITHOUT USING SPECIFIC ANSWERS GIVEN ON RIGHT (E.G., "ANYTHING ELSE?")	ANY VAGINAL BLEEDING . . . A FEVER . . . . . B SWOLLEN FACE OR HAND . . . C TIREDNESS OR BREATHLESSNESS . . . . . D HEADACHE OR BLURRED VISION . . . . . E CONVULSIONS . . . . . F BABY STOPS MOVING OR REDUCED FETAL MOVEMENT . . . . . G OTHER _____ X (SPECIFY) DON'T KNOW . . . . . Z	

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
126	What did the provider advise you to do if you experienced any of the warning signs? CIRCLE LETTER FOR ALL COURSES OF ACTION THE CLIENT MENTIONS. PROBE WITHOUT USING SPECIFIC ANSWERS.	SEEK CARE AT A FACILITY . . A DECREASE ACTIVITY . . . . . B CHANGE DIET . . . . . C OTHER _____ X (SPECIFY)	
127	Do you know any danger signs during/after delivery? IF YES: What danger signs do you know?	BLEEDING . . . . . A FEVER . . . . . B GENITAL INJURIES . . . . . C NO . . . . . Y	
128	During this visit or previous visits, has a provider talked to you about what you should eat during your pregnancy?	YES, THIS VISIT . . . . . A YES, PREVIOUS VISIT . . . . . B NO . . . . . Y DON'T KNOW . . . . . Z	
129	During this visit or previous visits, has a provider given you advice on the importance of exclusively breastfeeding—that is, about giving your baby nothing apart from breast milk?	YES, THIS VISIT . . . . . A YES, PREVIOUS VISIT . . . . . B NO . . . . . Y DON'T KNOW . . . . . Z	 → 131 → 131
130	For how many months did the provider recommend that you exclusively breastfeed, that is, that you do not give your baby liquid or food in addition to your breast milk?	4 TO 6 MONTHS. . . . . 1 6 MONTHS. . . . . 2 OTHER. . . . . 6 DON'T KNOW 8	
131	During this visit or previous visits, did the provider talk to you about where you plan to deliver your baby?	YES, THIS VISIT . . . . . A YES, PREVIOUS VISIT . . . . B NO . . . . . Y DON'T KNOW . . . . . Z	
132	Have you decided where you will go for the delivery of your baby? IF YES: PROBE FOR WHETHER THE PLAN IS TO DELIVER IN A FACILITY OR AT HOME.	AT THIS HEALTH FACILITY . . . 1 AT OTHER HEALTH FACILITY 2 AT HOME . . . . . 3 AT TBA's HOME 4 OTHER _____ 6 (SPECIFY) DON'T KNOW 8	
133	During this or previous visits, did a provider talk with you about using family planning after the birth of your baby?	YES, THIS VISIT . . . . . A YES, PREVIOUS VISIT . . . . B NO . . . . . Y DON'T KNOW . . . . . Z	

4. Information About Client's Satisfaction

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
	Now I am going to ask you some questions about the services you received today. I would like to have your honest opinion about the things that we will talk about. This information will help improve ANC services.		
201	How long did you wait between the time you arrived at this facility and the time you were able to see a provider for the consultation?	MINUTES . . . . . [ ][ ][ ] SAW PROVIDER IMMEDIATELY . . . . . 000 DON'T KNOW 998	
202	Now I am going to ask about some common problems clients have at health facilities. As I mention each one, please tell me whether any of these were problems for you today, and if so, whether they were **major** or **minor** problems for you.		

			MAJOR	MINOR	NO PROBLEM	DK
01	Time you waited	WAITING TIME	1	2	3	8
02	Ability to discuss problems or concerns about your pregnancy with the provider	DISCUSS PROBLEMS	1	2	3	8
03	Amount of explanation you received about the problem or treatment	EXPLAIN PROB. OR TREATMENT	1	2	3	8
04	Quality of the examination and treatment provided	QUALITY	1	2	3	8
05	Privacy from having others see the examination	VISUAL PRIVACY	1	2	3	8
06	Privacy from having others hear your consultation discussion	AUDITORY PRIVACY	1	2	3	8
07	Availability of medicines at this facility	MEDICINES	1	2	3	8
08	The hours of service at this facility	HOURS OF SERVICE	1	2	3	8
09	The number of days services are available to you	DAYS OF SERVICE	1	2	3	8
10	The cleanliness of the facility	CLEAN	1	2	3	8
11	How the staff treated you	HOW TREATED	1	2	3	8
12	Cost for services or treatments	COST	1	2	3	8
13	Any problem you had today that I did not mention	_____ (SPECIFY)	1	2	3	8

203	Are you a part of any prepayment plan (such as medical aid, insurance or a similar program) or institutional arrangement that pays for some or all of the services you receive at this facility?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	
204	Were you charged, or did you pay anything for any services provided today?	YES . . . . . 1 NO 2	→ 206

205	What is the total amount you paid for all services or treatments you received at this facility today?	TOTAL AMOUNT ☐☐☐☐☐☐ DON'T KNOW 999998	→ 206
205A	Please tell me how much you paid for each of the following services you received today: RECORD AMOUNT AS "OTHER" IF RESPONDENT DOES NOT KNOW WHAT THE MONEY WAS PAID FOR. MUST ADD UP TO AMOUNT IN Q205	1) LAB ☐☐☐☐☐☐ 2) MEDICINE ☐☐☐☐☐☐ 3) CONSULT ☐☐☐☐☐☐ 4) OTHER ☐☐☐☐☐☐	
206	Is this the closest health facility to your home?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	→ 208 → 208
207	What was the main reason you did not go to the nearest facility? IF CLIENT MENTIONS SEVERAL REASONS, PROBE FOR THE MOST IMPORTANT, OR MAIN REASON.	INCONVENIENT OPERATING HOURS . . . . . 01 BAD REPUTATION . . . . . 02 DON'T LIKE PERSONNEL . . .03 NO MEDICINE . . . . . .04 PREFERS TO REMAIN ANONYMOUS . . . . . 05 IT IS MORE EXPENSIVE . . . . 06 WAS REFERRED . . . . . .07 OTHER _____ 96 (SPECIFY) DON'T KNOW 98	
208	Have you ever visited this facility before (either as a patient or visiting or accompanying a patient)?	YES . . . . . 1 NO 2	
209	In general, which of the following statements describes best your opinion of the services given today at this facility: (READ ALL STATEMENTS; CHECK ONLY ONE) 01) I am **very satisfied** with the services given 02) I am **more or less satisfied** with the services given 03) I am not satisfied with the services given	VERY SATISFIED. . . . . 01 MORE OR LESS SATISFIED 02 NOT SATISFIED. 03	
210	Will you recommend this health facility to a friend or family member? (CHECK ONLY ONE)	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	

5. Personal Characteristics of Client

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
	Now I am going to ask you some questions about yourself. I would like to have your honest responses as this information will help us to improve services.		
301	How old were you at your last birthday?	AGE IN YEARS . . . . . ☐☐ DON'T KNOW. 98	
302	Have you ever attended school?	YES . . . . . 1 NO 2	→ 305
303	What is the highest level of school you attended?	PRIMARY. . . . . 1 POST-PRIMARY/VOCATIONAL. 2 SECONDARY/A-LEVEL. . . . . 3 COLLEGE (MIDDLE LEVEL). . . 4 UNIVERSITY. 5	
304	What is the highest (standard, form, year) you completed at that level?	GRADE ☐☐	SECONDARY AND ABOVE → 306
305	Do you know how to read or how to write?	YES, READ AND WRITE . . 1 YES, READ ONLY . . . . . 2 NO 3	
	Thank you very much for taking the time to answer my questions. Once again, any information you have given will be kept completely confidential. Have a good day!		
306	RECORD THE TIME THE INTERVIEW ENDED	☐☐ : ☐☐	
307	**Interviewer's comments:**		

HEALTH WORKER INTERVIEW

Facility Number:	[ ][ ][ ][ ][ ]	QRE **25**
Interviewer Code:	[ ][ ]	
Provider SERIAL Number:	[ ][ ]	**[FROM STAFF LISTING FORM]**
Provider Sex: (1=MALE; 2=FEMALE)	[ ]	
Provider Status: (1=Assigned; 2=Seconded)	[ ]	

Number of ANC Observations Associated with Provider	[ ]
Number of FP Observations Associated with Provider	[ ]
Number of Sick Child Observations Associated with Provider	[ ]
Number of STI Observations Associated with Provider	[ ]
Number of Delivery Observations Associated with Provider	[ ]

INDICATE IF PROVIDER WAS PREVIOUSLY INTERVIEWED IN ANOTHER FACILITY. IF YES, RECORD NAME AND FACILITY NUMBER WHERE HE/SHE WAS INTERVIEWED	YES, PREVIOUSLY INTERVIEWED . . . . ________________ NAME & NUMBER OF FACILITY [ ][ ][ ][ ][ ] NO, NOT PREVIOUSLY INTERVIEWED	**1** **2**	 → **STOP**

READ THE FOLLOWING CONSENT FORM

Good day! My name is ________. We are here on behalf of the Ministries of Health and NCAPD conducting a study to assist the government in knowing more about health services in KE`
Now I will read a statement explaining the study.

Your facility was selected to participate in this study. We will be asking you several questions about the types of services that you personally provide, as well as questions about training you have received.

The information you provide us may be used by the MOH, other organizations or researchers, for planning service improvements or further studies of services.

Neither your name nor that of any other health worker respondents participating in this study will be included in the dataset or in any report; however, there is a small chance that any of these respondents may be identified later. Still, we are asking for your help to ensure that the information we collect is accurate.

You may refuse to answer any question or choose to stop the interview at any time. However, we hope you will collaborate with the survey. Do you have any questions about the study? Do I have your agreement to proceed?

________________________ Interviewer's signature

DAY		MONTH		YEAR			
				2	0	1	0

SIGNATURE OF INTERVIEWER INDICATES INFORMED CONSENT WAS PROVIDED.

101	May I begin the interview now?	YES . . . . 1 NO 2	 →STOP
101A	Are there additional Health Worker Questionnaires?	MATERNAL HEALTH CARE KNOWLEDGE A NEONATAL HEALTH CARE KNOWLEDGE B NO ADDITIONAL QUESTIONNAIRES FOR HW Y	

1. Education and Experience

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
102	I would like to ask you some questions about your educational background. How many years of education have you completed in total? This is starting from your primary, secondary and further education.	YEARS	
103	What is your current professional/technical/medical qualification?	SPECIALIST (ANY CODE 01-08). . . . . 01 MEDICAL OFFICER (NON-SPECIALIST). . . . . 09 CLINICAL OFFICER. . . . . 10 BACHELLOR SCIENCE NURSE . . . . . 11 REGISTERED NURSE. . . . . 12 REGISTERED MIDWIFE. . . . . 13 ENROLLED NURSE. . . . . 14 ENROLLED MIDWIFE. . . . . 15 NURSE AIDE. . . . . 16 LABORATORY SCIENTIST. . . . . 20 LABORATORY TECHNOLOGIST. . . . . 21 LABORATORY TECHNICIAN/ASSISTANT. . . . . 22 NUTRITIONIST/NUTRITION TECHNICIAN. . . . . 23 HEALTH EDUCATION OFFICER. . . . . 24 SOCIAL WORKER. . . . . 25 HIV COUNSELOR/LAY COUNSELOR. . . . . 26 NO TECHNICAL QUALIFICATION . . . . . 30 OTHER (SPECIFY) _____ 96	
104	What year did you graduate (or complete) with this qualification? IF NO TECHNICAL QUALIFICATION (30), ASK: What year did you complete any basic training for your current position?	YEAR	
105	In what year did you start working in this facility?	YEAR	
106	In what year did you start working in your ***current position*** in this facility? IF YEAR IS NOT KNOWN, PROBE AND MAKE THE BEST ESTIMATE	YEAR	
107	What was your age at your last birthday?	AGE AT LAST BIRTHDAY (YRS) .	

2. GENERAL TRAINING AND SERVICES PROVIDED IN CURRENT POSITION IN THIS FACILITY

	First I want to ask you about some general training courses. During the past 3 years, have you received any pre-service or in-service training on: [READ TOPIC]. IF YES, ASK: Was that training within the past 1 year? IF NOT WITHIN THE PAST 1 YEAR, ASK: Was that training within the past 3 years?	YES, IN PAST 1 YEAR	YES, IN PAST 2-3 YEARS	NO TRAINING WITHIN PAST 3 YEARS
01	Infection Control, including Universal Precautions and waste management?	1	2	3
02	Any specific training related to injection safety?	1	2	3
03	Health Management Information Systems (HMIS) or reporting requirements for any service?	1	2	3
04	Confidentiality and rights to non-discrimination practices for People Living with HIV/AIDS (PLWHA)?	1	2	3

5. Maternal Health

501	During the past three years have you received any pre-service or in-service training on subjects related to maternal or newborn health and HIV/AIDS?	YES . . . . . 1 NO 2	→ 503

		YES, IN PAST 1 YR	YES, IN PAST 2-3 YRS	NO TRAINING WITHIN PAST 3 YRS
502	Did you receive the training in any topic related to [READ TOPIC]… IF YES, ASK: When was the most recent training?			
01	Prevention of mother-to-child transmission (PMTCT) of HIV/AIDS?	1	2	3
02	Nutrition counselling for newborn of mother with HIV/AIDS?	1	2	3
03	Modified obstetric practices as relates to HIV?	1	2	3

503	In your **current** position, and as a part of your work for this facility, do you personally provide any **antenatal** or **postnatal care** services? IF YES, INDICATE WHICH SERVICE IS PROVIDED.	YES, ANTENATAL . . . . . 1 YES, POSTNATAL . . . . . 2 YES, BOTH . . . . . 3 NO, NEITHER 4	→ 505
504	How many years in total have you provided such services? (service may have been in another facility). IF LESS THAN 1 YEAR, WRITE "00" IN THE BOXES	YEARS	
505	Do you ***personally*** provide any **PMTCT** services? IF YES, ASK: Which specific services do you provide? INDICATE WHICH OF THE LISTED SERVICES ARE PROVIDED AND PROBE: Anything else?	PREVENTIVE COUNSELING . . A HIV TEST COUNSELING . . B CONDUCT HIV TEST . . . . . C PROVIDE ARV TO MOTHER . . . D PROVIDE ARV TO INFANT . E NO PMTCT SERVICES . . . . . Y	
506	During the past 3 years have you received any pre- or in-service training on subjects related to antenatal or postnatal care?	YES . . . . . 1 NO 2	→ 508

		YES, IN PAST 1 YR	YES, IN PAST 2-3 YRS	NO TRAINING WITHIN PAST 3 YRS
507	Did you receive the training in any topic related to [READ TOPIC]… IF YES, ASK: When was the most recent training?			
01	ANC screening (e.g., blood pressure, urine glucose and protein)?	1	2	3
02	Counselling for ANC (e.g., nutrition, FP and newborn care)?	1	2	3
03	Complications of pregnancy and their management?	1	2	3
04	Any topic related to pregnancy and HIV/AIDS or PMTCT?	1	2	3 '09
05	Antiretroviral prophylactic treatment for prevention of mother to child transmission (PMTCT) of HIV?	1	2	3
06	Nutritional counselling for the newborn of mothers with HIV/AIDS?	1	2	3
07	Record keeping for PMTCT?	1	2	3
08	Nutrition counselling for the pregnant woman with HIV/AIDS?	1	2	3
09	Nutritional assessment of the pregnant woman, such as Body Mass Index calculation and Mid-Upper Arm circumference measurement?	1	2	3

508	In your **current** position, and as a part of your work for this facility, do you personally provide **delivery services**? By that I mean conducting the actual delivery of newborns?	YES . . . . . 1 NO 2	→ 512
509	How many years in total have you provided such services? (Service may have been in another facility)? IF LESS THAN 1 YEAR, WRITE 00 IN THE BOXED CELLS	YEARS	
510	During the past 6 months, approximately how many deliveries have you conducted as the ***main provider*** (include deliveries conducted for private practice and for facility)?	TOTAL DELIVERIES	

Appendix 2. Chi-square analysis of structural quality of ANC and facility type

	Facility type				
	Clinic/ Dispensary	Health Centre/ Maternity	Hospital	Total	χ^2 & *p*-value
Review maternal/newborn deaths/near-misses					
No	408	181	29	618	χ^2=282.3
Yes	48	170	75	293	$p < 0.001$
Emergency transport available					
No	456	267	30	753	χ^2=405.8
Yes	0	84	74	158	$p < 0.001$
Total	456	351	104	911	

Appendix 3. Policy Brief

Can quality of antenatal care affect women to return to their antenatal care facility for delivery? A national study in Kenya.

Executive Summary

The majority of maternal deaths can be prevented if all women deliver at a facility, receiving skilled care from a healthcare provider. However, women in in Kenya refrain from using healthcare facilities for delivery due to poor perception of the facilities and anticipation of bad treatment from the staff. This study sought to uncover if the quality of antenatal care (care received at healthcare facilities throughout pregnancy) can affect women's decision to return to their antenatal care facility for delivery.

Introduction

Every day, approximately 830 women die, worldwide, due to pregnancy-related causes. Maternal mortality is one of the leading causes of death in Kenya, with a maternal mortality rate (MMR) of 510 per 100,000 live births, which is two times higher than the world average and 31 times higher than that of developed countries. The majority of maternal deaths could be prevented if all women gave birth at a healthcare facility with a skilled birth attendant. In Kenya, only 61% of women deliver at a healthcare facility, even after the removal of user fees for delivery services. This phenomenon is thought to be due, in part, by women's perceived quality of healthcare facilities and staff. Women in Kenya have reported that they refrained from delivering at a facility due to poor treatment of healthcare providers, which they anticipated from previous direct or indirect experience of giving birth at a healthcare facility. Research supports that women are sometimes ignored, abandoned and abused, both physically and mentally, while giving birth at a healthcare facility in Kenya.

However, almost all (93%) women in Kenya visit healthcare facilities at least two to three times during pregnancy to receive antenatal (prenatal) care. Since antenatal care usage is high in Kenya, it might be possible to improve women's perception toward the healthcare facility and the staff through positive experiences during antenatal care. The hypothesis of this study was that women in Kenya were more likely to return to their antenatal care facility for delivery if they received better quality of antenatal care, provided that the facility offers delivery services.

Approach and Results

This study used Kenya's 2010 Service Provision Assessment survey, which is a national survey of healthcare facilities across Kenya. Women were asked about their intention for delivering at the same antenatal care facility was asked after they completed their antenatal care consultations. The quality of antenatal care provided to individual woman was measured and reported by a third person. Some examples of quality of antenatal care assessed in this study were having all essential physical resources, provision of routine antenatal care services, and women's overall satisfaction of the antenatal care services. Factors other than quality of antenatal care were also studied to determine their effects on women's intention for delivering at their antenatal care facility. These factors were classified as facility characteristics, provider characteristics, and maternal characteristics.

Contrary to the hypothesis, the quality of antenatal care was not found to be associated with women's intention to deliver at their antenatal care facility. However, other variables were found to have an association with women's intention to return to their antenatal care facility for delivery. For facility characteristics, facility type (hospital versus small clinics) and whether the facility was the nearest facility were associated with an intention to return for delivery. For maternal characteristics, the number of antenatal care visits to the same facility and being in the third trimester were associated with women's intention to deliver at their antenatal care facility.

Conclusion

Quality of antenatal care did not affect women's intentions to return to the same facility for delivery. Other studies have assessed the effect of quality of antenatal care on women's use of facilities for delivery in sub-Saharan Africa. The result of this study was in agreement with two studies conducted in sub-Saharan Africa (Nigeria and Burkina Faso) and in disagreement with a multi-country study conducted in Africa. Reviewing these three studies and the results of this current study, a pattern was observed. When quality of antenatal care was assessed by a third person, it was not associated with women's use of facilities for delivery, but when quality of antenatal care was assessed by mothers, it was associated with facility-based delivery. This could imply that there is some discordance between third person observation of quality and mothers' assessment of quality of antenatal care.

While quality of antenatal care was not associated with women's intention to deliver at the same facility, women's intentions were mainly driven by facility type and distance. Previous studies in sub-Saharan Africa have reported the effect of distance on women's use of facilities for delivery. Women's preference was for a specific facility type, hospitals, not necessarily because these facilities had provided good quality of antenatal care. This could imply that women may be choosing hospitals over other facilities due to poor perception of lower level facilities such as clinics, or concerns about the ability of transferring to hospitals in the event they need emergency care during delivery. Maternal factors were also associated with women's intention to return to their ANC facility for delivery and they were in agreement with the literature.

Policy Implications

This study found that there is some discordance in the assessment of quality of antenatal care depending on the person assessing quality. This could mean that the assessment tools used by a third person observer is lacking some aspects of quality that patients find

critical. Therefore, governments and health related NGO's should develop quality assessment tools that can capture the mother's perspectives as well.

Moving forward, we should work towards changing women's perception towards facilities other than hospitals so that women may use facilities that are easily accessible. In addition, it is critical to establish a good referral system so that women can be assured that in emergency situations, they can be confident that they will be able to receive hospital care even if they were initially admitted to a small clinic. Also, the cost for emergency referrals should be removed so that women can use clinics without worrying about the extra cost that can arise due to emergency referrals.

Curriculum Vitae

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