

**CHOICE OF PLACE OF BIRTH IN THE ERA OF THE MATERNITY  
SUBSIDY IN KENYA**

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## **DECLARATION**

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### **Declaration by Supervisor**

This research paper has been submitted to the University of Nairobi for examination with my approval as the University supervisor

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## **DEDICATION**

This study is dedicated to women of child-bearing age living in marginalized and desolate communities who experience limited reproductive health choices and experience agony when fulfilling their wishes because of existing in a part of the world they did not choose.

## **ACKNOWLEDGEMENTS**

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## **ABSTRACT**

Adverse maternal and neonatal outcomes disproportionately afflict low and middle-income countries, which experience high-unmet need for safe and skilled attendance at birth. This study sought to investigate how choices for place of birth are made in Kenya during the era of the national maternal subsidy. The study employed data from the Kenya Demographic Health Survey 2014 and involved data from women who experienced a birth around the era of the maternity subsidy. When probit regression models were estimated, maternal age, the woman's and partner's education, paid employment, higher household economic status, reduced parity, low county poverty headcount rate, access to medical insurance, access to complementary reproductive services and the period during the maternity subsidy were associated with increased likelihood to choose deliveries in public and private health facilities. These findings imply that investments, which prevent early pregnancies, reduce domestic and national poverty, increase education attainment, expand autonomy of women and promote access of the continuum of reproductive health services can optimize choice making in favor of institutional births during the era of the maternity subsidy.

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## **LIST OF ABBREVIATIONS**

WHO	World Health Organization
MDG	Millennium Development Goals
SDG	Sustainable Development Goals
OOPS	Out of pocket payments
KNBS	Kenya National Bureau of Statistics
MMR	Maternal Mortality Ratio
NMR	Neonatal Mortality Rate
HSSF	Health Sector Services Fund
KEPH	Kenya Essential Package For Health
KDHS	Kenya Demographic Health Survey
FMS	Free Maternity Services
DHS	Demographic Health Survey
TBA <sub>s</sub>	Traditional Birth Attendants
ANC	Antenatal Clinic
CBHI	Community Based Health Insurance
FP	Family Planning
KIHBS	Kenya Integrated Household Budget Survey
2SRI	Two-stage Residual Inclusion
SSA	Sub-Saharan Africa

## CHAPTER ONE: BACKGROUND INFORMATION

### 1.1 Status of global maternal and neonatal indicators

Across the globe, adverse maternal, perinatal and neonatal outcomes are common and heterogeneous patterns have been documented across nations and between continents (World Bank, 2015; World Health Organisation (WHO), 2006a). Perinatal deaths constitute stillbirths (fetal deaths from 24 weeks up to term) and early neonatal deaths (deaths within the first seven days after birth). On the other hand, neonatal deaths are deaths of the infant within the first 28 days after birth.

Ideally, pregnancy and childbirth are normal physiologic processes and complications or death to the mother, fetus or the neonate are highly regrettable. Unfortunately, over a quarter a million maternal deaths continue to haunt the globe every year, most of them occurring in developing countries, and over 800 women die every day while pregnant or during childbirth (Alkema, *et al.* 2018). Further, approximately 3 million pregnancies results to stillbirths and another 3 million live births end at death in the early days of life (Lawn, Cousens and Zupan, 2005; WHO, 2006).

Conversations towards improving maternal health have concentrated boardrooms in the global health arena. In tandem, health systems across the globe in the last two centuries have struggled to improve maternal and perinatal outcomes to avert any unwarranted maternal deaths (Bhutta and Black, 2013). This pressure culminated in the inclusion of two specific goals towards the improvement of maternal and reproductive health (Goal 4 and 5) in the Millennium Development Goals (MDGs) with ambitious targets to reduce maternal deaths by 75% by 2015 (United Nations, 2015a). In addition, six out of the eight MDGs addressed sectors with a direct influence on optimal maternal health. As if this was not enough, three maternal and early life targets were recently included within goal three, on health and wellbeing, in the Sustainable Development Goals (SDGs) launched in 2015 (United Nations, 2015b).

Most maternal and perinatal deaths are avoidable through a multiplicity of health system and social interventions (Bhutta and Black, 2013). Efforts such as improving gender equality and women empowerment, improving maternal education, increasing skilled attendance during birth, health

system strengthening to improve capacity in addressing health emergencies and community based interventions have proven helpful to reduce these deaths (Campbell, Graham and group, 2006). In addition, health system interventions such as preventing unwanted pregnancies, improving antenatal care attendance, strengthening the quality of maternal and early life care through improving universal access, improving staffing ratios and strengthening the referral pathways are effective (WHO, 2011).

In 2006, the WHO recommended investment in skilled attendance at birth as a means of addressing high maternal mortality and improving perinatal outcomes introducing an economic angle to improving maternal health. For instance, reducing poverty and reliance of out of pocket payments (OOPs) to purchase healthcare, addressing health and gender inequalities, improving maternal education and increasing total health expenditure as a proportion of gross domestic product (GDP) have emerged as economic indicators of maternal health (Filippi, *et al.* 2006).

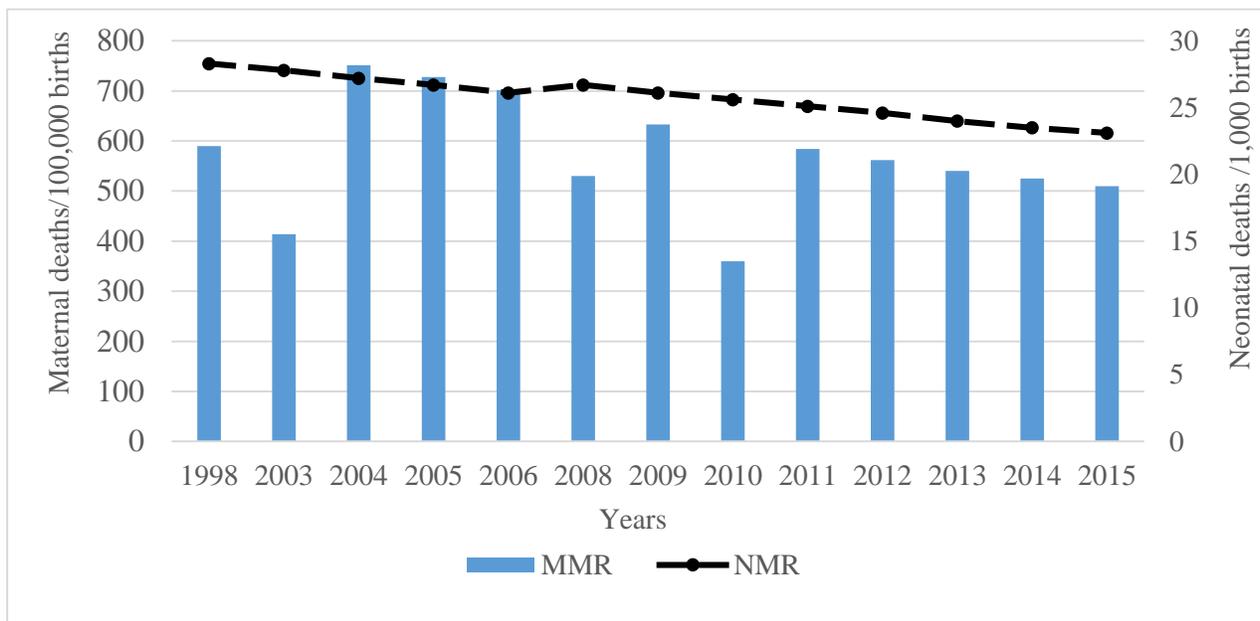
According to a recent consensus report by the United States National Academies of Sciences and Medicine (2017), strategic investments through increased allocation of resources for healthcare, improved efficiency of the health system, and improved overall welfare of women should be executed otherwise attaining the 2030 maternal and child SDGs' indicators will remain a mirage. Towards the end of the MDG era, financial risk protection, social welfare programs and deliberate investments to improve maternal wellbeing indicators have shown promise and resulted to a 43.9% overall reduction in maternal death (Alkema, *et al.* 2016).

## **1.2 Status of maternal and neonatal health in Kenya**

Kenya is a lower-middle income in sub-Saharan Africa and was estimated to have a population of 46.6 million people by end of 2017 (Kenya National Bureau of Statistics (KNBS), 2018a). Kenya has travelled a tumultuous path with its health indicators and its last two decades were characterized by fluctuating trends in maternal mortality ratio (MMR). Kenya experienced the highest MMRs in 2004, 2005 and 2006. However, reduction in MMR have consistently been witnessed since 2011 to an all-time low of 510/100 000 in 2015, an indication of successful implementation of multiple interventions. Kenya has also witnessed sustained reduction in

neonatal mortality rates (NMR) since the late 1990s except for a slight increase in 2008. The trends in MMR and NMR in Kenya are summarized graphically on Figure 1.

**Figure 1: Trends in maternal mortality ratios and neonatal mortality rates in Kenya**

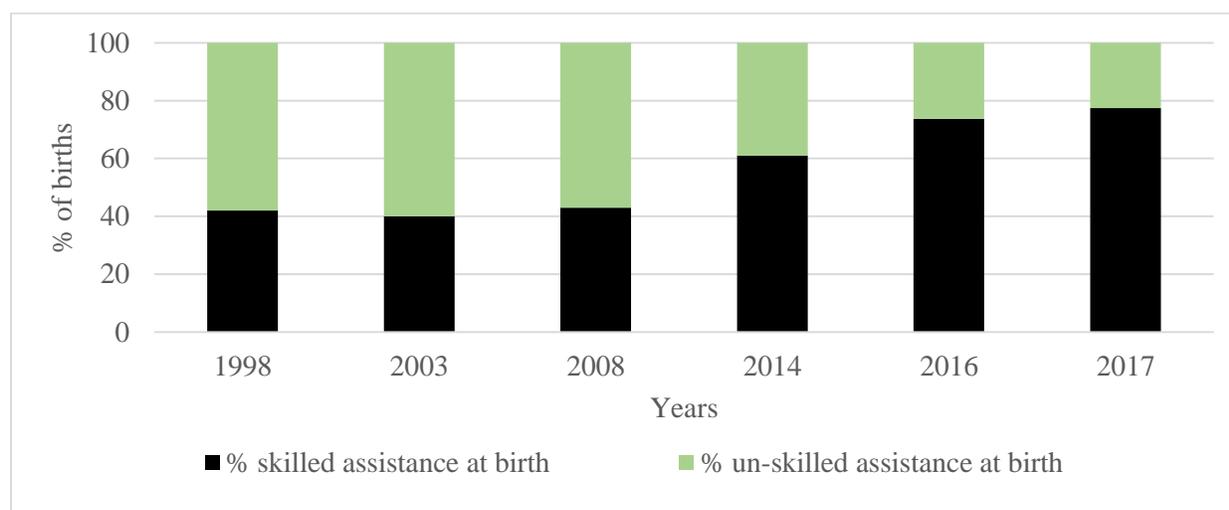


**Source:** KNBS. (2018b). *Women and Men Booklet Kenya fact and figures 2017*

Although data on perinatal mortality rate is scanty and is only available for the 2008/9 and 2014 demographic health surveys, surveys reported a remarkable decline from 37 deaths per 1000 births in 2008/9 survey to 29 deaths per 1000 births in 2014.

Kenya has continued to report significant improvements in skilled attendance at birth and delivery in health facilities over the last two decades; two crucial outputs that determine the quality of maternal health. Conversely, the reported improvements were far away below what had been anticipated prompting the immediate post-devolution government to implement a maternity subsidy (free maternity services) starting from June 2013. The purpose of this maternity subsidy was to facilitate access to skilled attendance at birth through removal of delivery-related costs and thus reducing supply-side barriers to access. A consistent increase in skilled attendance at birth has been reported since the launch of the maternity subsidy program on 1<sup>st</sup> June 2013, gains which were rather a deviation from the trends that had been witnessed in the two decades prior to the maternal subsidy as summarized on Figure 2.

**Figure 2: Proportion of women receiving skilled vs non-skilled attendance at birth in Kenya**



*Source: Economic Survey 2018: KNBS, 2018. pp340.*

The maternal subsidy followed similar and previous policy attempts by the government to use subsidies in the health sector to improve public health indicators in Kenya as outlined on Table 3.

**Table 1: Health sector subsidies implemented in Kenya in the post-independence era**

Period	Nature of subsidy
<b>1965-1989</b>	Exclusive government funding of health services in all public facilities
<b>1990-1991</b>	Suspension of user-fees in all public health facilities
<b>1991</b>	Exemption of fees for services targeting children under 5 years in public facilities
<b>2002</b>	User-fees reduction to a bare minimum to cater for registration in Tier 2 and 3 facilities (The 10/20 policy)
<b>2005</b>	The introduction of the Health Sector Services Fund (HSSF) to cushion Tier 2 and 3 facilities from revenue loses following the 10/20 policy
<b>2013</b>	<ol style="list-style-type: none"> <li>1. User-fee removal for all health services received from Tier 2 and 3 health facilities in the Kenya essential package of health (KEPH)</li> <li>2. Free maternity services covering delivery and postnatal care in public health, selected non-profit and faith-based health facilities</li> </ol>

*Source: Health financing reform in Kenya: Assessing the social health insurance proposal (WHO, 2006b)*

Since its inception, the maternity subsidy has resulted to an overall improvement in skilled attendance and delivery in health facilities as displayed on Figure 2. Despite this remarkable impact, on average more than a quarter of pregnant women continued to deliver at home and regional disparities have continued (Asule, Kwena and Wambui, 2017). This implies that factors, other than delivery-related costs, influence the choice where pregnant women and their families

elect as their preferred place to have their deliveries. This study sought to describe how sociodemographic, economic and reproductive factors influenced the choices women made about where to deliver in a 30 months period around when the maternity subsidy was in place.

### **1.3 Statement of the problem**

Towards the run to the March, 4<sup>th</sup> 2013 general elections, Kenya was just recovering from the shock of the results of the 2008 KDHS which showed a rise in MMR to 488 deaths per 100 000 births compared to the previous 414 per 100000 births in the 2003 survey. This indicator was three times worse than the anticipated millennium development goal (MDG) target of 147/100000 and had sparked outrage from policy makers.

Skilled attendance at delivery is a postulated gold standard solution to addressing maternal and early child deaths by the WHO, but despite numerous attempts in improving health infrastructure and human resources for health, Kenya's level of skilled delivery was at a paltry 44%. To respond to the growing concern in global health forums about the existing trends, the newly elected post-devolution government announced the launch of the maternity subsidy, dubbed the free maternity services (FMS). The goal of this subsidy was to provide direct re-imburement of service providers in public and selected private facilities for any skilled deliveries conducted. The rationale of this program was to remove service-related costs, through fee exemption, which would encourage poor women to access skilled attendance at birth.

This subsidy consisted a budgetary allocation equivalent to Kshs. 3.7 billion channeled to county government-run health facilities, faith-based and national referral hospitals. A 22% and 17% point rise in skilled birth attendance for normal and caesarian deliveries respectively was anticipated in the immediate period after its launch. It was anecdotally reported that ripples of its early adoption were witnessed across the country with some sites reporting congestion and increased delivery related workload. Although implementation barriers were to be later documented in grey and peer reviewed literature, the maternity subsidy received accolades as being widely successful by policy makers (Pyone, Smith and van den Broek, 2017; Ministry of Health, 2015). The expectation of this subsidy was to deliver the magic bullet on the skilled attendance dilemma but this did not happen. It was plagued by multiple implementation barriers and other problems related to access

and utilization of health services which prevented optimal attainment of its goal (Wamalwa, 2015; Asule, Kwena and Wambui, 2017).

Many women continued to deliver at home despite the fee-for-service exemption, because other access barriers were not addressed. How women and their families make decisions about where to deliver seems to be informed by other factors other than the anticipated cost of the delivery services. This study intends to investigate factors, other than service-delivery costs, as additional determinants of choice of place of birth. Although studies such as those conducted by Asule, Kwena and Wambui (2017); Ministry of Health (2015), have been carried out to determine the impact of the maternity subsidy on trends in skilled attendance at delivery during the last 5 years, these were based on small samples and involved hospital-based populations. This study sought to explore trends in decision making in the era of the subsidy using nation-wide data from the KDHS 2014, which was collected using a robust sampling criteria. Furthermore, this study sought to compare between decision making of place of birth during and prior to the subsidy. Further, this study sought to analyze the determinants of choice between a private and a public facility among women who opted for a facility delivery.

#### **1.4 Research question**

The broad research question of this study was: What influences the choice of place of birth in the era of the maternity subsidy in Kenya?

#### **Specific research questions**

- a. What factors determine the choice between a home and institutional delivery during the era of the maternal subsidy in Kenya?
- b. What factors determine the choice between a delivery in a private and public health facility during the era of the maternal subsidy in Kenya?

#### **1.5 Objectives**

The broad objective of this study was to investigate how choices for place of birth are made during the era of the maternal subsidy in Kenya

## **Specific objectives**

The specific objectives of this proposal were:-

- a) To analyze how choice between home and institutional delivery are determined during the era of the maternal subsidy in Kenya.
- b) To estimate how choice between private and public institutional delivery are determined during the era of the maternity subsidy in Kenya

## **1.6 Justification**

The criteria that woman and their acquaintances follow when choosing where to deliver their babies is very vital. Understanding the criteria not only provides useful information but can influence how interventions can be positioned to modify the decision making process. Given the scarcity of resources available for health services across the globe, it is needful to allocate resources affirmatively where they will generate optimal impact. As social protection programs continue to occupy a vital place in health economics, it is vital that complementary interventions are positioned correctly to increase their impact. With more countries continuing to implement subsidized maternal services to improve access and remove financial barriers, it is critical that they infuse an understanding about how users make their preferences around health interventions beyond the cost of receiving the intervention. It is understood that user preferences are influenced by many factors, including personal, community, social and economic factors and a socio-ecological model has been postulated to describe choice making among users of reproductive health services (Montagu *et al.*, 2011; Combiere *et al.*, 2004).

Understanding user preferences can influence policy makers to derive interventions, which not only respond to unique user needs but also help to predict the potential utilization of developed public health interventions. This study identifies that understanding how families and pregnant women make decisions on where to deliver their babies is vital as the government continues to allocate additional resources towards the implementation of an expanded version of the maternity subsidy. This study was designed to suggest potential determinants that will provide guidance towards the attainment of the goals of the maternity subsidy. Results of this study were to be helpful in providing policy makers with a deeper understanding of what else might need to be addressed to optimize the maternity subsidy in closing on the gap in non-skilled attendance at birth.

## **1.7 Overview of the proposal**

In Chapter 1, we present background information and describes the problem and justification of analyzing choice of place of delivery in the era of the maternal subsidy project in Kenya. In Chapter 2, we describe global trends in adverse maternal and early child indicators and existing literature showing what influences choice in the context of an existing subsidy while highlighting the gaps this study seeks to address. In Chapter 3, we summarize the design, sampling and data collection procedures, the variables of interest and our approach to descriptive and inferential analysis. In Chapter 4, we present the findings of the study, starting with descriptive findings and focusing on findings from econometric analysis. In Chapter 5, we describe our findings comparing them with what is published in literature. Finally, in Chapter 6, we present our conclusion, recommendations and limitations of our findings.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.0 Introduction**

This chapter presents the theoretical perspectives through which decision making in healthcare and in maternal health are based. This study reviews empirical literature regarding circumstances of decision making for choice of place of birth and describes how subsidies have been implemented to improve choice making as a means to improving utilization of health services. This study reviews the impact of such subsidies across the globe. At the end of this section, a nuanced summary of what has emerged from existing literature is presented while highlighting specific gaps in literature which this study sought to address.

### **2.1 Theoretical literature**

The theoretical basis for decision making by consumers of goods and services was best described during the last two centuries. Among widely quoted theories is the Random Utility Theory (RUT) which was advanced in the early 1900s by Thurstone (1927) and which was later expanded by McFadden (1978) in the 19<sup>th</sup> century. The RUT has formed the basis of most of decision-making models in the 20<sup>th</sup> century. According to random utility models, individuals make preferences for good and services based on their independent assessment of the attributes of all the available alternatives. Decision-making based on the random utility models assumes that individuals are rational and individuals make decisions to maximize benefits from the available choices. Decision-making is a process, rather than a single event, and is influenced by the availability of information and depends on the tastes and preferences of the individual.

Towards the end of the 19<sup>th</sup> century, the Grossman model (1972) would revolutionize arguments in health economics. It was Grossman's Model, which first framed health as a capital stock that naturally depreciates with increasing age. This model postulates health as an investment such that rational individuals would utilize healthcare to maintain their stock of health. Individuals invested resources to access healthcare and to acquire additional education as investments to sustain their capital stock and prevent illness to maintain their productivity. This model builds on the RUT in that individuals will choose between alternative healthcare services and will prefer interventions that optimized benefits in restoring health. Decision-making therefore in the era of multiple public health interventions is driven by the need to maximize benefits from each selected intervention.

Decision-making has been constructed and viewed through a behavioral lens. Using this construct decision-making is an experienced, learnt and intentionally planned act. According to the Theory of Reasoned and Planned Behavior by Ajzen and Fishbein (1980), individuals make decisions based on their intention, but their ability to exercise control over their intentions is intertwined by multiple factors. The intention itself is influenced by multiple factors including perceived risks and benefits, an individual's attitudes, their subjective norms and their self-efficacy to make particular decisions. Further, this theory describes a decision maker as a community, a family and introduces a perspective different from the individualistic rational persona described by utilization models.

In summary, public health experts have historically exploited these three theories to improve decision making to improve utilization of health interventions. Several interventions have targeted adjustment in prices or removal of fees to increase demand, reducing information asymmetry by increasing health education, modifying attitudes, and social norms and improving self-efficacy to influence intentions to increase uptake of services or improving development indices to increase capacity to make rational decisions. This study sought to analyze how removal of delivery fees targeting women from disadvantaged societies shifts decision-making as a means to optimize favorable birth outcomes in Kenya.

## **2.2 Empirical literature**

Multiple factors have been postulated to explain how women and their families choose where their babies are born. An ecological model consisting of a multiplicity of individual, cultural, health system and socio-economic factors has been developed to explain decision-making process. The three delays model advanced by Thaddeus and Maine (1994), describes three potential delays in decision making which account to the occurrence of most adverse pregnancy and childbirth outcomes. According to the three delays model, initial delays occur at the domestic level at the point when an individual woman or their families makes a decision to seek care. This delay is related to perceived threat or benefits of seeking services and is influenced by individual characteristics such as prior birth experiences, level of maternal education, degree of women empowerment, presence of socio-cultural beliefs, perceived costs and other economic considerations.

The second delay occurs at the time when the decision to access services have been arrived and in the course of trying to access services. Decisions are delayed because the women or their families lack resources to facilitate their access of services. This decision delay is ameliorated by challenges encountered when trying to reach a health facility including travel distance, transport problems and infrastructural challenges.

The final delay occur due to delays in decision making at the facility and is related to inefficiencies at the health facility level which includes delays in instituting appropriate interventions, in identifying complications and delays on timely referrals. The three delays are largely centered on a decision making process, starting from the family and the women, then extending to decisions by the policy influencers who allocate resources and finally decisions by the custodians of care within the health system. However, it is the decision by the pregnant woman and her family that provides other players the opportunity to apply their decisions and the decision by the woman is very critical to influence.

## **2.2 Choice of place of birth**

The final decision on where to deliver a baby rests on the individual woman, their spouse, her relatives and sometimes her friends but this decision is influenced by many factors. In literature, these factors have been conceptualized into four broad thematic areas; individual factors, social-cultural factors, economic factors and health system factors (Gabrysch and Campbell, 2009; Mwifadhi, *et al.* 2007; Magadi, Diamond and Rodrigues, 2000). The first three factors are likely to introduce demand-side barriers, compared to health system factors, which introduce supply-side barriers. Unfortunately; demand side barriers receive limited attention by health system leaders and policy makers (Ensor and Cooper, 2004). Each of these four broad thematic factors have been described in existing literature as expounded below.

### **2.2.1 Individual woman factors**

Biological and socio-demographic characteristics of the individual woman can influence the choice of place of delivery. Autonomy, individual ability to make independent decisions, ownership of property, previous personal experiences, reproductive histories and experience including parity and previous pregnancy outcomes, education and age are examples of factors

demonstrated to influence a woman's choice of place of delivery (Fotso, Ezeh, and Essendi, 2009). Maternal education especially attaining post-primary education has consistently been demonstrated as a key determinant of the choice to deliver in a health facility and to use contraceptives thereafter (Babalola and Fatusi, 2009). A study involving 31 developing countries and conducted by Ahmed, et al (2010) indicated that women autonomy, independent decision-making and economic empowerment showed promising results in influencing decisions on utilization of maternal services.

Literature posits that women autonomy or decision-making power on its own has a mixed influence on choice of place of delivery. Studies conducted in Kenya, in Ghana and among women involved in a study among 31 countries found weak influence of women autonomy on delivery choices (Fotso, Ezeh and Essendi, 2009; Speizer, Story and Singh, 2014; Ahmed *et al.* 2010). On the contrary, a follow-up study conducted in Ghana using a different methodology found that women with a greater influence on their decision-making on seeking healthcare were likely to make decisions that improved utilization of services. In the same study, women with decision making power over huge household purchases were less likely to access health services (Ameyaw, *et al.*, 2016).

The mixed results on the impact of autonomy on delivery choices are not surprising because there several plausible explanations. First, women make choices based on the environment in which they live. The decision making process is influenced by social norms such that even when the perceived benefits out weight the disutilities, women will elect to make 'bad' choices based on what has been socialized as a norm or habit. In some social circumstances, poor outcomes such a maternal death or a stillbirth which result from 'bad' choices have even been accepted as a norm (Kyomuhendo, 2003). Further, women living in an environment where they perceive that every other woman is delivering at a health facility, irrespective of their degree of autonomy or empowerment, are more likely to make a similar decision. This illustrates that norming attendance at birth in a health facility can persuade negative individual perceptions towards deliveries in health facilities.

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Second, autonomous women make independent choices based on their own learnt experiences. In this case, women who have witnessed negative experiences with the health system will be significantly influenced by these experiences. Third, health interventions are often perceived to be over- medicalized and sometimes overlook the importance of social support. For instance, women have reported perceived lack of psychological and physical support in health facilities during the birthing process as an explanation to why they prefer to deliver at home. Women will decline to choose health interventions as long as they perceive that interventions are not packaged with adequate social and psychological support (Roro, *et al.* 2014).

Methodological faults and lack of validated scales to construct women's autonomy have been cited as weaknesses of most autonomy studies (Ahmed *et al.* 2010). Nonetheless, the modest influences of autonomy in decision-making on reproductive health choices by women cannot be invalidated. Maternal education and economic empowerment, which are intermediate outcomes of empowerment programs whose aim is to improve autonomy, have a larger influence on decision-making. Policy makers should continue to allocate resources to fund interventions, which improve self-efficacy in decision-making and empowerment of women as a recipe to improve the overall wellbeing of women.

### **2.2.2 Social factors**

The societal norms surrounding childbirth have an enormous influence on the woman's preference on where she can deliver her baby. In Ethiopia, delivery in a health facility for instance has previously been viewed as a waste of time and resources (Shiferaw, *et al.* 2013). In many African societies, traditional birth attendants (TBAs) are endorsed and highly adored as the sole acceptable agents for assisting childbirth (Izugbara, Ezeh and Fotso, 2009). In communities where skilled delivery is not widely appreciated as a safe option to delivery, facility deliveries are given a wide berth.

A study conducted in Nyandarua in Central Kenya highlighted that women with high scores in differentiating a safe and unsafe delivery were 36.5 times likely to choose a home delivery compared to women with low scores who were 1.9 times likely to delivery in a health facility (Wanjira, *et al.* 2011). This finding suggests that increasing health education and promoting

change in social norms around childbirth is vital. Unfortunately changing of social norms is a wearisome process. This introduces a limitation, which policymakers should acknowledge that when implementing singular interventions such as subsidy programs, the success is restricted to a certain extent. To expect better results, beyond this, multi-sectoral approaches would suffice.

### **2.2.3 Health system factors**

Health system factors have been suggested to influence decision-making for place of birth and include distance between the residence of the woman and the health facility. For instance, a study conducted in Kenya by Mwaliko, *et al* (2014) identified that beyond a 2 km distance from a facility any unit increase in distance increased choice of a home delivery by 50% while the odds of a home delivery doubled with increase in distance beyond a 4 km radius from a hospital. Further studies have concurred with these findings and recommended reduction of distance from a health facility to incentivize facility deliveries (Kitui, Lewis and Davey, 2013).

Provider-client relationships can also influence decisions to deliver at a health facility or not. Where providers are perceived to have unfriendly attitudes, to be insensitive, unable to express empathy, to be unkind or perceived not to be caring, pregnant women often struggle to make decisions to delivery in the same health facilities (Mwifadhi, *et al.* 2007). Similarly in Kenya, expected high quality and culturally sensitive services and perceived benefits from skilled attendance during delivery by the women, the spouse and even the extended family incentivizes choice of a facility delivery (Kwambai, *et al.* 2013). In Uganda, the anticipation that the health provider would bear the burden of disposing the placenta has been illustrated as an incentive to deliver in a health facility (Anyait, *et al.* 2012).

In some circumstances, delivery in private facilities is preferred to delivery in public facilities. Studies by Bazant, *et al* (2009) and Fotso and Mukiira (2012) document that private facilities especially in urban informal settlements are preferred by pregnant women and their relatives even when they do not meeting basic quality standards to facilitate safe deliveries because they guarantee privacy and secrecy. In the study conducted on informal health facilities in Nairobi, women's perception of better quality, ease of access and positive provider interaction from private facilities influenced them to continue accessing delivery services from these types of facilities

(Fotso and Mukiira, 2012). According to this study, perceived high quality was associated with nearly 3 times choice of delivery in a particular facility even when its objective quality was inappropriate.

#### **2.2.4 Economic factors**

Money, wealth and availability of resources influence decision making about the place of delivery. In a 2012 study conducted in Busia, Uganda by Anyait, *et al* (2012), availability of money to spend on transport or availability of a means of transport increased by two times the odds of a choice for a hospital delivery. In addition, a lower household wealth index has been consistently demonstrated to influence decision towards a delivery at home as has low spousal income (Anyait *et al.* 2012, Fotso, Ezeh and Essendi, 2009).

Disposable income at the household level is a key facilitator or barrier when making choices of the place of delivery. Increasing domestic income increases probabilities of utilizing antenatal care (ANC) and professionally supervised deliveries. Perceived and real costs for the services as well as additional costs incurred on meals and accommodation are also additional barriers to access services in health facilities. Mwangome, *et al* (2012) found direct costs of delivery as a barrier to accessing facility deliveries.

Opportunity costs of visiting a health facility for both the women and an accompanying person are viewed as cost-based barriers to accessing care. The time spent to reach the health facility, time spent at the facility and a night spent in the precincts of health facility often will prevent the woman or their relative from participating in an income-generating endeavor and thus act as disincentives for skilled delivery utilization. The anticipated lost income is even worse for caesarian deliveries, which are associated with prolonged recovery periods and need for a caretaker. In some instances, a thought that a woman might be recommended to have an operative delivery can persuade women to ignore safe hospital deliveries even when they will not meet the related costs.

#### **2.2.5 The Economics of choice of place of birth**

Economic considerations account for a significant proportion of the delays described by the three delays model. Real economic costs (direct medical, direct non-medical and opportunity costs) can

influence utilization of health services. Perceived costs and perceived availability of resources at a health facility also influence decision-making (Mwabu, Ainsworth and Nyamete, 1993). Inadequate investment in public goods that facilitate access to health facilities such as transport infrastructure and weak investment in health infrastructure, personnel and technologies and inefficiencies in the health facilities account to a significant level decisions to underutilize health care services.

The work by Thaddeus and Maine (1994) identifies that a woman positioned at the door of a high quality and adequately equipped health institution at the time of delivery to a certain extent guarantees a favorable maternal and neonatal outcome. Unfortunately, a woman and her relatives must make the initial decision to walk to the door of the health facility or at least decide so. This cannot happen if they have not deliberately made that choice. Since the dawn of the new millennium, governments have made deliberate efforts to influence these decisions by increasing health education, incentivizing deliveries in health facilities, removing cost barriers through subsidies and by improving the quality of services offered at health facilities. Substantial success has been achieved through removal of cost-related barriers to access of birth in health facilities in several countries.

#### **2.2.6 Affirmative economic interventions to choice of place of birth**

Many countries have used affirmative approaches to reduce cost-related barriers to improve decisions and behaviours that influence access of services and improve utilization and mostly by targeting the poor. First, countries have extended insurance coverage through low-cost insurance schemes with equitable contributions influenced by wealth or income bands and premium subsidies offered for the poor. In Rwanda for instance, the poor receive subsidies from government or development partners to facilitate them to enroll in the community based health insurance (CBHI), "*Fonds de Mutuelles de Santé* (Lu, *et al.* 2012). The CBHI has resulted to improved maternal and child health indicators. Thailand uses a similar approach where government taxes are used to subsidize premiums for the poor. This has resulted to a 14 million increase in insurance coverage (Damrongplasit and Melnick, 2009). Ghana implements a health insurance premium exemption for all pregnant women (Speizer, *et al.* 2014).

The second affirmative approach includes the use of price subsidies. This can be implemented as a blanket intervention for a particular service for all citizens (fee removal), a fee waiver (exemption) to facilitate access to a particular interest group, or a redeemable voucher or card for a particular service. The second scenario is premised upon the ability to distinguish or verify the beneficiaries. This scenario has is associated with huge administrative and logistical challenges.

Exemption of fees has been used in addressing maternal and childcare services across the globe. In Africa alone, Benin (2009), Morocco (2008), Ghana (2005), Zambia (2006), South Africa, Burkina Faso (2006) and Mali (2005) have used this approach (Witter, *et al.* 2009). Other countries that used this approach include Burundi, Afghanistan, Niger, Nigeria, Nepal, Sudan, Senegal and Uganda. Vouchers have been successfully used in Tanzania, Nicaragua and Managua to encourage women access an array of reproductive services (O'Donnell, 2007)

The third affirmative approach to address service costs is the use of cash rewards to encourage service utilization. For this approach, financial incentives are offered in return for conditional use of health services. The incentives are paid directly to the women or to their household as cash transfers. Examples of such incentives have been employed in Nicaragua, Honduras, Brazil and Mexico (Morgan, *et al.* 2013).

### **2.2.7 Impact/outcomes of subsidy programs**

Affirmative economic interventions aimed at improving decisions to access and utilize health facilities for delivery and childbirth have yielded positive results across the globe. In Rwanda, a 10% increase in skilled attendance was witnessed after the introduction of the CBHI (Lu, *et al.* 2012). In Burkina Faso, skilled attendance increased from 49% to 84% over a five-year period following the introduction of the fee removal policy (De Allegri, *et al.* 2011). Similar but modest results were reported in Ghana, Nepal, Nigeria and Ethiopia (Hatt, *et al.* 2013). In Ghana for instance, women who were enrolled in the national health insurance scheme were more likely to deliver in a health facility and more likely to experience favorable maternal and neonatal outcomes (Speizer, *et al.* 2014).

Affirmative economic interventions face multiple implementation challenges, which often modulate their effectiveness. A review by Morgan, *et al* (2013) argued that economic interventions do not adequately respond to health system revenue losses or address the challenge of increased workload on the health providers. Although some improvement in the quality of services have been documented with economic interventions, they can drain available resources and result to perennial shortages and stock-outs. Hatt, *et al* (2013) described that the poor were not actually adequately financially protected by these subsidies and that the poorest of the poor were the least likely to benefit from these subsidies. Nonetheless, researchers across the globe recommend economic interventions but propose matching investments to address individual and socio-cultural barriers to access and as well as improvement of the quality and governance of health services.

### **2.3. Overview of the literature review**

In summary, the reviewed literature displays mixed arguments regarding the outcomes of interventions which have been implemented with an aim of positively influencing decisions around where women delivery their babies. Choice emerges to be influenced by a myriad of individual, community and health system facilitators and barriers. Choice of place of delivery comes out to be an economic issue. Financial protection interventions begin to appear as acceptable interventions by governments to improve decisions that promote use of health services, but implementation challenges disentangle these efforts and results to mixed results. This creates room for further analysis of the impact of existing and new economic interventions on decision-making. Unfortunately, no studies have independently looked at the influence of the maternal subsidy in Kenya on the discrete choices available for women when they decide where to deliver their babies.

Empiric literature on studies conducted in Kenya only focused on whether or not a delivery occurred in a health facility or under the guidance of skilled personnel. This overlooks the fundamental issue that the women and their relatives exercised independent choices about where they delivered their babies, including private facilities, which are largely not identified as distinct options with unique attributes. This study used nationwide population data to analyze the choices made by women using multiple levels during the subsidy and compares how decisions were made on these choices prior and during the existence of the subsidy.

## **CHAPTER THREE: METHODOLOGY**

### **3.0 Introduction**

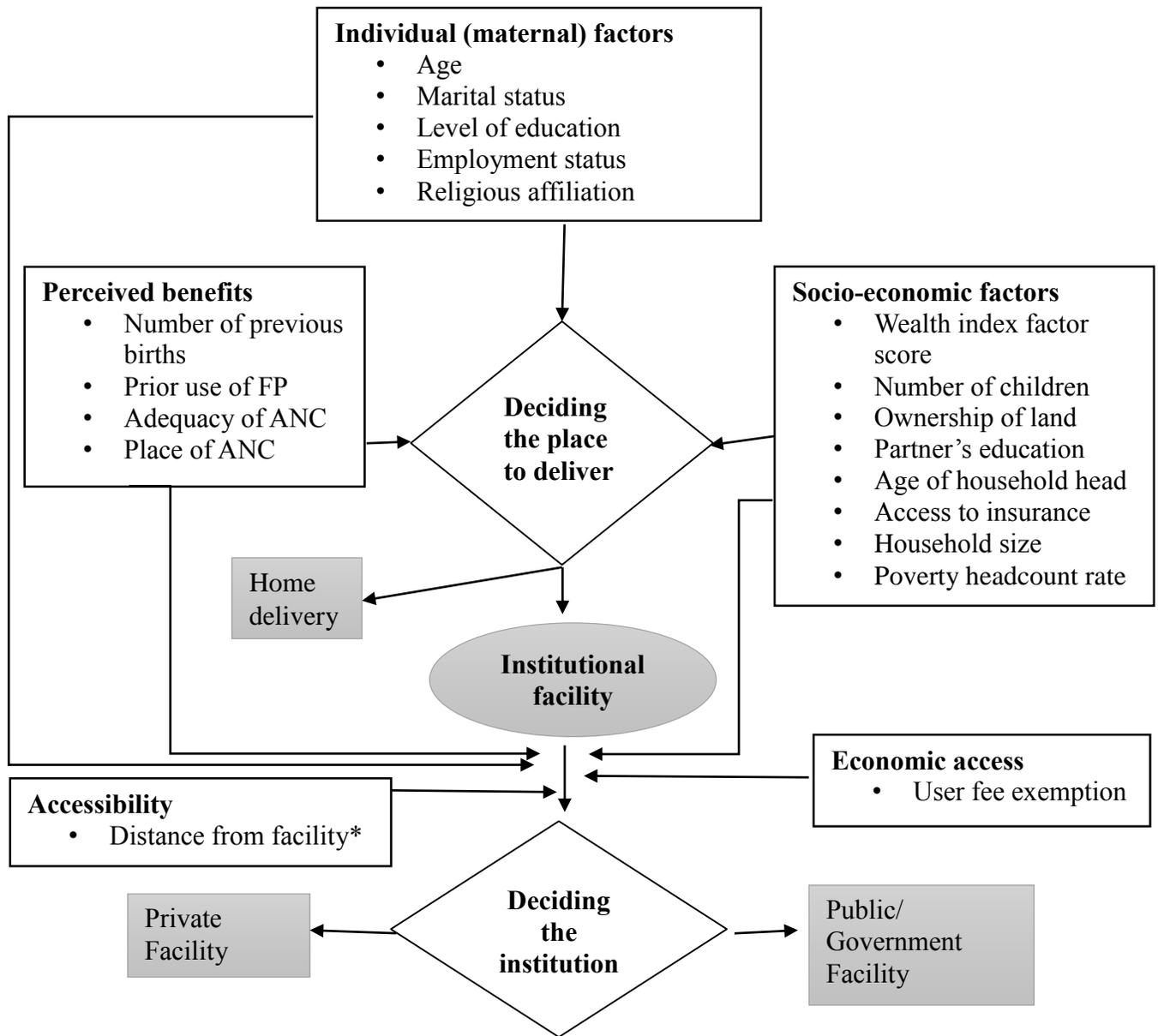
This chapter describes the conceptual framework that forms the basis of the approach used for this study. This framework summarizes the variables of this study and presents a pictorial description of the relationship between individual, societal, environmental and health system factors and the choices made by women about where to deliver their babies. The chapter presents the econometric analytic structure for the study, the relevant variables chosen for this study and their operational definitions and describes the data sources.

### **3.1 Conceptual framework for study**

Motivation to make acceptable choices rides on an individual's characteristics, attitude and perceptions, the social influence and the external environment. It is based on the theoretical framework surrounding how individuals make choice, derived from RUT and Theory of Reasoned and Planned Behavior, and how an individual's characteristics influences their intentions and ability to control over their own behaviors. This argument assumes that individuals have the cognitive ability and understanding of the implications of the choices they make.

Apart from the individual characteristics, the surrounding physical, socio-economic, ecological and policy environments have potential to alter decision-making. Thus, an individual's choice is as good as their social networks, legal and regulatory environment. Environmental factors modulate the degree of self-efficacy in decision-making and in turn influence the ability to perform a particular health behavior as summarized in Figure 3.

**Figure 3: Conceptual framework of this study**



\*Not included in this study's model but county poverty headcount rate (KHIBS 2015/16) used as a proxy indicator

**Adapted from:** Gabrysch, S., and Campbell, O. M. R. (2009). Still too far to walk: Literature review of the determinants of delivery service use. *BMC Pregnancy and Childbirth*, 9(1), 34. <https://doi.org/10.1186/1471-2393-9-34>

### 3.2 Analytic framework

Using a Random Utility Model, in which an individual is presented with two alternatives about where to deliver their baby (at home or in a health institution), a rational individual will prefer the choice which maximizes utility. Choice theory assumes that a woman is adequately informed of the benefits and risks of each choice and is rational. Assuming that there are many women making a choice to deliver at home or in a health facility represented by  $I = (1, \dots, n)$  and that the two binary alternatives are denoted by  $j$  and  $k$ . If an individual women  $I$  choses home delivery denoted by  $j$ , the assumption is that  $j$  delivers maximum utility  $U_{ij}$  to her. The utility from choice  $j$  can be represented as

$$U_{ij} = V_{ij} + E_{ij} \dots \dots \dots (1)$$

Where;  $U_{ij}$  is the true but unobservable utility for home delivery choice  $j$ ;  $V_{ij}$  is the observable component of utility for the home delivery choice and describes the extent to which an individual woman  $i$  prefers home delivery  $j$  between the two discrete choices.  $E_{ij}$  describes the random aspect of the utility derived from home delivery  $j$  and includes determinants of utility not included in  $V_{ij}$ .

The non-random utility  $V_{ij}$  can further be denoted as

$$V_{ij} = \beta_{0j} + \beta_{1j} x_i \dots \dots \dots (2)$$

In this case,  $x_i$  is a vector of individual characteristics; the coefficients  $\beta_0$  and  $\beta_1$  are vectors of the parameters representing the influence of characteristics of the individual and two available choices. The subscript  $j$  allows variation of the coefficients  $\beta_0$  and  $\beta_1$  between the two distinct choices. The differences in the utility between the two choices is determined by the probability of selecting one of the two choices and can be presented as a probability function. The probability of choosing home delivery  $j$ , versus health facility delivery  $k$  can be presented as

$$\text{Prob}(U_{ij} > U_{ik}) = \text{Prob}(V_{ij} + E_{ij} > V_{ik} + E_{ik}) = \text{Prob}(V_{ij} - V_{ik} > E_{ij} - E_{ik}) \dots \dots \dots (3)$$

It is possible to derive the utility of the home delivery choice  $j$  using a probit model. The probit model applies in decision-making circumstances when the dependent variable has binary categories. The probability of the woman making the home delivery choice  $j$  can further be expressed as,

$$\text{Prob}(\mathbf{y} = \mathbf{1} \mid \mathbf{X}) = \Phi(\mathbf{X}^T \boldsymbol{\beta}) \dots\dots\dots (4)$$

Where  $\Phi$  is the cumulative density function (CDF) of the standard normal distribution,  $\mathbf{X}^T$  consists the vectors specific to the woman and  $\boldsymbol{\beta}$  are the coefficients of these vectors.

In the event a woman  $i$  selects a home delivery,  $\mathbf{y}=\mathbf{j}$  and in the event a woman selects a delivery in a health facility  $\mathbf{y}=\mathbf{k}$ . Probit models demand that there should always be a reference category against which the probability of the other choice is computed. The reference category is denoted by a zero such that

$$\mathbf{y} = \begin{cases} \mathbf{0} & \text{if } \mathbf{y} \leq \mathbf{0} \\ \mathbf{1} & \text{if } \mathbf{y} > \mathbf{0} \end{cases} \dots\dots\dots (5)$$

The link function of  $\mathbf{y}$  is equivalent to  $\Phi^{-1}(\mathbf{y})$  and transforms the probability  $\mathbf{y}$  into z-scores from a standard normal distribution. Assuming that home delivery  $\mathbf{j}$  is the base category,  $\mathbf{k}$  has probability between 0 and 1. The probit model assumes that the errors terms  $\boldsymbol{\varepsilon}$  are normally distributed. The probability a random woman  $\mathbf{y}^*$  will choose to deliver in a health facility can be computed using the equation

$$\mathbf{y}^* = \mathbf{X}^T \boldsymbol{\beta} + \boldsymbol{\varepsilon} \dots\dots\dots (6)$$

Where  $\mathbf{y}^*$  is the place of birth;  $\boldsymbol{\beta}$  are the estimated coefficients,  $\mathbf{X}^T$  are vectors representing the unique characteristics of the woman as well as the socio-economic and health system factors; and the error term  $\boldsymbol{\varepsilon} \sim N(\mathbf{0}, \mathbf{1})$

The signs and magnitude of the coefficients for each of these characteristics can be estimated. The independent variables can yield a density function presented as

$$\frac{\partial \text{P}(\mathbf{y} = \mathbf{1} \mid \mathbf{x})}{\partial \mathbf{x}_i} = \boldsymbol{\beta}_i f(\mathbf{x}\boldsymbol{\beta}) \dots\dots\dots (7)$$

Where  $f(\cdot) = \frac{\partial f}{\partial f(\mathbf{x}\boldsymbol{\beta})}$

The marginal effects for the two choices of place of birth can be computed using the equation

$$\text{P}(\mathbf{Y} = \mathbf{1}) \mid (\mathbf{X}_k = \mathbf{1}) - \text{P}(\mathbf{Y} = \mathbf{1}) \mid (\mathbf{X} = \mathbf{0}) \dots\dots\dots (8)$$

$$= F(\mathbf{X}\boldsymbol{\beta} \mid \mathbf{X}_k = \mathbf{1}) - f(\mathbf{X}\boldsymbol{\beta} \mid \mathbf{X}_k = \mathbf{0}) \dots\dots\dots (9)$$

The probit model can be expressed as a likelihood function and summarized in an equation

$$L = \prod_{i=1}^n \Phi(\chi_i\beta)^{y_i} [1 - \Phi(\chi_i\beta)]^{1 - y_i} \dots \dots \dots (10)$$

It is relatively easier and more convenient to use a log likelihood function to express the equation above using the equation 11

$$\ln L = \sum_{i=1}^n \{y_i \ln[\Phi(\chi_i\beta)] + (1 - y_i) \ln[1 - \Phi(\chi_i\beta)]\} \dots \dots \dots (11)$$

Using equation 11, we estimated the  $\beta$  coefficients that maximize the likelihood function and use the probit model to interpret the magnitude, significance and sign of the coefficients using the marginal effects described earlier.

### 3.3 Model specification

The probability of the woman choosing either a home or an institutional delivery can be expressed using a multivariate regression model using her unique characteristics. These include individual maternal factors, socio-economic factors, perceived benefits, accessibility of health institutions and access to economic subsidy.

For each of the individual women characteristics, the coefficients can be computed as  $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}, \beta_{12}, \beta_{13}, \beta_{14}, \beta_{15} \dots \beta_k$ .

The probit model for the choice for either a home or an institutional delivery  $y$  can be expressed in equation 12 where  $y=1$  for institutional delivery and  $y=0$  for home delivery. The log of an institutional delivery is a function of individual maternal factors, socio-economic factors, perceived benefits, accessibility of health institutions and access to economic subsidy. This can further be expanded with the variables of the study. Equation 12 fulfils the needs of objective (1) regarding the determinants of choice between a home and institutional delivery.

$$\log y_i = \beta_0 + \beta_1 A + \beta_2 MS + \beta_3 NC + \beta_4 SH + \beta_5 RA + \beta_6 LOE + \beta_7 PE + \beta_8 OL + \beta_9 R + \beta_{10} WI + \beta_{11} PI + \beta_{12} DM + \beta_{13} AH + \beta_{14} PE + \beta_{15} I + \beta_{16} NB + \beta_{17} ANC + \beta_{18} AC + \beta_{19} FP + \beta_{20} T + \varepsilon \dots \dots \dots (12)$$

Equation 12 represents the variables used for the study, which includes individual women characteristics where A=age in years, MS=marital status, NC=number of children, SH=size of household, RA=religious affiliation and LOE=level of education. Socio-economic factors include

PE=paid employment, OL=ownership of land, R=residence (urban versus rural), WI=household wealth index score, PI=county poverty head count rate, DM=decision making on food, AH=age of household, PE=partner’s education and I=existence of insurance. Perceived benefits include NB=number of previous births, ANC=adequacy of antenatal care, AC=place of access to ANC, FP=previous FP use. T =Time of subsidy is a dummy variable created to differentiate the period prior and during the maternal subsidy.

Considering that the choice for an institutional delivery can further be disaggregated into a binary variable, a second model regarding a choice of the type of institutional delivery among women who experienced a delivery in a health facility was constructed. A private facility (PVF) was denoted by 1 and a public facility (PF) denoted by 0. A choice of a private facility delivery is treated as the unexpected norm and a unique deliberate choice because public facilities are highly subsidized and directly targeted by the maternal subsidy. The probit model for choice for an private facility delivery  $y$  can be represented in equation 13 using the same variables in equation 12 where  $y=1$  for private facility and  $y=0$  for public facility

$$\log y_i = \beta_0 + \beta_1A + \beta_2MS + \beta_3NC + \beta_4SH + \beta_5RA + \beta_6LOE + \beta_7PE + \beta_8OL + \beta_9R + \beta_{10}WI + \beta_{11}PI + \beta_{12}DM + \beta_{13}AH + \beta_{14}PE + \beta_{15}I + \beta_{16}NB + +\beta_{17}ANC + \beta_{18}AC + \beta_{19}FP + \beta_{20}T + \varepsilon \dots\dots\dots (13)$$

Equation 13 is estimated for objective (2) on the determinants of choice between a private facility and a public facility delivery.

### 3.4 Variables for the study and their definitions

This study analyzed both dependent and independent variables. The dependent variable of this study was place of delivery in the most recent birth. The dependent variable consisted of two layers. The first layer describes the place of delivery either as a home delivery or an institutional delivery. A home delivery was defined as a birth conducted at home or in any other place apart from a health facility. An institutional delivery was defined as a delivery conducted in a health facility. Home delivery was the reference category. The second layer categorized institutional delivery into two choices; a private facility or a public facility delivery. Private facilities consisted informal private facilities, private for profit and private non-profit facilities (run by a non-governmental organization or affiliated to religious organizations).

Independent variables consisted of individual characteristics of the women and included age (years), marital status (presented as single or ever married and divorced or separated, and married or cohabiting), parity, level of education, place of ANC attendance, adequacy of ANC attendance, paid employment, religious affiliation, number of children and use of family planning.

Socio-economic factors consisted ownership or contribution towards land, residence (urban versus rural), household wealth index computed through principal component analysis (PCA) based on ownership of selected assets by the household, poverty level of county, food decisions, age of household head, spousal education and existence of health insurance.

A dummy variable for the period before the subsidy and the period during the subsidy was created. For this variable, the period before the subsidy was denoted by 0 while the period during the subsidy was denoted by 1. This necessitated comparison of determinants of choice prior and during the maternity subsidy in Kenya.

**Table 2: Variables and their operational definitions**

	<b>Variable name</b>	<b>Variable definition</b>	<b>Measurement</b>	<b>Expected sign</b>
<b>Dependent variable</b>				
1.	Place of birth	Place of delivery either in health facility or at home	1=Health facility delivery 0=Home delivery	Positive
		Institutional delivery as either public or private health facility	1=Private facility delivery 0=Public facility delivery	Positive
<b>Independent variables</b>				
1.	Age in years (A)	Age of the women in completed years since last birthday at the time of the survey	Continuous and in completed years	Negative
2.	Marital status (MS)	Marital status as either married, single, divorced, separated or cohabiting	1=Married or currently living as if married 0=Single never married, divorced or separated	Positive
3.	County poverty head count rate (%)* (PI)	The poverty headcount rate (proportion) of the county based on Kenya Integrated Household Budget Survey (KIHBS) 2015/16	Continuous as a proportion with a maximum of 100%	Negative
4.	Ownership of land (OL)	Woman owns or contributed to ownership of land	1=Owns or contributes to land ownership 0=Doesn't own or contribute to ownership	Positive
5.	Woman's level of education (LOE)	Woman's highest completed level of education	1=Post-primary education 0=Primary or no formal education	Positive
6.	Adequate ANC attendance (ANC)	Attended at least 4 ANC visits in a health facility (WHO guidelines)	1=4 or more FANC visits 0=3 and below or no ANC attendance	Positive
7.	Institutional ANC (AC)	Place of attendance for ANC care	1=In a health institution 0=No ANC or ANC elsewhere	Positive
8.	Nature of employment (PE)	Woman engaged in work that attracts payment	1=Paid employment 0=Unpaid employment	Positive

9.	Religious affiliation (RA)	Woman's religious affiliation as either Christian, Muslim, other religious sects	1=Christian 0=Other religious affiliation	Positive
10.	Number of births (NB)	Number of births experienced by the woman including stillbirths or early child deaths	Continuous as the number of reported births	Positive
11.	Number of children (NC)	Number of children reported by the woman (biological and adopted)	Continuous as number of surviving children for the woman	Positive
12.	Size of household (SH)	Number of individuals living and consuming food from the same pot	Continuous as the number of household members	Negative
13.	Use of family planning (FP)	Woman reported access to any family planning method	1=Ever used a family planning method 0=Never used FP	Positive
14.	Residence (R)	The woman's place of residence as either urban or a rural residence	1=Urban residence 0=Rural residence	Positive
15.	Household wealth index factor score (WI)	Wealth index of household computed using PCA from a set of household assets and defined as very poor, poor, middle, high	Continuous score of the household wealth index	Negative
16.	Makes decisions on food purchases (DM)	Woman independently makes decisions on food to be cooked in the household or someone else	1=Makes food decisions alone 0=Makes decisions jointly with others or someone else makes decisions	Positive
17.	Age of household head (AH)	The age of the household head documented from the last birthday	Continuous with age in numerical years	Positive
18.	Partner's education (PE)	Partner's highest completed level of education	1=Post-primary education 0=Primary or no formal education	Positive
19.	Ownership of insurance (I)	Woman and her household have access to a medical insurance	1=Owned insurance 0=Didn't own insurance	Positive
20.	Time of the subsidy (T)	Period during which the maternity subsidy was functional (from June 1, 2013)	1=Time during the subsidy 0=Time before subsidy	Positive

\*County poverty head count rate from the Kenya Integrated Household Budget Survey (KIHBS) 2015/16

*Adapted from: Magadi, M., Diamond, I., and Rodrigues, R. N. (2000). The determinants of delivery care in Kenya. Social Biology, 47(3-4), 164-188.*

### **3.5 Data sources**

This study analyzed data from Kenya demographic and health survey (KDHS) conducted between May and October 2014. The survey used a nationally representative sample. Respondents were drawn from 36,812 households from which 31,079 women aged 15-49 were interviewed representing a response rate of 96.6%. This sample of women constituted 11,614 urban and 19,465 rural women. Of the 31,079 women interviewed, 14,741 (48.4%) completed the women questionnaire which was of interest to this study. The KDHS 2014 was conducted five years after the 2008-9 survey.

The demographic surveys have been conducted in Kenya since 1989 and are conducted to provide invaluable data to monitor changes and describe trends of health indicators in comparison to previously conducted surveys. This study focused on choice of place of delivery at birth during a period when the maternal subsidy was operational; therefore, information on the most recent births was necessary. The population of interest were women aged 15-49 years who gave birth in the last five years preceding the survey. Among women who experienced a birth in the five-year period, only a subset of women who reported a birth in a 30-month period leading to end of the survey in October 2014 were included in this analysis (15 months prior and 15 months after maternity subsidy was approved). The study analyzed secondary data that is freely available to the public upon fulfilling a data request and contains no identifiable information on the respondents and hence, no ethical considerations were required.

## CHAPTER FOUR: RESULTS AND INTERPRETATIONS

### 4.0. Introduction

Results and interpretation of the findings are presented in this chapter. The chapter commences with descriptive results, and presents the results of the estimated probit models in the subsequent sub-sections.

### 4.1. Descriptive statistics

This study employed STATA 15.0 to analyze data from 4,772 women who experienced a delivery during the period of interest among 9,892 women who completed the full women questionnaire. Table 3 summarizes the frequencies, mean, standard deviation, minimum and maximum values for all variables.

*Table 3: Summary statistics of the study variables*

<b>Variables</b>	<b>Frequency</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>
Woman's age	4772	27.7745	6.477	15	49
Marital status	4000	0.8382	0.368	0	1
Age of household head	4772	37.763	12.698	15	95
Number of children	4772	3.227	2.116	0	12
Number of births	4772	3.4564	2.314	1	14
Woman's education	1281	0.2684	0.443	0	1
Partner's education	1487	0.3116	0.463	0	1
Owning land	372	0.078	0.268	0	1
Size of household	4772	5.764	2.444	1	19
Makes food decisions	3215	0.6737	0.469	0	1
Residence	1583	0.3317	0.471	0	1
Wealth index factor score	4772	-21160.34	98414.90	-248010	340346
Paid employment	2138	0.4498	0.498	0	1
Religious affiliation	3827	0.802	0.399	0	1
Poverty headcount rate	4772	27.333	9.755	16.7	47.4
Health insurance coverage	605	0.1268	0.333	0	1
Use of family planning	3066	0.6425	0.479	0	1
Place of ANC attendance	4434	0.9292	0.257	0	1
Adequate ANC	2520	0.5281	0.499	0	1
Time of the subsidy	2429	0.509	0.5	0	1
Institutional birth	2748	0.5759	0.494	0	1
Private facility birth	574	0.2089	0.407	0	1

From the descriptive analysis summarized on Table 3, women included in the study were medium age with a mean of 27.8 years (standard deviation=6.477). The youngest were 15 years old while the oldest woman was 49 years old, which affirms that women spanning the reproductive age bracket were included. Only 16.2% of the women were living without a married partner; split equally between divorced or separated. Nearly one-third (31.16%) of women reported that their male partners had attained post-primary education. The mean age for the household head was 37.8 years and ranged between 15 and 95 years. Women reported an average of three previous births, while the average number of living children for the women was also three. Women in this study were coming from households whose size was a mean of six individuals.

Economically, only 7.8% of women, alone or jointly with their partners, owned land. A substantive proportion (67.37%) of women independently made decisions about food cooked in their households. The mean poverty headcount rate for the counties from which the women who participated in the survey were drawn was 27.3% an illustration of the level of poverty for the counties where they were drawn. Most women were affiliated to Christian religion (80.2%) and only one-third (33.17%) were residing in urban areas. Women involved in the study came from households with diverse levels of wealth and the factor scores ranged -248,010 to 340,346 and a mean of 98,414.90. Less than one-half (44.98%) of women were engaged in a form of paid employment while only a paltry 12.7% of women came from households, which possessed some form of health insurance.

Regarding access to reproductive health services, 64.25% of women reported previous use of a family planning method and majority (93.8%) of women had attended ANC for the pregnancy of interest. The vast majority (86.8%) of the ANC attendances were in public health facilities. Among these women, 41.0% did not attain the optimal number of attendances (at least four visits in the course of pregnancy) as recommended by the WHO. Regarding place of delivery, 57.59% reported an institutional delivery. This is a 15.7% improvement because among 2310 women who had experienced a recent birth prior to the birth of interest to the study, only 41.8% had witnessed an institutional delivery. Of the women reporting a delivery in a health facility, the majority (79.1%) reported delivery in public health facilities.

## **4.2. Diagnostic tests**

We performed diagnostic tests to increase the validity of the results. First, we conducted multi-collinearity tests to determine the relationship between each of the variables of interest to the study. Of the 20 independent variables, variables demonstrated multi-collinearity if they were highly or perfectly correlated. This was confirmed if the zero-order or pairwise correlation coefficient between the two variables was approaching a value of one. A cut-off of the correlation coefficient used for this study was 0.8. The correlation matrixes are summarized on Tables 10 and 11 on the Appendices. Two variables i.e. number of living children and number of births were highly correlated ( $r=0.968$ ). Number of previous births was maintained in the model.

Second, we employed two-stage residue inclusion (2SRI) to address any potential endogeneity on the variables included when estimating the probit models. First we estimated probit models for the two models. We then employed the residuals from these estimated models as variables to estimate superior models. On the empirical results sub-section, results of the basic models and the models in which endogeneity has been controlled are presented.

## **4.3. Empirical model results**

The results of the empirical models are described in two parts. In the first part, results on objective 1 on the choice between institutional versus home delivery are described. In the second part, results on the choice between private health facility versus a public health facility delivery are described.

### **4.3.1 Choice between health facility and home delivery**

In this sub-section, probit model estimates for a choice for place of delivery between a health facility and a home delivery are presented. Table 4 presents the probit model estimates for choice for the place of delivery for Objective 1.

**Table 4: Estimates of choice between health facility and home delivery (N=4,772)**

Institutional birth (home as reference)	Coefficient	S.E.	z	P>z	95% C.I.	
					Lower	Upper
Woman's age	0.0190**	0.0056	3.37	0.001	0.0079	0.0301
Marital status	-0.1027	0.0793	-1.3	0.195	-0.2589	0.0527
Religious affiliation	-0.0522	0.0607	-0.86	0.390	-0.1713	0.0668
Poverty headcount rate	-0.0085**	0.0023	3.75	0.000	0.0041	0.0130
Woman's education	0.2769**	0.0595	4.66	0.000	0.1603	0.3934
Age of the household head	0.0026	0.0020	1.27	0.205	-0.0014	0.0065
Size of the household	-0.0117	0.0115	-0.99	0.323	-0.0339	0.0117
Owens land	-0.0385	0.0831	-0.46	0.643	-0.2014	0.1244
Paid employment	0.0709	0.0449	1.58	0.114	-0.0170	0.1588
Food decision	0.0395	0.0588	0.67	0.501	-0.0757	0.1547
Residence	0.1547**	0.0529	2.92	0.003	0.0510	0.2585
Wealth index factor score	0.0001**	0.0000	16.17	0.000	0.0000	0.0001
Partner's education	0.1063*	0.0526	2.02	0.043	0.0032	0.2094
Health insurance coverage	0.3520**	0.0832	4.23	0.000	0.1888	0.5152
Adequate ANC attendance	0.2471**	0.0435	5.69	0.000	0.1619	0.3323
Place of ANC access	0.9583**	0.1155	8.3	0.000	0.7320	1.1847
Use of family planning	0.1743**	0.0505	3.45	0.001	0.0753	0.2733
Number of births	-0.1196**	0.0177	-6.74	0.000	-0.1544	-0.0848
Time of the subsidy	0.1649**	0.0434	3.8	0.000	0.0799	0.2501
<b>Number of obs.=4772; LR chi2(19) =1853.80; Prob &gt; chi2&lt;0.0001; Pseudo R2=0.2861</b>						
<b>Log likelihood = -2312.5367</b>						

\*p values <0.05; \*\*p values<0.01

Table 4 presents a R2 of 0.2861, which implies that approximately 29% of choice of the place to deliver (between a health facility and home) are influenced by the 19 explanatory variables included in this model. This means that 71% of the variance in the choices made about whether to deliver in a health facility or not can be explained by variables missing in this model. Of the 19 variables included in the analysis, 12 were statistically significant (p<0.05).

To address potential endogeneity (potential correlation between the error term and the independent variables in the models), this study employed 2SRI in the probit model as suggested by Terza, Basu and Rathouz (2008). Adequate ANC attendance was employed as the endogenous regressor and woman's level of education and number of previous births used as instrumental variables. Generalized residuals generated in the estimated model for adequacy of ANC attendance were incorporated as additional regressors in the probit model for choice of place of birth while

maintaining the adequate ANC attendance variable in this model. Table 5 summarizes the results of the model in which 2SRI was employed.

**Table 5: Two-stage residual inclusion (2SRI) estimates of choice between health facility and home delivery (N=4,772)**

Home delivery as the Reference	Coefficient	S.E.	z	P>z	95% C.I.	
					Lower	Upper
Woman's age	0.0192**	0.0056	3.43	0.0010	0.0082	0.0303
Marital status	-0.0983	0.0815	-1.21	0.2280	-0.2582	0.0614
Religious affiliation	-0.0467	0.0599	-0.78	0.4350	-0.1641	0.0707
Poverty head count rate	-0.0088**	0.0023	3.85	0.0000	0.0043	0.0133
Woman's education	0.2727**	0.0606	4.5	0.0000	0.1540	0.3915
Ownership of land	-0.0440	0.0786	-0.56	0.5760	-0.1982	0.1102
Food decisions	0.0392	0.0593	0.66	0.5080	-0.0770	0.1554
Paid employment	0.0706	0.0450	1.57	0.1170	-0.0176	0.1587
Household wealth score	0.0001**	0.0000	14.97	0.0000	0.0000	0.0000
Partner's education	0.1059*	0.0533	1.99	0.0470	0.0013	0.2104
Age of household head	0.0029	0.0020	1.41	0.1600	-0.0011	0.0069
Size of household	0.0166	0.0207	0.81	0.4200	-0.0238	0.0572
Residence	0.1502**	0.0539	2.83	0.0050	0.0460	0.2545
Coverage by insurance	0.3478**	0.0835	4.16	0.0000	0.1837	0.5110
Adequate ANC attendance	0.2462**	0.0434	5.67	0.0000	0.1611	0.3314
Place of ANC attendance	0.9608**	0.1154	8.33	0.0000	0.7347	1.1870
Use of FP	0.1789**	0.0505	3.55	0.0000	0.0780	0.2778
Number of previous births	-0.1179**	0.0182	-6.48	0.0000	-0.1536	-0.0823
Time of the subsidy	0.1670**	0.0435	3.84	0.0000	0.0818	0.2523
Residuals	-0.0832	0.0491	-1.7	0.0900	-0.1794	0.0129
Intercept	-1.5351**	0.2407	-6.38	0.0000	-2.0069	-1.0632
<b>Number of obs.=4751; LR chi2(19) =1150.71; Prob &gt; chi2&lt;0.0001; Pseudo R2=0.2866; Log likelihood = -2310.9642</b>						

\*p values <0.05; \*\*p values<0.01

Table 5 highlights that upon conducting the 2SRI in the model all the 12 variables that showed association with choice of place of birth on the crude models maintained significance. From the analysis, it appears that a unit increase in woman's age was associated with 0.0192 times increase in likelihood of choosing a health facility delivery while holding other factors constant. Being married was associated with 0.0983 times being unlikely to select a health facility for birth (p=0.228). Additionally, being affiliated to Christian religion seemed to portray a negative

association with a choice for a health facility delivery although this was not significant ( $p=0.435$ ). As would be expected, originating from a county characterized by high poverty headcount rate such as Lamu, Kilifi and the former Northern Frontier counties was associated with 0.088 times likelihood of not electing to delivery at a health facility compared to coming from low poverty counties such as Nairobi and former Central Kenya counties *ceteris paribus* ( $p<0.001$ ).

Women with higher education attainment such as those holding post-primary education were 0.2727 times more likely to deliver on a health facility when holding all factors constant ( $p<0.001$ ). A similar pattern was observed for women engaged in some form of paid employment who were also 0.0706 times more likely to choose a health facility for birth although the association was not significant ( $p=0.1170$ ). Surprisingly, women who owned land, alone or jointly with spouse, were 0.044 times less likely to deliver on a health facility although the association was not significant ( $p=0.576$ ). Contrastingly, independence in making food decisions was associated with a higher likelihood of choosing a health facility delivery *ceteris paribus* ( $p=0.508$ ).

Reporting to have a partner who had attained post-primary education was associated with 0.1059 times more likely to deliver in a health facility while holding other factors constant ( $p=0.047$ ). Women who reported to be living in households headed by older individuals were associated with a 0.029 times more likely to choose a health facility for birth although the association was not significant ( $p=0.160$ ). A similar pattern was observed for women from large-sized households. Women living in an urban environment were 0.157 times more likely to elect to have a health facility delivery *ceteris paribus* ( $p<0.005$ ). Holding other variables constant, women who possessed health insurance were 0.3478 times likely to receive a facility delivery ( $p<0.001$ ). As anticipated, women from a household with a higher wealth index factor score were 0.001 times more likely to choose a health facility delivery ( $p<0.001$ ) when holding other factors constant.

In terms of access to reproductive health services, women who had accessed adequate ANC were 0.2462 times more likely to opt for a health facility delivery when holding other variables constant ( $p<0.001$ ). Attendance to ANC in a health facility, which provides optimal access to care during pregnancy, compared to other places, was associated with a 0.961 times higher likelihood of a choice for a health facility delivery *ceteris paribus* ( $p<0.001$ ). Women who have previously accessed family planning prior to the birth of interest were 0.1789 times likely to opt for a facility

delivery ceteris paribus ( $p < 0.001$ ). Contrastingly, increasing number of experienced births was associated with 0.1179 times less likely to prefer a health facility birth ceteris paribus ( $p < 0.001$ ).

Finally, when holding other variables constant, women whose births occurred during the time of the free maternity subsidy were 0.1670 times more likely to choose a health facility delivery ( $p < 0.001$ ), an indication that the presence of the subsidy was influencing women to make choices favoring delivery in health facilities.

Average marginal effects for choice between a health facility and home delivery were estimated using the explanatory variables and are presented on Table 6.

**Table 6: Average marginal effect for choice between health facility and home birth (N=4,772)**

Home delivery as the Reference	dy/dx	S. E.	z	P>z	95% C.I.	
					Lower	Upper
Woman's age	0.0052**	0.0015	3.39	0.0010	0.0022	0.0083
Marital status	-0.0283	0.0224	-1.26	0.2060	-0.0721	0.0156
Religious affiliation	-0.0144	0.0165	-0.87	0.3820	-0.0467	0.0179
Poverty headcount rate	-0.0024**	0.0006	3.76	0.0000	0.0011	0.0036
Woman's education	0.0763**	0.0166	4.6	0.0000	0.0438	0.1088
Owning land	-0.0106	0.0216	-0.49	0.6240	-0.0530	0.0318
Paid employment	0.0195	0.0124	1.58	0.1150	-0.0047	0.0438
Food decisions	0.0109	0.0163	0.67	0.5050	-0.0211	0.0429
Urban residence	0.0426**	0.0146	2.92	0.0030	0.0141	0.0712
Wealth index factor score	0.0000**	0.0000	16.43	0.0000	0.0000	0.0000
Partner's education	0.0293*	0.0147	1.99	0.0460	0.0005	0.0581
Age of household head	0.0007	0.0006	1.26	0.2090	-0.0004	0.0018
Size of household	-0.0031	0.0032	-0.96	0.3350	-0.0095	0.0032
Coverage by insurance	0.0970**	0.0228	4.24	0.0000	0.0522	0.1417
Adequate ANC attendance	0.0681**	0.0119	5.74	0.0000	0.0448	0.0913
Place of ANC attendance	0.2639**	0.0312	8.45	0.0000	0.2027	0.3252
Use of FP	0.0480**	0.0138	3.48	0.0010	0.0210	0.0751
Number of births	-0.0329**	0.0049	-6.66	0.0000	-0.0426	-0.0232
Time of the subsidy	0.0454**	0.0119	3.82	0.0000	0.0221	0.0688

\*p values <0.05; \*\*p values <0.01

From Table 6, the choice women make about where to deliver is positively or negatively influenced by multiple factors including individual factors, household factors, economic factors and access to reproductive health services including ANC as posited by Gabrysch and Campbell (2009) and are discussed in the following sub-section.

### **Women individual factors**

We observed a significant increasing probability for women to choose a health facility delivery with an increase in their own age. Studies identify that increasing maternal age increases risk for adverse maternal outcomes such as stillbirths and perinatal deaths and need for interventions including a need for caesarian delivery, which might prompt the women to plan for a health facility delivery (Lampinen *et al*, 2009). It is probable that as the women grow older, they anticipate these risks and as a precautionary measure plan for a health facility delivery. In addition, increasing age grants women autonomy, expanded space to articulate their preferences with confidence, and experience reduced reliance of relatives to make critical decisions. Further, older women are more likely to have been persuaded (through their own experiences) that health institutions are acceptable and safe for delivery.

Education appears to illustrate a strong positive influence on decision-making for place of birth. Attainment of post-primary education by the women and their partners illustrates higher probabilities of electing a delivery in a health facility in concurrence with other studies (Mwaliko *et al*, 2014). Education's capacity to empower women and their partners to negotiate and make rational decisions has been proven by investigators in similar socio-economic settings (Babalola and Fatusi, 2009; Fotso *et al*, 2009). It is plausible that the ability to process the benefits of a health facility delivery versus the complications, which might occur from a home delivery increase with higher education attainment further driving women and their spouses to make risk averse decisions. These findings validate the value of education as an investment to achieving better health outcomes.

The role of the shared decision-making and influence of the women's social environment including family and household members portrays mixed results. Surprisingly, women who were married appeared to be less likely to deliver in a health facility, a concurrence with other studies which suggest the dominance of men and their extended family in negatively influencing decision-

making that guarantees safety for pregnant women (Mwifadhi *et al*, 2007; Wilunda *et al*, 2016). Further, an increase in the household size, a crude measure of domestic burden and dependency, seems to have a negatively influence on the choice for a safe place for delivery. Conversely, increasing age of the household head appears to positively impact choice making in favor of facility delivery further affirming evidence about their role in influencing reproductive decisions. An increase in age could mean increased maturity and willingness of household heads to play a supportive role in encouraging safe reproductive choices. Further, older heads especially if they are spouses, are likely to experience reduced influence from relatives and the community and older heads are likely to enjoy some space to make independent decisions. No meaningful associations were established regarding how particular religious beliefs influenced the choice of place of birth.

The proxy determinants of women's autonomy showed mixed results in this study hence concurring with existing literature (Ahmed *et al*, 2010). First, women with paid employment had a higher probability of experiencing a health facility delivery supporting existing literature, which posits that participation in paid labor force is an important determinant of women's ability to make decisions to access reproductive health services. This implies that women have disposable resources within their control to facilitate access to services such as to cater for their transport costs and to meet the direct costs of services. Similar to findings by Speizer *et al* (2014), decision making on food and ownership of land were weakly associated with the choice women make regarding the place of delivery. The mixed results are not unique. A recent analysis published in 2019 using recent demographic health survey (DHS) data from 31 countries in sub-Saharan Africa (SSA) found weak associations, and in some countries no relationship, between measures of autonomy and access to pregnancy related services (Chol *et al*, 2019). It is plausible that factors not included in the survey including cultural beliefs and economic inequalities distributed across the women who participated in the survey might have a greater effect on birthing decisions.

### **Household economic factors**

The findings from this analysis identify the household as a critical determinant of the choice of place of birth. Women from poor households were found to have a higher probability of not delivering in a health facility, which validates studies in the SSA region. Bintabara, Nakamura, and Seino (2018) through a population-based study conducted in Tanzania established comparable results. Even through delivery services have been subsidized, this does not mean that access to

services is absolutely cost free. Mwangome *et al* (2012) associated access to delivery services with resource needs to cater for transport, meals, medical items absent at the facilities and opportunity costs related to income loss when relatives accompany the women to the health facility. Although these costs might appear miniscule, compared to what is covered by the subsidy, poor households experience disproportionate negative consequences when they incur minimal costs. These findings imply that women from poor households begrudgingly persevere home deliveries even when their lives are at grievous risk.

Similar to our study, Bintabara *et al* (2018) identified that women from households that possessed health insurance were more likely to delivery in a health facility. These findings are consistent with analysis conducted using data from KDHS 2008-9, which highlighted that 7% of women who possessed insurance at that time were 23 percentage points likely to deliver in a health facility (Were *et al*, 2017). Coverage by insurance remains a critical influencer of accessing health services (Mati *et al*, 2018). It is commendable that a 5% increase in insurance coverage was observed between the 2008-9 and 2014 demographic surveys. Apart from this, it appears that the higher concentration of health institutions in urban centres in Kenya is favorable for women making choices in favor of health facility deliveries. The distance women would have to cover to reach a health facility determines if they will choose a facility for delivery and as Mwaliko *et al* (2014) argue, investing in building and equipping comprehensive reproductive facilities is a meaningful approach to entice women to consider seeking professional assistance during birth.

### **Access to reproductive health services**

This study establishes that women who made previous favorable decisions and accessed adequate ANC, attended ANC in a health facility, and used FP methods tended to make consistent decisions when selecting the place of delivery. Women who used FP are likely to have spaced their pregnancies allowing them to have sufficient resources to access ANC, afford a health facility delivery and sustain utilization of beneficial reproductive services. Access to reproductive services provides clinicians with opportunities to offer health education, identify danger signs in pregnancy and recommend specific interventions to the women including facility delivery, thus optimizing future utilization. Furthermore, increased experience with health services assists to persuade existing cultural and negative beliefs about the usefulness and appeal of health facilities further expanding agency for utilization.

This study has established that with increasing number of births women shy away from making decisions that favor deliver in a health facility. These findings are comparable to studies, which document that women with three or more children are two times less likely to deliver in a health facility (Moindi *et al*, 2016). We contend that women who experienced several uncomplicated deliveries possess limited motivation to deliver in a health facility. Further, women are more likely to experience easier deliveries with increasing parity, which increases complacency and reduces the initiative to seek assistance during subsequent births. In circumstances where negative experiences during facility delivery is rampant, women with multiple births are likely to lose their patience and avoid health facilities. Multiple successful births translate to increased dependency, higher domestic expenditures, and reduced fiscal space that reduce willingness to incur costs to access services when cheaper alternatives exist.

More women appear to choose health facility deliveries during the time of the subsidy than before. This is very encouraging news for policy makers because the subsidy appears to yield the intended outcomes replicating results observed in other counties. Subsidies in Rwanda, Burkina Faso, Ghana, Nigeria and Ethiopia resulted in impressive outcomes in skilled attendance during delivery (Lu *et al*, 2012, De Allegri *et al*, 2011, Morgan *et al*, 2013). These Kenyan results show good promise given that this study reports data for the first 15 months of the subsidy when structural implementation challenges were reported (Wamalwa, 2015). With additional optimization, this subsidy has potential to attain better results given that these findings were attained during a transition period when health was being fully devolved to the counties and the process was faced by a myriad of teething problems (Tsofa *et al*, 2017).

### 4.3.2 Choice of birth between a private facility and public health facility

In this section, estimates for a choice between a private and public health facility delivery are presented. Table 7 presents the probit model estimates for choice between a private and public health facility.

**Table 7: Estimates of choice between private and public health facility (N=2,748)**

Private Facility Birth	Coefficient	S.E.	z	P>z	95% C.I.	
					Lower	Upper
Woman's age	0.0022	0.0075	0.29	0.7710	-0.0124	0.0168
Marital status	0.0673	0.1108	0.61	0.5440	-0.1499	0.2844
Religious affiliation	0.1132	0.0984	1.15	0.2500	-0.0796	0.3061
Poverty head count rate	-0.0052	0.0028	-1.83	0.0670	-0.0108	0.0004
Woman's education	0.0303	0.0686	0.44	0.6590	-0.1042	0.1648
Owning land	-0.0804	0.1281	-0.63	0.5310	-0.3315	0.1708
Paid employment	0.0659	0.0605	1.09	0.2760	-0.0527	0.1845
Food decisions	0.0639	0.0813	0.79	0.4320	-0.0954	0.2232
Residence	0.1168	0.0704	1.66	0.0970	-0.0211	0.2547
Wealth index factor score	0.0001**	0.0000	7.33	0.0000	0.0000	0.0000
Partner's education	0.0129	0.0664	0.19	0.8460	-0.1173	0.1431
Age of household head	0.0011	0.0030	0.37	0.7150	-0.0047	0.0069
Size of household	-0.0202	0.0170	-1.18	0.2370	-0.0536	0.0132
Coverage by insurance	0.4031**	0.0728	5.53	0.0000	0.2603	0.5458
Adequate ANC attendance	0.0312	0.0615	0.51	0.6120	-0.0893	0.1517
Place of ANC attendance	-0.5704*	0.2494	-2.29	0.0220	-1.0592	-0.0816
Use of FP	0.0283	0.0780	0.36	0.7160	-0.1245	0.1812
Number of births	0.0079	0.0260	0.30	0.7630	-0.0431	0.0588
Time of the subsidy	-0.1963**	0.0579	-3.39	0.0010	-0.3097	-0.0828
Intercept	-0.831*	0.308	-2.7	0.007	-1.435	-0.227
<b>Number of obs.=2732; LR chi2(19) =279.40; Prob &gt; chi2&lt;0.0001; Pseudo R2=0.0997</b>						
<b>Log likelihood = -1260.8164</b>						

\*p values <0.05; \*\*p values<0.01

Table 7 represents a R2 of 0.0997 which means that approximately 10% of choices made for delivery between a public and a private health facility are determined by the 19 explanatory variables included in this model. This implies that 90% of the variation in choosing between a

public and private facility delivery can be attributed to variables not included in the model. In this crude model, only four of the 19 independent variables were statistically significant ( $p < 0.05$ ).

Similar to the model for choice between a home and health facility delivery, 2SRI was employed. Adequacy of ANC attendance was retained as the endogenous regressor but household wealth index factor scores used as the instrumental variable. On Table 8, the results of the probit models estimated using 2SRI for choice in favor of a private health facility delivery are represented. Upon inclusion of residuals from the adequacy of ANC attendance model, minimal changes were observed on this advanced model compared with what is presented on Table 7.

**Table 8: 2SRI estimates of choice for a birth between a private or public facility (N=2,748)**

Private Facility Birth	Coefficient	S.E.	z	P>z	95% C.I.	
					Lower	Upper
Woman's age	0.0020	0.0072	0.28	0.7830	-0.0122	0.0162
Marital status	0.0629	0.1113	0.57	0.5720	-0.1552	0.2810
Religious affiliation	0.1099	0.0967	1.14	0.2560	-0.0796	0.2994
Poverty head count rate	-0.0053	0.0028	-1.89	0.0590	-0.0108	0.0002
Woman's education	0.0325	0.0675	0.48	0.6300	-0.0998	0.1648
Owning land	-0.0788	0.1232	-0.64	0.5220	-0.3203	0.1626
Paid employment	0.0661	0.0597	1.11	0.2680	-0.0509	0.1831
Food decisions	0.0635	0.0811	0.78	0.4340	-0.0955	0.2226
Residence	0.1191	0.0704	1.69	0.0910	-0.0189	0.2571
Wealth index factor score	0.0001**	0.0000	6.93	0.0000	0.0000	0.0000
Partner's education	0.0133	0.0654	0.2	0.8380	-0.1148	0.1415
Age of household head	0.0009	0.0029	0.33	0.7400	-0.0047	0.0066
Size of household	-0.0313	0.0293	-1.07	0.280	-0.0887	0.0261
Coverage by insurance	0.4051**	0.0718	5.64	0.0000	0.2643	0.5459
Adequate ANC attendance	0.0320	0.0617	0.52	0.6000	-0.0877	0.1517
Place of ANC attendance	-0.5704*	0.2622	-2.18	0.0300	-1.0843	-0.0565
Use of FP	0.0264	0.0796	0.33	0.7400	-0.1297	0.1825
Number of births	0.00767	0.0257	0.3	0.7600	-0.0426	0.0579
Time of the subsidy	-0.1980**	0.0581	-3.41	0.0000	-0.3119	-0.0842
Residuals	0.0310	0.0635	0.49	0.6200	-0.0936	0.1556
Intercept	-0.4896	0.3849	-1.27	0.2000	-1.2440	0.2648

\*p values <0.05; \*\*p values <0.01

On Table 8, it appears that the woman's demographic characteristics and their partners' such as the age of the woman and that of the household head, being affiliated to Christian religion, being married and attaining post-primary educational attainment (women and spouse) are associated with increased likelihood for choosing a private facility delivery although the associations are not statistically significant ( $p > 0.05$ ) *ceteris paribus*.

Holding other variables constant, owning land (alone or jointly with husband) illustrates a negative relationship because women who do are 0.0788 times less likely to make a choice to deliver in a private facility ( $p = 0.5220$ ). In addition, variables that grant women autonomy and independence in making decisions including making decisions on food cooked in the household and paid employment are associated with a higher likelihood of making a decision to experience a private facility delivery although the associations are not statistically significant ( $p > 0.05$ ).

As expected, women who were living in an urban environment in which a wide variety of private facility options are available were 0.1191 times more likely to choose a private facility delivery *ceteris paribus* ( $p = 0.09$ ). Holding other variables constant, women who had access to a form of medical insurance were 0.4051 times more likely to select a private facility delivery an illustration about how preferences are widened when alternative payment options and resources are available ( $p < 0.001$ ). Contrastingly, women from households described to have a low wealth index factor score were 0.0001 times less likely to choose a private health facility delivery when holding other factors constant ( $p < 0.001$ ).

Previous and current experiences in accessing sexual and reproductive health services appear to show mixed influences on the choice between a private and public facility birth. Women who attended ANC in any health facility were 0.5704 times less likely to choose to deliver in private facility *ceteris paribus* ( $p < 0.001$ ). On the converse, women who accessed adequate ANC were 0.0320 more likely to opt for a private facility delivery while holding other variables constant ( $p = 0.600$ ). However, previous FP use was associated with higher (0.0264 times) likelihood of opting to deliver in a private facility delivery *ceteris paribus* ( $p = 0.74$ ). With a unit increase in the number of births, woman were 0.00767 more likely to choose a delivery in a private facility while holding other factors constant ( $p = 0.760$ ).

As would be expected, women whose births occurred during the time of the maternity subsidy were 0.198 times less likely to choose a private facility delivery ( $p < 0.001$ ). This implies that the subsidy was driving women to make decisions in a way that they would optimally benefit from subsidized delivery fees.

Table 9 presents the parameter estimates (average marginal effects) for choice between a private versus a public health delivery.

**Table 9: Average marginal effect of choice for a private versus public facility (N=2,748)**

Private Facility Birth (reference public facility)	dy/dx	S. E.	z	P>z	95% C.I.	
					Lower	Upper
Woman's age	0.0006	0.0019	0.30	0.7640	-0.0031	0.0042
Marital status	0.0173	0.0285	0.61	0.5430	-0.0386	0.0733
Religious affiliation	0.0292	0.0249	1.17	0.2420	-0.0197	0.0781
Poverty headcount rate	-0.0013	0.0007	-1.87	0.0620	-0.0028	0.0001
Woman's education	0.0078	0.0174	0.45	0.6530	-0.0262	0.0418
Owning land	-0.0207	0.0318	-0.65	0.5140	-0.0830	0.0415
Food decisions	0.0165	0.0209	0.79	0.4310	-0.0245	0.0575
Paid employment	0.0170	0.0154	1.10	0.2690	-0.0132	0.0472
Residence	0.0301	0.0181	1.66	0.0970	-0.0054	0.0657
Wealth index factor score	0.0001**	0.0000	7.37	0.0000	0.0000	0.0000
Coverage by insurance	0.1039**	0.0183	5.68	0.0000	0.0681	0.1398
Partner's education	0.0033	0.0169	0.20	0.8430	-0.0297	0.0364
Age of household head	0.0003	0.0007	0.38	0.7040	-0.0012	0.0017
Size of household	-0.0052	0.0043	-1.21	0.2260	-0.0136	0.0032
Adequate ANC attendance	0.0080	0.0157	0.51	0.6090	-0.0228	0.0389
Place of ANC attendance	-0.1471*	0.0675	-2.18	0.0290	-0.2794	-0.0148
Use of FP	0.0073	0.0205	0.36	0.7210	-0.0328	0.0474
Number of births	0.0020	0.0066	0.31	0.7590	-0.0109	0.0150
Time after subsidy	-0.0506**	0.0148	-3.41	0.0010	-0.0797	-0.0215

\*p values <0.05; \*\*p values <0.01

This study identifies that 20.9% of 2,748 women who had opted for a facility delivery had chosen to deliver in private health facilities. This underscores the vital role the private sector plays in the health system in Kenya and confirms its untapped potential in making a substantial contribution to safe deliveries even during the era of highly subsidized services in public facilities. We content that there are multiple explanations for the continued preference for private facilities. First, private

facilities are historically attractive because they are associated with better quality services such as better infrastructure, cleanliness, short wait times, reduced crowding, and empathetic, trustable and welcoming health providers' attitudes (Fotso and Mukiira, 2012). Second, seeking services in a private facility, even when one is paying handsomely for the services, is associated with belonging to a higher social class. This perception drives women to deliver in private facilities even when the services are of poor quality compared to cheaper public facilities. Third, implementation challenges and missed opportunities related to devolution might have frustrated women who could have opted for public facilities driving them to choose private facilities (Asule *et al*, 2017). These three propositions have also been reported in studies conducted in SSA and Asia (Pomeroy, Koblinsky and Alva, 2014).

This study established that engaging in paid employment and making independent food decisions by women, which are markers of autonomy showed a positive influence on choice in favor of deliveries in a private facility. Additionally, increasing household head age and partner education were positively associated with a private facility delivery. On the converse, increasing household size reduced the likelihood of a private facility delivery. The mixed results on impact of socio-demographic factors and autonomy on private facility choice have been observed among 16 counties (Pomeroy, Koblinsky and Alva, 2010). Surprisingly, it appears that owning land (alone or jointly with spouse) is associated with a higher predictive probability of not choosing a private facility for birth. We hypothesize that this is a spurious finding. We content that land is a valuable asset whose ownership should imply higher economic independence by the women. There is need to critically review the participants' understanding of this DHIS question and the nature of responses it elicits.

This study has established that women from urban residences and those with medical insurance had a higher probability of delivering in private health facilities. Urban residence provide clients with a variety of choices because health facilities are proportionately highly concentrated in these centres (Kesterton *et al*, 2010). This includes a variety of low, middle and high costs private facilities providing women with low purchasing capability access to institutions within their reach. Owning insurance itself grants the women even wider room to choose because there is a perception that they will not bear the costs directly unless they exceed pre-set limits. We content that among women with insurance, moral hazard could not be absolutely voided and women who previously

experienced successful births through public facilities might opt to elect a private facility once they have access to insurance particularly given that we observed an increase in insurance coverage between 2008/9 and 2014. Recent studies conducted in Kenya have observed that transferring the costs of payment to an alternative payer including a voucher system and insurance providers increases service utilization in private facilities (Dennis *et al*, 2018).

Findings from this study highlight that women who have previously accessed ANC in a health institution were significantly less likely to opt for a private facility delivery during the subsidy. We observe that ANC services have been historically free in public facilities as part of the Kenya's Essential Package for Health and are covered comprehensively as part of the maternity subsidy. This could have resulted in higher institutional ANC attendance. In fact, the study by Dennis *et al* (2018) identified an increase in institutional ANC attendance during the life of the subsidy and during the period when a voucher system was available in private facilities within five counties. We speculate that there are women who had accessed ANC in private facilities but opted to seek delivery in the subsidized public facilities particularly since ANC services are not as costly as delivery costs and are offered on outpatient basis. Women might opt to access ANC services in private facilities to avoid long wait times, access high quality laboratory services and personalized care but elect to deliver in public facilities to enjoy the subsidy and avoid overpriced delivery services in private facilities.

Finally, the time-period during the maternity subsidy was associated with a reduced probability of choosing a private facility for birth. This portrays very positive impact of the maternity subsidy in reducing financial burden and swaying choice making in favor of public facilities where the subsidy was available. These findings highly concur with a study by Calhoun *et al* (2018) conducted in four Kenyan counties, which observed changes in women's preference for public facilities during the time of the subsidy. The findings imply that there existed women and their households who painfully bore the burden of the costs in accessing private facilities and who relinquished their previous choices when the costs were reduced for public facilities. Our study also observed that women from households with poor wealth index were less likely to prefer a private facility during the subsidy. We recognize the subsidy in potentially increasing equitable access to safe deliveries among women from poor households who were prevented from incurring avoidable financial burden.

## **CHAPTER FIVE: SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS**

### **5.0 Introduction**

In this chapter, we present a summary of the findings from the study, the conclusion and policy and future research recommendations

### **5.1 Summary and conclusion**

This study has elucidated the determinants of choice making for place of birth among women who experienced deliveries during the era of the maternity subsidy in Kenya. The study employed representative data from across the country. The study employed two-stage residual inclusion to check for unobserved endogeneity and constructed multi-collinearity matrixes to test for collinearity between the variables.

This study has identified that during the time of the subsidy, more women were likely to choose to deliver in a health facility, which highlights the impact of the subsidy towards increasing universal access to skilled births and its inherent potential in reducing unwarranted complications to the mother and unborn child during birth. Apart from the subsidy, the study has documented modifiable factors, which can empower women and strengthen decision making such as access to post-primary education for both the women and their spouses, paid employment, medical insurance coverage, urbanization, improved domestic wealth and access to the continuum of reproductive health services as factors that can increase decision-making agency towards choosing health facility deliveries.

During the time of the subsidy, this study has observed that private facilities made a substantial contribution to deliveries that occur in health facilities highlighting the role the private sector plays in reducing maternal morbidity and mortality. The study highlights that access to ANC, urbanization, improved household wealth and coverage by medical insurance serve as influencers when choosing private facilities.

## **5.2 Policy recommendations**

The findings of this study imply that the maternity subsidy has been helpful in driving more women to access institutional births. Emphasis needs to be laid on popularizing the subsidy to the potential beneficiaries, addressing the reported challenges related to its implementation and ring-fencing the allocation of resources to sustain the subsidy. Additionally, the subsidy can be expanded to cover a package of comprehensive reproductive health services.

The study contends that higher educational attainment for women and their partners, autonomy of women and engaging women in paid work positively influences decision-making. It is crucial that affirmative approaches that retain more women in education beyond primary school, create more women-friendly employment opportunities and policies that recognize and safeguard women's rights to own assets and enable women to control their own lives are enforced. Low poverty incidence and high domestic wealth are facilitative of positive choices. To address the quandary of low skilled attendance at birth, the government should deliberately invest in national poverty eradication schemes, implement measures that enrich households with domestic resources and reduce fertility rates to reduce dependency, which can lower domestic expenditures. Apart from this, policies which address prohibitive religious or cultural beliefs, and mitigate early pregnancies and early marriages should be enforced so that women get pregnant and are married when they are not only old enough to have sufficient agency for independent decision-making but also when they can negotiate safe practices including access to the continuum of safe maternal care services.

Kenya's policymakers should explore disruptive and innovative approaches that can expand health insurance coverage and widen access to third party payment systems to facilitate access to births in private and public facilities. The private health sector has emerged as a critical player in ensuring that women access safe deliveries. The Ministry of Health (MOH) should develop policies that strengthen investments in the private health sector such as tax waivers and public-private partnerships. Further, MOH should enforce the national quality standards for health service provision to ensure that high quality and safe maternity services are available to women who choose private facilities for their deliveries.

### **5.3 Recommendations for further research**

This study employed cross-sectional data from the KDHS, which has limitations to the nature of conclusions we can draw regarding decision-making. Furthermore, it employed data collected during the early phases of application of the subsidy when formative challenges were still being experienced. We recommend that prospective and mixed-method studies that can follow the women through the process when they make birthing intentions and through the decision-making process in real-world settings to generate robust explanations and patterns should be conducted.

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## APPENDICES

### Appendix 1:

**Table 10: Correlation matrix for home versus health facility delivery (N=4772)<sup>§</sup>**

Correlations	1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	17	18	19	20	21	22	
1. Place of birth	1																					
2. Woman's age	.063**	1																				
3. Marital status	.061**	.155**	1																			
4. Ownership of land	-0.018	.108**	-.101**	1																		
5. Number of children	-.058**	.738**	.179**	.112**	1																	
6. Women's education	.141**	-.078**	-.065**	-.053**	-.318**	1																
7. Adequacy of ANC	.061**	-.049**	.043**	-0.009	-.150**	.151**	1															
8. Place of ANC	-0.019	-.031*	0.025	-0.008	-.114**	.132**	.264**	1														
9. Employment status	.042*	.115**	0.019	0.005	.042**	.109**	.036*	.088**	1													
10. Religious affiliation	.046*	-.067**	-.076**	0.001	-.180**	.231**	.083**	.162**	.234**	1												
11. Use of FP	.091**	0.027	.058**	-.070**	-.119**	.242**	.153**	.225**	.228**	.341**	1											
12. Residence	.150**	-.052**	0.000	-0.021	-.181**	.229**	.132**	.129**	-.059**	0.009	.171**	1										
14. Food decision	.063**	.144**	.631**	-0.024	.119**	-.041**	0.022	.041**	.037*	-0.016	.076**	-0.013	1									
15. Coverage by insurance	.222**	.073**	.065**	-0.026	-.124**	.314**	.132**	.095**	.137**	.117**	.177**	.155**	.057**	1								
16. Time of the subsidy	-.084**	-.125**	-0.011	-0.024	-0.018	-0.018	-.057**	-0.015	-.051**	-0.020	-.066**	-0.006	-0.023	-0.024	1							
17. Partner's education	.139**	0.021	.124**	-.039**	-.179**	.399**	.148**	.131**	.084**	.153**	.246**	.234**	.095**	.292**	-0.028	1						
18. Number of living children	-.053**	.730**	.182**	.111**	.968**	-.316**	-.156**	-.118**	.032*	-.180**	-.121**	-.183**	.131**	-.114**	0.0154 1	-.172**	1					
19. Poverty headcount rate	-.038*	-.065**	0.006	0.014	0.021	.079**	0.011	-0.012	-0.025	.109**	-0.015	.068**	-.049**	0.005	-0.016	.060**	0.005	1				
20. Size of household	-.076**	.308**	-.133**	-0.017	.499**	-.165**	-.100**	-.050**	0.012	-.155**	-.140**	-.138**	-.106**	-.083**	.052**	-.133**	.524**	0.010	1			
21. Age of household head	-.044*	.217**	-.307**	-.052**	.163**	-0.002	-0.020	-0.014	0.008	-.029*	-.076**	-.127**	-.207**	-.038**	-0.011	-.071**	.157**	-0.021	.481**	1		
22. Wealth index factor score	.277**	-.029*	-.031*	-.117**	-.296**	.473**	.212**	.276**	.125**	.263**	.427**	.524**	-0.014	.365**	-.036*	.434**	-.296**	.057**	-.136**	-.036*	1	

\*\* Correlation is significant at the 0.01 level; \*Correlation is significant at the 0.05 level (2-tailed)

<sup>§</sup> The numbers of the variables on the horizontal column corresponds to the variable description and number on the vertical column

## Appendix 2

**Table 11: Correlation matrix for private versus public delivery (N=2748)<sup>§</sup>**

Correlations	1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	17	18	19	20	21	22
1. Place of birth	1																				
2. Woman's age	.063**	1																			
3. Marital status	.061**	.155**	1																		
4. Ownership of land	-0.018	.108**	-	1																	
5. Number of children	-.058**	.738**	.179**	.112**	1																
6. Women's education	.141**	-.078**	-	-.053**	-.318**	1															
7. Adequacy of ANC	.061**	-.049**	.043**	-0.009	-.150**	.151**	1														
8. Place of ANC	-0.019	-.031*	0.025	-0.008	-.114**	.132**	.264*	1													
9. Employment status	.042*	.115**	0.019	0.005	.042**	.109**	.036*	.088**	1												
10. Religious affiliation	.046*	-.067**	-	0.001	-.180**	.231**	.083*	.162**	.234**	1											
11. Use of FP	.091**	0.027	.058**	-.070**	-.119**	.242**	.153*	.225**	.228**	.341**	1										
12. Residence	.150**	-.052**	0.000	-0.021	-.181**	.229**	.132*	.129**	-.059**	0.009	.171**	1									
14. Food decision	.063**	.144**	.631**	-0.024	.119**	-.041**	0.022	.041**	.037*	-0.016	.076**	-0.013	1								
15. Coverage by insurance	.222**	.073**	.065**	-0.026	-.124**	.314**	.132*	.095**	.137**	.117**	.177**	.155**	.057**	1							
16. Time of the subsidy	-.084**	-.125**	-0.011	-0.024	-0.018	-0.018	-	-0.015	-.051**	-0.020	-.066**	-0.006	-0.023	-0.024	1						
17. Partner's education	.139**	0.021	.124**	-.039**	-.179**	.399**	.148*	.131**	.084**	.153**	.246**	.234**	.095**	.292**	-0.028	1					
18. Number of living children	-.053**	.730**	.182**	.111**	.968**	-.316**	-	-.118**	.032*	-.180**	-.121**	-.183**	.131**	-.114**	-	-	1				
19. Poverty headcount rate	-.038*	-.065**	0.006	0.014	0.021	.079**	0.011	-0.012	-0.025	.109**	-0.015	.068**	-.049**	0.005	-0.016	.060*	0.005	1			
20. Size of household	-.076**	.308**	-	-0.017	.499**	-.165**	-	-.050**	0.012	-.155**	-.140**	-.138**	-.106**	-.083**	.052**	-	.524**	0.010	1		
21. Age of household head	-.044*	.217**	-	-.052**	.163**	-0.002	-	-0.014	0.008	-.029*	-.076**	-.127**	-.207**	-.038**	-0.011	-	.157**	-0.021	.481*	1	
22. Wealth index factor score	.277**	-.029*	-.031*	-.117**	-.296**	.473**	.212*	.276**	.125**	.263**	.427**	.524**	-0.014	.365**	-.036*	.434*	-.296**	.057**	-	-.136*	1

\*\* Correlation is significant at the 0.01 level; \*Correlation is significant at the 0.05 level (2-tailed)

<sup>§</sup> The numbers of the variables on the horizontal column corresponds to the description and number on the vertical column

