DETERMINANTS OF FIRST POSTNATAL CHECK-UP AMONG NEWBORNS IN KENYA

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DECLARATION

I declare that this is my original work and has not been presented for the award of a degree in this or any other university

Signature…… Date……

Wanjohi Evans Mwangi

X53/85586/2016

This thesis is submitted for the award with my approval as the supervisor.

Signature…… Date…….

Dr. Mercy Mugo

School of Economics

DEDICATION

To my family, for their unwavering love and support during this part of my life.

I thank you.

ACKNOWLEDGEMENTS

For God’s grace of good health and a sound mind to be able to commence and successfully complete my graduate studies, I am always indebted.

Special gratitude goes to my supervisor Dr. Mercy Mugo for her valuable input in shaping this paper and helping me build a strong foundation in research writing. Your patience and guidance every step of the way was more than appreciated.

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LIST OF ABBREVIATIONS

ANC	Antenatal Care/Clinic
f PNC	first Postnatal Care
FP	Family Planning
HSB	Health seeking behavior
KDHS	Kenya Demographic and Health Survey
LMIC	Low and Middle Income Countries
MCH	Mother and Child Health
MDGs	Millennium Development Goals
MMR	Maternal mortality rate
MNCH	Mother, Neonatal and Child Health
MOH	Ministry of Health
MoPHS	Ministry of Public Health and Sanitation
NMR	Neonatal mortality rate
PNC	Postnatal Care
SDGs	Sustainable Development Goals
SSA	Sub-Sahara Africa
TBA	Traditional Birth Attendant
UNICEF	United Nations Children’s Fund
UN-IGME	United Nations Interagency Group for Child Mortality Estimation
WHO	World Health Organization

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ABSTRACT

Maternal, neonatal and child health remain an important aspect covering the general health and well-being of both the mother and the child. Postnatal care has for the most part received limited and at times no attention more so from the newborns perspective. Healthcare workers for the most part have given the required PNC attention to the mother but have subsequently neglected the newborn. Sub-Sahara Africa and southern Asia have borne the biggest brunt in both morbidity and mortality rates being the highest globally. In Kenya, the picture is no different. Various studies have looked at factors affecting uptake of postnatal care from the mothers' perspective. Scarce studies have looked at first PNC among newborns in Kenya. Using secondary data from the KDHS 2014, this study sought to analyze the determinants of first PNC among newborns in Kenya.

This study employed a three level analysis; univariate, bivariate and multivariate analysis. From the results generated, wife's age, education level, timing of mothers' first PNC, the provider of care for both, timing of the ANC visits and their frequencies, place of delivery, household wealth, region and residence emerged as being highly significantly associated with the first postnatal care among the newborns. Birth spacing as well as the gender of the household head, did not have a significant association with the first uptake. At the multivariate level, ANC visits, provider of mothers' PNC check and place of delivery emerged as significant determinants of first postnatal care checkup among newborns.

Evidence based policy recommendations proposed looking at the quality of care given at the health institution. In addition, it was seen to be important to look at postnatal care after discharge from the facility and its impact on newborn health.

CHAPTER 1: INTRODUCTION

1.1 Background of the study

The period following childbirth is known as the postnatal period. Mothers and babies are given care during this time, most crucially within the first 24 hours and for the next 42 days. This is defined as postnatal care. Lack of appropriate and adequate care during this time results in disability and or even death (WHO, 2006). Following a series of conferences held by the United Nations in 2000, all 191 countries then including 22 global organizations established the eight international development goals for the year 2015 commonly known as Millennium Development Goals (MDGs). The fourth objective outlined a reduction in child mortality rates, specifically, a 66.67% reduction in the under-five mortality between 1990 and 2015. The fifth goal focused on maternal care improvement. The first sub-goal here, focused on maternal death reduction by 75% between 1990 and 2015. The second target under this fifth goal focused on attainment of global health access and coverage in reproductive health by the year 2015 (UNICEF, 2012). This was relative to a baseline of meetings held in the 1990s that agreed to concentrate on MCH services, nutrition as well as human rights.

The approximate number of deaths in under-fives reduced from a high of 12.7 million in 1990 to about 6.3 million in 2013.This was about a 50% decrease in the death rate. Worldwide, the MMR decreased by 44% to approximately 216 deaths in 2015 compared to 385 deaths per 100,000 live births in 1990. In absolute numbers, maternal deaths reduced by 43% to 303,000 in 2015, from 532,000 in 1990. Out of this, LMICs contributed about 99%, which are about 302,000 of global maternal deaths in 2015. Countries in SSA accounted for 66% (201,000) of these deaths and southern Asia contributed 4% (WHO, 2015).

Although considerable efforts were made during the lifetime of the MDGs, the world still fell short of its targets. Mortality rates of both mother and child are still high and remain an area of concern and priority as the world transitions to the Sustainable Development Goals (SDGs). Large geographic inequalities persist as seen in SSA and southern Asia (WHO, 2015). In the new SDGs agenda through 2030, WHO set strategies that focused

on decreasing maternal death rates worldwide, to fewer than 70 deaths per 100,000 live births as well as put an end to preventable mortalities among neonates as well as children less than five years of age. The SDG agenda in addition to this also focuses on reducing NMR to 12 per 1,000 live births and under five death rates to 25 per 1,000 live births. Countries with highest death burdens will need an even greater reduction (WHO, 2015).

There has been considerable achievement in SSA and south asia in recent years where the mortality rates of mother and child have been concentrated. 22 countries in these regions with the highest burden have had average reduction rates of 4.4% or higher. With such considerable milestones achieved, 17,000 children are still dying daily, majority of who are below five years of age. (UN- IGCME, 2014).

Resulting deaths from these women and children are largely due to preventable causes, most of which arise in the disadvantaged population groups. Some of the main causes of child mortalities include infectious respiratory diseases such as pneumonia, diarrhea and malaria. These are easily prevented, diagnosed and managed at facility level (Lancet, 2014). About half of all postnatal maternal mortalities happen in the first seven days with a majority being within first 24 hours. The main cause which accounts for 34% of all deaths is post-partum hemorrhage. Infection and sepsis account for about 10% of all deaths, with HIV positive mothers accounting for more deaths than HIV negative mothers (WHO, 2006).

There are a total of 130 million live births that occur yearly. Out of these, 3.7 million to 4 million death cases occur within the initial four weeks. Two-thirds of these mortalities take place in the initial seven days and 50% on the first day (1.9 million to 2 million deaths).Countries in resource limited settings contribute the majority. SSA has the highest rates of newborn deaths. The main cause of death is asphyxia[1] within the first 24 hours and 38% die of infection in the first week. These newborn deaths contribute to about 44% of all mortality cases among children below five years and progress is slow in bringing down these numbers (WHO, 2006).

[1] Birth asphyxia is a condition that occurs when the baby's vital organs are deprived of oxygen. More often causing harm to the brain.

It is unfortunate that the newborn deaths take place before six weeks when child health services are scheduled to commence through the immunization visits. Inadequate care and low coverage has negative effects on activities geared towards MNCH continuity of care. It is approximated that if the scheduled postnatal checkup and any curative care required during this period reached to 90% of the mothers and newborns, then between 10 and 27% of fatality cases among the newborns could be avoided (Lancet, 2005).

The World Health Organization through a technical working group reviewed existing and other agency guidelines relating to PNC. The main focus during this review was on PNC checkup for the mother and the child within LMICs and other resource limited settings. The crucial outcomes observed for newborns were morbidity and mortality. These guidelines also addressed the frequency, timing and the location where the service was rendered and what was encompassed therein. That is, what parameters or activities were checked or performed on the newborn (WHO, 2013).

WHO recommendation 2 stated that if the delivery occurred in a health institution, babies together with their mothers were to receive PNC at the premise for 24 hours. However, if the birth occurred away from the health institution, for example at home, then the initial contact was to be within 24 hours. Three other postnatal care contacts to be scheduled on day three, between day seven and fourteen and 42 days later from the date of birth. This as per the technical working group was a strong recommendation on the basis of positive outcomes seen in empirical studies that focused on newborn outcomes. In addition to this, a strong WHO recommendation 3 advocated for house visits within the first seven days (WHO, 2013).

1.2 Postnatal Care in Kenya

The ministry of public health and sanitation (MoPHS) in 2010 came up with a child survival and development strategy (CSDS) and a national framework that looked at the mother and child health as well as their well-being. The aim of these documents was to provide a roadmap that would lead to improved health outcomes for both with a focus on proper nutrition within the existing government health facilities. The MoPHS further developed an operationalization manual with top priorities being high impact interventions for the newborn that were less costly and having proven to have worked

elsewhere. They included: delivery with the assistance of a skilled HCW, presence of antibiotics for infection control, proper and hygienic cord care, hand washing, exclusive breastfeeding, HIV prophylaxis and temperature control (MOPHS, 2010 unpublished).

Maternal mortality rate in Kenya currently stands at 362 per 100,000 live births and the NMR at 22 per 1,000 live births. This remains higher than the global average estimates of maternal mortality rates at 216/100,000 and NMR at 18/1,000 live births (UNICEF, 2015). This is despite the policy documents being in place. Significant newborn deaths in Kenya take place in the home setting and involve family practices that inform care of the newborns which are based on existing traditions which may not necessarily be of benefit to the newborn and at times, have proven harmful (KSPA, 2010).

Kenya's health ministry has stipulated in the national maternal and obstetric guidelines, three scheduled postnatal visits. The first contact to be within 48 hours, the second within seven to fourteen days and the third within 42 days (MOH, 2014). In Kenya, more than 80% of the health facilities are in a position to offer MCH services including postnatal care. However, only 59% of them offer PNC (KSPA, 2010).

In the recent KDHS 2014, about 53% of mothers had a postnatal care checkup within the crucial 48 hours post-delivery. About 43% of them did not receive any PNC checkup within the first 42 days. Only 36% of the babies received the initial crucial checkup within the first two days after delivery. Surprisingly, 62% of newborns had no PNC assessment within the first seven days. Overall about 52% newborns did not receive any postnatal checkup at all (KDHS, 2014).

The provider of the postnatal checkup came from a medical officer, nurse or a midwife and about 49% of these mothers received the first care from either of these clinicians. 33% of newborns also received the initial care from either of the above. It is worth noting that traditional birth attendant role in PNC provision to the mother diminished from 10% in the previous demographic survey to about 4% of mothers receiving care from the TBAs. Only 2% of newborns received postnatal care from TBAs (KDHS, 2014).

Mothers aged 35 years and below, those who had just delivered their first child and the delivery was in a health institution, supervised by skilled providers had the highest uptake of a postnatal checkup. Central region in Kenya recorded the highest uptake with 72% of women utilizing this service while the north eastern part had the lowest uptake at 14% (KDHS, 2014).

Poor or no antenatal care services, low wealth index, women in rural residences, age of the mother at delivery, geographic distance between health institution and home, low levels of education, employment status are some of the key contributing factors that have been identified with low utilization of postnatal check-up in Kenya. Cultural practices such as seclusion of the newborn for instance until the umbilical cord falls have also played a key role in the service uptake. Poor communication of healthcare workers to the mothers as well as weak referral systems also contributes to low PNC (KSPA, 2010).

1.3 Integration and continuum of care

It is difficult to separate the healthcare needs of the mother, newborn and child as they are linked. The patterns normally seen for the mothers reflect that of the newborns and children and at times could be worse for the latter. Some existing programmes still treat mothers' health concerns different with the newborn and child. This remains to be of great concern that needs immediate resolution since the first day of life and subsequent days are the most crucial since it is when mortality is at the highest. More than half of all mother and baby fatality cases as well as intrapartum still births occur here, yet it is when the quality of care given and its coverage is at its lowest (Lancet, 2005).

Effective integration in the continuity of care should incorporate mother, newborn and child health packages starting from the female adolescence stage, through to pre-pregnancy care, post-pregnancy period and into childhood. It has been noted for example that availability and ease of access to family planning commodities leads to desired pregnancies within the desired period which further contributes to good care throughout the gestation period and safe delivery aided by qualified health workers and post-delivery care including postnatal care with its appropriate timings (WHO,

2005).Other estimates point that an increase in PNC coverage coupled with appropriate interventions from before conception leading all the way to child birth, can save up to 1.9 million neonatal lives yearly (Bhutta et al., 2014).

Integration could result in more lives being saved at a lesser cost and strengthening of a more robust healthcare system (Adam et. al, 2005). In this integration, promotion of key practices such as proper nutrition care, PMTCT, scheduling of immunization visits, home visits and malaria prevention and control practices could be incorporated. PNC home visits by skilled providers within 48 hours after delivery for instance, could result in a 30–40% reduction in newborn deaths (Baqui et al., 2009).

Antenatal care serves as the first point of contact along the continuum of care for an expecting mother. Effective programmes during this visit leads to better outcomes during delivery and well into postnatal care. A majority of African countries spend about US$0.58 cents per capita on time, drugs, supervision and other varied costs to deliver essential newborn interventions. To scale up the antenatal and postnatal care to 90% coverage, it is approximated that an extra US$ 0.20 per capita on ANC and US$ 0.29 per capita on PNC is needed. Care at delivery has shown the highest impact when it comes to saving newborn lives at an extra cost of US$ 0.76 per capita. Thus, African states would require a total of an additional US$ 1 billion to provide 90% coverage of ANC and PNC to mothers and newborns with crucial MCH packages all at an extra cost of US$ 1.39 per capita. This would ultimately reduce long term disabilities and improve overall quality of life (Adam et. al, 2005).

The main focus on integration should be to get all the essential mother, newborn and child health (MNCH) interventions to optimum quality and wide coverage as opposed to choosing between these packages (WHO, 2006).

1.4 Statement of the Problem

A significant number of newborn deaths are in babies delivered away from a health institution in SSA (Sines et al., 2007). This has been seen to be due to inappropriate management of complications should they arise and poor hygienic practices at delivery and during the first crucial hours of life (Lukonga et al., 2015).

Most of these neonatal lives have a chance of being saved through early PNC checkups (Titaley et al., 2009; Kearns et al., 2014). The care offered at this initial and subsequent postnatal checkup should include; checking for breathing, temperature, breastfeeding and movement. This also serves as an opportune time to educate mothers on other best newborn practices (Sines et al., 2007; Kante et al., 2015; UNICEF, 2015). Approximately 10% of all newborns in every country need assistance to begin breathing immediately after birth (Save the children, 2014).

Along the continuum of care, seamless service provision has been disrupted and the postnatal period has become the most neglected period. Childbirth and related programmes are among the weakest of MNCH programmes in the continent including Kenya (Mohan et al., 2015; WHO, 2013; Warren et al., 2006). Different studies that have been carried out have tried to identify factors associated with PNC uptake and utilization. Some include; facility or home delivery, maternal education, employment status and wealth status (Kante et al., 2015; Lwelamira et al., 2015; Mohan et al., 2015; Somefun, 2016). However, findings appear not to be consistent. For example, ANC attendance and household income was shown significant in PNC uptake (Kante et. al, 2015). Weak or no associations were seen in a different study in regards to PNC uptake (Mohan et. al, 2015).

Studies examining uptake of the first PNC among newborns in Kenya are rare. The few studies present, focus on PNC; both the mother and the newborn. Some have focused on a framework to improve PNC in Kenya (Chelagat et al., 2016). Others have been to determine postnatal care use among mothers only (Akunga et al., 2014) while others have looked at the timing of postnatal care services among mothers (Kosgey, 2009).

This study sought to look at the timing of the first newborn PNC from the KDHS 2014. Newborns were considered having made the first postnatal checkup within 24 and 48 hours if the delivery was conducted in a health institution. If the delivery was away from the facility, for example at home, the newborn were considered to have made the first postnatal checkup at the health facility within 24 hours after birth. This is in line with the second WHO recommendation on the timings.

1.5 Research questions

The principal research question in this study was to investigate what factors are attributed to the first postnatal care checkup among newborns in Kenya. The specific questions guiding this study were:

- What percentage levels of uptake and non-uptake of the first PNC among newborns are associated with the chosen predictor variables of interest?
- What is the association between each predictor variable with the first postnatal care among newborns in Kenya?
- What significant determinant factors are associated with first PNC checkup utilisation among newborns in Kenya?
- What are the evidence-based policy recommendations that promote first PNC checkups among the newborns in Kenya?

1.6 Research Objective

The main objective of this study was to investigate the factors attributed to the first postnatal checkup among newborns in Kenya. Specifically, the study sought to:

- To determine the percentage levels of uptake and non-uptake of the first PNC among newborns with the chosen predictor variables of interest.
- To analyze the association between each predictor variable with the first postnatal care among newborns in Kenya.
- To identify significant determinant factors associated with first PNC checkup utilisation among newborns in Kenya.
- To provide evidence-based policy recommendations that will promote first PNC checkups among the newborns in Kenya.

1.7 Significance of the study

Postnatal care remains an area along the continuum of mother, neonatal and child health care that continues to receive limited attention in Kenya. It is unfortunate that the resulting mortality cases in the first few hours of life could be averted but with the low first PNC uptake, they are not. Investigating the determinants of this, contributes to a body of knowledge; provides empirical evidence to inform decision-makers on national policies relating to postnatal care coverage. The study also identifies key factors responsible for the relatively low first postnatal visit in Kenya.

With the numerous predictors that contribute to uptake of the first postnatal checkup, an effective grasp of this information is of significance as it helps in formulating better best-practices that will see the relevant stakeholders increase the coverage and utilization of this service in Kenya.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter presents the theoretical literature, empirical as well as an overview of the reviewed literature on first postnatal check-up among newborns. The initial PNC checkup is of importance since it serves as a vital component in newborn care. The access and availability of high quality of care contributes significantly to improving neonatal health.

2.1 Theoretical Review

The process of seeking healthcare is complex coupled with behavior processes influenced by socio-economic and demographic factors, service availability and accessibility as well as perceived need for the healthcare itself (Sikder et al., 2015). Healthcare seeking patterns are also dependent on quality of healthcare givers, opportunity cost, the quality of the services rendered, convenience as well as effectiveness (Sarker et al., 2014). The Illness, its duration and the age of the ill person, are vital predictors of whether mothers seek care for the children or not (Ahmed et al., 2005).

2.1.1 Health seeking behavior

Individuals, who perceive themselves as being ill or having any health problems, undertake certain activities to restore back their health. This is referred to as health seeking behavior (HSB). Health seeking behavior is placed inside the wider dimension of health behavior whereby activities are geared towards prevention of ill health, conserving good health and measures employed to deal with any deviation from a state of good health. Within the health behavior, there is also the sub-discipline of health belief modeling that attempts to explain certain beliefs that can contribute to individual motivations towards the health behavior (Abraham et al., 2000).

There are several models that help in description and prediction of health seeking behavior. Two main approaches have emerged in health seeking behavior modeling. The first is the ‘pathways’ model. This describes a series of steps people take toward health, in this case, the mother, in seeking the first postnatal checkup for the newborn

(Mackian et al., 2004). Suchman (1965) developed one of the fore-most pathway models. In his model, he stated that an individual's period of illness could be divided into five stages. First, the individual starts by experiencing the symptoms of the illness, then adopts the sick role, the individual then contacts a doctor, he becomes the patient and finally, stage five, the individual gives up the sick role. He concluded that stage one and two were of critical importance when decisions were being made with severity of the pain due to the illness and input from family and friends being very crucial.

Suchman further stated that once the decision to seek treatment was reached, the subsequent phases were easy to come by (Suchman, 1965). In as much as this study was useful in defining the steps taken during an illness episode, other scholars revealed that the third and fourth stages are not always as easy as per Suchman's assumptions. Postnatal care is more of a preventive and promotive approach than a curative one. Healthcare services offered differ in quality and as such, Suchman's study did not cater for the likely outcome of delaying in seeing a doctor and subsequently assuming the patient role and therefore could not satisfactorily address the differences in utilisation also of health facilities. Although this model is useful for outlining the steps taken by mothers in seeking for the health service, it fails to address the question why certain decisions are made and what drives them (Dutton, 1978).

The second approach in health seeking behavior modeling is the 'determinants' model. Here, the common models include those of Mechanic 1972 and Andersen 1975. The mechanic model focuses on health seeking behavior being in line with the society and its culture and as such, becomes a learnt response. He stressed the importance of psychological and cultural determinants within the society in exploring utilisation of doctors when seeking care. This model however assumed that mothers seek care only from formal biomedical institutions. It also failed to note that decisions where health seeking is directed by the extended family members and the local community (Mechanic, 1972).

Andersen's first model proposed that healthcare seeking behavior has a basis on three categories. These are: predisposing, enabling and needs-based factors (Andersen, 1975). This is a useful model for understanding health seeking behavior in uptake of the

first postnatal checkup. However, the modified Andersen behavioral model of health services shall be adopted in this study.

2.2.2 Andersen and Newman behavioral model

The framework for this study will be the Andersen and Newman behavioral model of health services use (Andersen & Newman 2005). It centers on the person as the unit under investigation and examines differences when it comes to consumption of medical care services from a socio-demographic view. In this study, the individual will be the newborn and the factors that contribute to their first postnatal checkup. This model has the advantage of assessing information on mothers' characteristics retrieved from the Kenya demographic and health survey 2014. The model's assumption is that healthcare service use is largely influenced by several determinant factors, which are classified as need, predisposing and enabling factors.

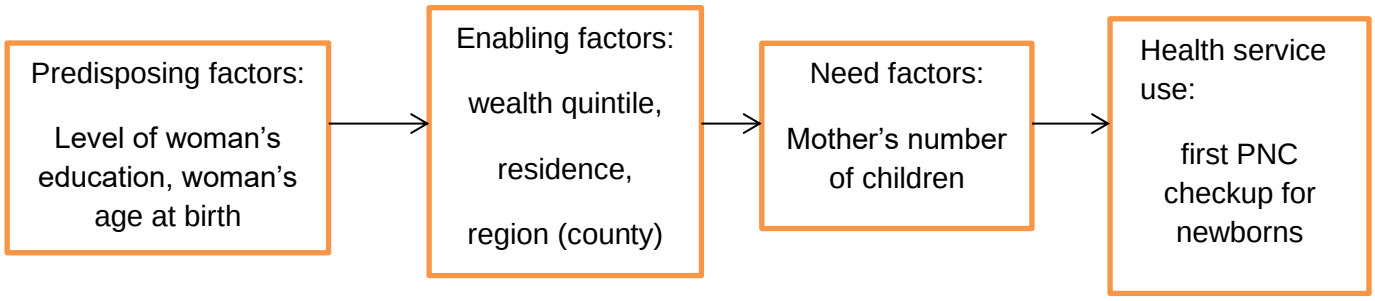
Predisposing factors look at the socio-cultural characteristics among people, in this case mothers' tendency to utilize health. In Andersen's model, predisposing factors consist of health attitudes and beliefs, religion, marital status, occupation, size of the family, sex, age and education,. These factors contribute significantly as to whether the mother seeks care for the newborn or not (Andersen & Newman 2005).

Enabling factors focus on family and community characteristics that contextualize the mother's ability to receive health services. Examples of the characteristics include but not limited to geographical distance to health institution, residential area (urban or rural), wealth status, region of the country located and provider-to-population ratio (Andersen & Newman 2005).

Need factors consist of both perceived needs and evaluated needs. Perceived needs are the self-judgments of the urgency and magnitude of the health concern that is, facility checkup for the first postnatal visit or of the probability that its occurrence is sufficient to warrant seeking care. They can be operationalized through self-reported symptoms, perception of disability, or a self-report of one's general state of health.

Evaluated needs are those based on a physical exam, clinical diagnosis, or external, objective criteria as to whether care is warranted.

Figure 2. 1: Andersen and Newman Behavioral Model



Source: Andersen and Newman, 2005

2.2 Empirical Review

2.2.1 Determinants of first postnatal check-up uptake

There are several factors contributing to uptake of the first postnatal checkup. Some of these factors have been seen to encourage timely utilisation while others have been seen as inhibiting. The determinants discussed hereunder will be divided broadly in to three. First, socioeconomic where we shall look at the region (area/county), residential place (rural or urban), mother's education level and wealth quintile. Secondly, demographic factors where the age of the mother at delivery as well as her parity will be looked at. Thirdly, health service factors i.e. whether the delivery was conducted in a health institution or elsewhere and antenatal care timings and frequencies. Review of existing literature will be done in each of these areas.

2.2.1.1 Region (County)

Women residing in all eight provinces in Kenya apart from the rift valley province had lower odds of postnatal care utilisation for their newborns and themselves in comparison to women in Nairobi (Akunga et al., 2014). This is however inconsistent with other studies where women who delivered outside health institutions in nyanza province, had a higher likelihood of seeking PNC from skilled health professionals within 48 hours after delivery (Kosgey, 2009). Women seeking care in Nairobi and

central regions had however higher tendencies to seek postnatal checkups compared to the other regions (Kosgey, 2009).

2.2.1.2 Residence

Women in rural areas had a lower tendency of PNC utilisation in relation to those in urban centers. Among the newborns that received first postnatal checkup within the recommended 48 hours in the urban areas were twice as high as those in the rural centers (Bwalya et al., 2017; Dansou et al., 2017). Similar studies drawn from Ethiopia came to a similar conclusion (Mekonnen &Mekonnen, 2002). Several factors seen to contribute to these differences include; higher levels of knowledge in urban areas, easy access to healthcare services and health promotion and education activities geared towards an urban audience (Singh et al., 2011). However, some studies have shown no statistical significant relationship with timing of uptake of the first PNC between urban and rural women (Kosgey, 2009).

2.2.1.3 Mother's education level

Several studies done in developing countries, most of them being in SSA, have shown a direct relationship in the woman's level of education and uptake of PNC. They highlighted that the higher the level of education, the higher the probability of utilisation of care for themselves and their newborns (Dhakal et al., 2007; Neupane & Doku, 2013; Rahman et al., 2011). For instance in Nigeria, the education level was shown to have a positive effect to uptake of PNC. Educated women were seen to have a higher likelihood of seeking delivery care services in a facility setting as opposed to the uneducated women and in turn, this was related with a higher chance of utilizing PNC checkup (Ononokpono et al., 2013). Studies in Pakistan also linked low postnatal care uptake with low levels of education (Yunus et al., 2013). Kenyan studies around this area have also pointed to a positive influence of education on PNC uptake. Women who had their births away from a facility setting with only a primary school education were 2.6 times more likely compared to those with no education to seek PNC within two days (Kosgey, 2009). Mothers with a post-primary school education were 1.8 times more likely to seek care than those with a primary school education alone (Kosgey, 2009). About 90% of mothers aged between 20 to 29 years with a primary education had a

higher PNC uptake in comparison to the older cohort groups (Akunga et al., 2014). Mothers who had no education had a 30% less chance of postnatal care utilisation than those with a secondary or tertiary education. Because of education and knowledge at present more young women have an inclination to modern medicine for use by their children (Akunga et al., 2014).

2.2.1.4 Wealth quintile

The family's economic and social position based on their household income has been shown to have a direct relationship with PNC utilisation. In Zambia for instance, studies have shown that the number of newborns receiving the initial care within 2 days, increases as family wealth increases. Babies that were born in families categorized as rich were twice as likely to get the initial PNC within 48 hours compared to those in poor households (Bwalya et al., 2017). This is also consistent in Benin republic where mothers and newborns in rich or richest quintiles had a higher likelihood of receiving PNC as to those in the poor or poorest quintiles (Dansou et al., 2017). This has been seen to be due to high expenses of medical care in SSA. Due to the competing needs within the family for the limited financial resources, studies have shown that women from poor families, due to this prioritization, may opt not to use the PNC services. This, a stark contrast to women in families where resources are available for utilisation (Muldoon et al., 2011; Singh et al., 2012).

2.2.1.5 Mother's age when giving birth

A higher death rate in mothers and newborns has been observed in women who give birth either when they are too young or are nearing the end of their reproductive cycle. These statistics have been partly due to their lack of PNC utilisation especially for those mothers under 20 years (teen mothers) and those above 40 years since they tend to be more susceptible to complications during and after childbirth thus compromising the quality of health in mother and newborn (Akunga et al., 2014).

Other studies carried out have pointed to the contrast. They suggested that mature older women were thought to be more experienced and knowledgeable in seeking care for themselves and their newborns and as such had a higher likelihood of postnatal care

services utilisation. The studies also tied in other factors related to the age of the mother such as the decision power. Younger women were seen not to participate in the decision making process thus hindering them from accessing PNC (Glei et al., 2003; Reynolds et al., 2006).

2.2.1.6 Mother's number of children

Studies done in Malawi suggested that adolescent women who had two or three children, had lower chances of seeking postnatal care for subsequent births for themselves and their newborns, compared to adolescent women had had a single child (Rai et al.,2013). This resonates with a study in Benin, where mothers with higher rank of births had a lesser probability of receiving the appropriate first PNC within two days (Dansou et al., 2017). Studies carried out in Turkey and Nigeria came to the same conclusion (Rai, Singh& Singh, 2012). Part of the reason for this finding among different scholars was that women were more careful when it came to seeking care during their first pregnancy than subsequent births. However, as the women got more and more children, they relied more and more on previous experiences with their earlier pregnancies and as such reluctant in seeking appropriate and timely PNC (Mekonnen & Mekonnen, 2002). In line with this and cutting across availability of resources, evidence suggests that as the family grows, fewer resources become available for postnatal care access.

2.2.1.7 Place of delivery

Mothers who gave birth in a health institution aided by skilled healthcare workers were seen to have a higher utilization of PNC services than those who delivered elsewhere (Anwar et al., 2008; Mrisho et al., 2009). Studies done in Nepal further suggested that women with skilled assistance during delivery had a higher chance of postnatal care utilisation than those who lacked assistance (Paudel et al., 2013). In Zambia, 58% of newborns born in a health center got their first PNC as opposed to 48% of newborns who were delivered away from the facility (Bwalya et al., 2017).

Facility deliveries lead to higher uptake of first PNC, regardless of whether the delivery was in private or public facilities. The place of delivery emerged as significant in first

PNC utilisation, consistent with the above studies (Dansou et al., 2017). Kenyan studies also showed a positive outcome where delivery in a health facility significantly increased PNC use by about 37%. Mothers' whose delivery was conducted by unskilled healthcare workers were 81% less likely to utilize PNC compared to those who gave birth with the assistance of skilled workers (Akunga et al., 2014). However, another study in Nepal suggested the contrary. The study came to the conclusion that the place of delivery had an indirect relationship with postnatal checkup within eight weeks of delivery (Neupane & Doku, 2013).

2.2.1.8 Antenatal care

Studies done looking at the continuum of care for the mother, newborn and child health, came to the conclusion that ANC plays a crucial role in this cascade (Kerber et al., 2007). According to the study, emphasis was that these visits present vital opportunities for skilled healthcare workers (medical doctors and midwives), to educate mothers on the importance of facility delivery, benefits gotten from exclusive breastfeeding as well as why it is vital to return to the health institution for postnatal care (Kerber et al., 2007). Similar conclusions were observed in that ANC visits made were directly proportional to mothers bringing their children not only for PNC but also for vaccinations and nutritional supplementation (Dixit et al., 2013).

2.2.2. Methodological choices and approaches

Different studies carried out globally, have sought to study the link between postnatal care uptake and utilization by mothers and newborns and their demographic and socioeconomic status. Different methods were employed depending on availability of data and the population group under investigation. For instance, in Bangladesh, a mixed method approach was used in a cross-sectional study. The results showed that 94% of the women failed to use PNC services. Inferring from the qualitative results, lack of use was seen to be because of several reasons: long distances to health care centers, the women were not educated, they were not aware of health issues pertaining to themselves and their newborns post-delivery and language barriers also played a key role (Islam & Odland, 2011). This study however focused on mothers' determining factors alone.

Studies that have been carried out in Myanmar, sought to investigate the uptake of full PNC services among women in rural areas and their determining factors. The study employed a cross-sectional survey carried out at select villages. Covariates were adjusted for using multivariable analysis with multivariable logistic regression. The limitation in the study however, was the cross-sectional nature of the data, thereby restricting the ability to draw a cause and effect relationship between potential predictors and complete postnatal care use (Aye et al., 2018). The study was also concentrated in select villages, thereby could not give a true national representation.

An initial study on PNC service utilisation carried out in Ethiopia, showed that uptake was low at 37.2%. Use of multistage and simple random sampling techniques concluded that women who were educated, received media messages and had fewer children ended up utilizing PNC services more than women who were uneducated, did not receive media messages and had more children (Regassa, 2011). In Zambia, separate analyses for deliveries conducted at a health institution and those conducted at home were done since contributing factors for PNC uptake for deliveries at hospital may differ from those of deliveries conducted at home. Descriptive statistics that is both bivariate and univariate were employed to illustrate overall coverage and timing of postnatal care service utilisation by demographic and socioeconomic variables. There were however limitations since the study was cross-sectional and as such, not possible to infer causality in associations between covariates in the survey and outcome variables. Therefore, only probabilistic inclusions could be done (Bwalya et al., 2017).

In Nepal, a descriptive cross-sectional study was carried out in Kathmandu district. The study focused on 150 women who came from two rural district areas. The study concluded that postnatal care use was low at 34% within the first six weeks post-delivery and worse still at 19% in the first two days of life. The conclusion was that the women were not aware of the importance on PNC (Dhakal et al., 2007).

Other studies have applied a three level analysis (univariate, bivariate and adjusted multinomial logistic modeling) between the predictor variables and the probability of

women in seeking PNC services for themselves and their babies (Dansou et al., 2017; Somefun, 2014). This study will employ the same approach but analysis in the Kenyan context as well as availability of data in the demographic and health survey 2014.

Select Kenyan studies have employed bivariate and multivariate analysis on determinants of PNC. This has been limiting because the PNC was related to care of the mother only and not newborn (Akunga et al., 2014). Frequencies to establish characteristics of study respondents, cross tabulations to show differentials in use and non-use of timing and logistic regression to assess effects of variables on timing have also been used with the limitation of focus on women timing uptake within 48 hours (Kosgey, 2009).

2.3 Overview of Literature

Andersen and Newman's behavioral model will be used in this study. This study will concentrate on identifying and understanding the levels of uptake, the association between the predictor variables that influence uptake of first postnatal checkup among newborns and as such, the health behavior model shall be adapted as the theoretical framework. The model suggests that use of medical care services is for the most attributed to a number of determinant factors, classified into: enabling, need and predisposing factors.

From the reviewed literature, there are a myriad of factors that contribute to utilisation of the first PNC checkup. These have been thoroughly reviewed individually with past empirical literature. Some have shown to have a positive effect on uptake while others have been seen not to be statistically significant with first postnatal care utilisation among the newborns. The determinants in this study include; region, residence, the mother's education level, wealth quintile, age of the mother when giving birth, parity and whether the birth was conducted in a health institution or not, antenatal care among others. In Kenya few studies have looked at determinants of uptake of the first postnatal checkup, from the newborns perspective using cross-sectional data from the Kenya demographic and health survey 2014.

CHAPTER 3: RESEARCH METHODOLOGY

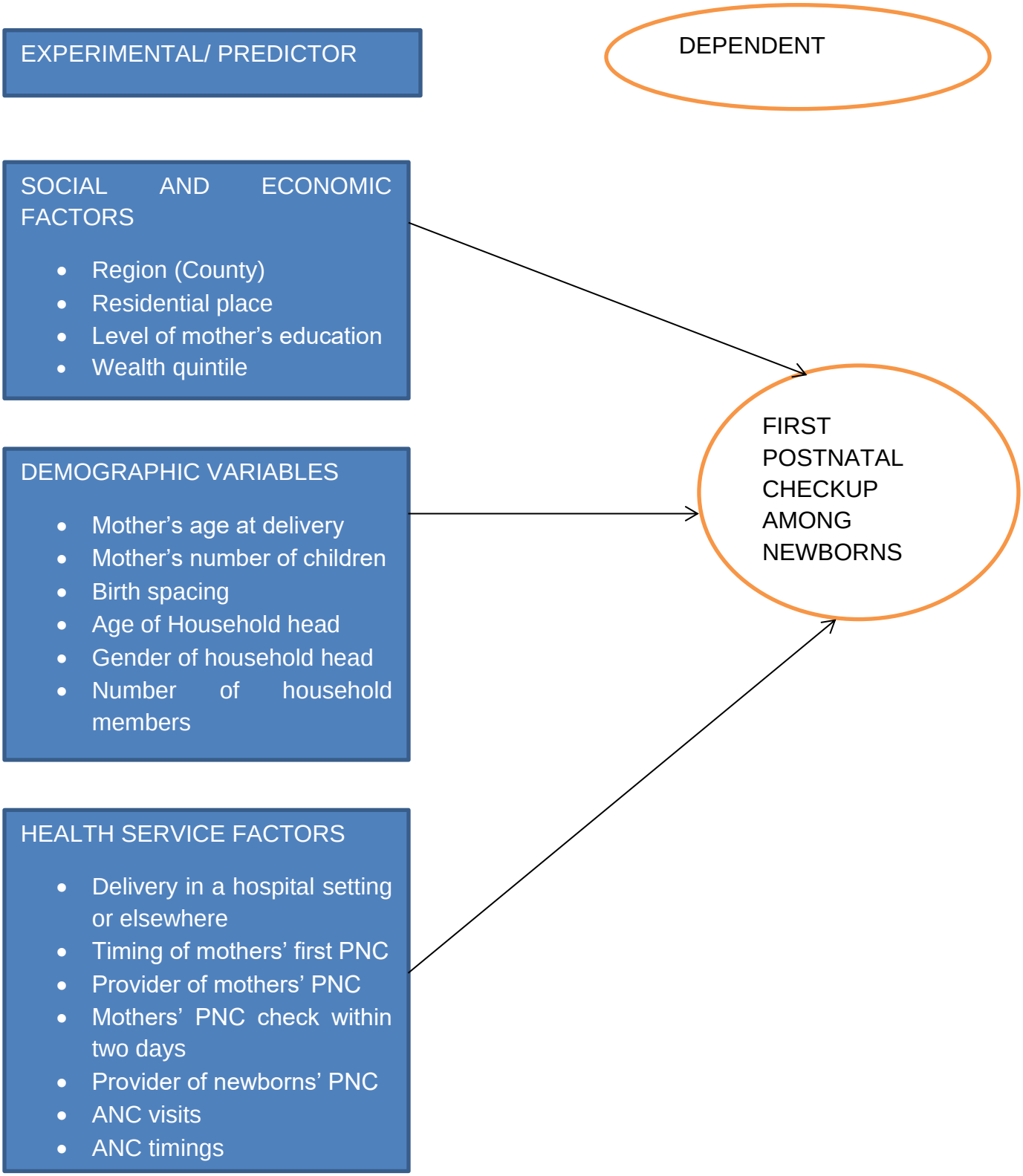
3.0 Introduction

This chapter focused on the methodology and data to be used in this study. It started by presenting the conceptual framework, econometric model, model specification and data analysis, definition and measurement of variables and lastly data source.

3.1 Conceptual Framework

The conceptual framework employed in this study was adapted from the Andersen and Newman (2005) framework for health service utilization. Use of this model had the benefit of incorporating information on mothers' background characteristics available in the Kenya demographic and health survey. This study made use of enabling, need and predisposing factors that were seen to have an impact on uptake of first postnatal checkup. The predisposing factors focused on the characteristics of the mother to include; mother's age and education attainment. The enabling factors focused on: wealth quintile, residence and region. The need factors included: parity and home or facility delivery and ANC.

Figure 3. 1: Conceptual Framework



Source: Author's conceptualization

3.2 Econometric model

The probit model was utilized in this study to analyze the determinants of first PNC check among newborns in Kenya. This is because the outcome of interest was binary in nature and takes two values, 1 and 0. A study by Machio (2008) highlighted that a binary choice model is based on the assumption that individuals choose between two alternatives and that choice is based on different influencing factors. The probit model was thus expressed as:

Prob (Y = $\frac{1}{X}$ = Φ ($X'\beta$)……...1

Prob – probability

Φ – cumulative standard normal distribution function

β - vector of parameters that were estimated.

If Y takes values between 1 and 0, latent variable Y^* was defined as:

Y^* = X_iβ + ε……2

Y^* - outcome variable of interest (1st PNC within 48 hours)

X_i – predictor (independent) variable of interest

β – coefficients to be estimated

ε – Error term normally distributed with N (0,1)

As such;

Y_i = { 1 – ith baby receives first PNC within 48 hours
0 – otherwise

Therefore the probability that Y=1 given X is estimated using the standard normal cumulative function which is illustrated by the equation below.

Prob (y_i = $\frac{1}{x}$ = Φ(S) = $\int_{-\infty}^{-S}(2\pi)^{-1/2}\, e^{-s^2/2}$ ds……3

Where $S = X_i\beta$

The standard normal transformation Φ(S) constraints for the probability to lie between 0 and 1.

The probit model facilitated in interpretation of the significance of coefficients and the sign. It was therefore appropriate to estimate the marginal effects in order to interpret both the sign and magnitude. The marginal effects show the change in probability of y=1 per unit change in independent variable X. It was calculated thus as:

$$\frac{\partial p}{\partial xj} = \Phi(x'\beta)\beta_j \text{……………………………………………………………..4}$$

The marginal effect was estimated in two forms; either for average person in the sample x or as average of individual marginal effects. In this case the average of individual effects estimated was given as:

$$\frac{\partial p}{\partial xj} = [\{\sum F'(X'\beta(X'\}]\beta\beta_j \text{………………………………………………………5}$$

3.3 Model specification and data analysis

First postnatal check-up, was our dependent variable and was binary in nature and coded as “1” if the baby received the initial postnatal check-up within 48 hours and “0” if otherwise.

Y being the outcome, X’s, being the predictors, β’s, the partial slope coefficients of the parameters, and, ε, is the stochastic error term. The general form of the equation was therefore given as:

$$Y=\beta_0 + \beta_I X_I + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 Y_1 + \beta_6 Y_2 + \beta_7 Z_{1 \ldots\ldots} + \varepsilon. \quad \text{……………6}$$

Where Y = First Postnatal checkup (Y= 1; N= 0)

X_1 = Region (county); Nairobi, Mombasa, Kisumu..

X_2 = Residential place (urban or rural)

X_3 = Education of the woman

X_4 = Wealth quintile

Y_1 = Age of the mother when giving birth

Y_2 = Number of children

Y_3 = Birth spacing

Y_4 = Age of household head

Y_5 = Gender of household head

Y_6 = Number of household members

Z_1 = Health facility delivery or elsewhere

Z_2 = Timing of mothers' first PNC

Z_3 = Provider of mothers' PNC

Z_4 = Mothers PNC check within two days

Z_5 = Provider of newborns PNC

Z_6 = ANC visits

Z_7 = ANC timing

A three level analysis to include: univariate, bivariate and multivariate analysis was conducted. In the univariate level of analysis, the levels of the first PNC checkup among newborns was presented percentage wise, according to their health service, socio-economic and demographic factors as shown in table 3.1 below. Next, bivariate level of

analysis, Pearson's chi-square test was employed examining whether there was a statistically significant relationship among the predictor variables and the first PNC checkup as in table 3.2 below. A logistic regression was then incorporated examining the association of each predictor variable and the dependent variable. Lastly, multivariate level of analysis. A binary logistic regression was adopted examining the relationship between all the predictors and the dependent variable that is, examining the adjusted effects of all independent variables on first postnatal checkup among newborns in Kenya as expressed in table 3.3 below. All data was analyzed using STATA version 14 and done at 95% confidence level and at 5% level of significance.

Table 3. 1: Descriptive statistics

	Weighted count		**Weighted count**	
Variable	**Received 1st PNC within 48 hours**	**%**	**Did not receive 1st PNC within 48 hours**	**%**
Wife's age				
Wife's education				
Timing of first mother PNC check				
Provider for mother's PNC check				
PNC check within two days for mother				
Provider for newborn's PNC check				
Timing of first ANC check				
Number of ANC visits during pregnancy				
Birth Spacing				
Place of delivery				
Head of household's age				
Gender of household head				
Household wealth				
Number of household members				
Region				
Residence				

Source: Author's conceptualization

Table 3. 2: Bivariate associations between demographic, social and economic variables and first checkup among newborns in Kenya

	N (weighted)	%	95% CI	X^2 P-value
Overall				
Variable				
Wife's age				
Wife's education				
Timing of first mother PNC check				
Provider for mother's PNC check				
Timing after delivery for newborn's PNC check				
PNC check within two days for mother				
Provider for newborn's PNC check				
Timing of first ANC check				
Number of ANC visits during pregnancy				
Birth Spacing				
Place of delivery				
Head of household's age				
Gender of household head				
Household wealth				
Number of household members				
Region				
Residence				

Source: Author's conceptualization

Table 3. 3: Multivariate associations between demographic, social and economic variables and first checkup among newborns in Kenya

Variable	**Full**		**Reduced**	
	OR	95% CI	OR	95% CI
Wife's age				
Place of delivery				
Number of ANC visits during pregnancy				
Timing after delivery for newborn's PNC check				
Provider for mother's PNC check				
Wife's education				
Household and Community Characteristics				
Number of household members				
Household wealth				
Region				
Residence				

Source: Author's conceptualization

3.4 Definition and Measurement of Outcome and Predictor Variables

This subsection presented the outcome and predictors to be used. The study sought to investigate the determinants of first postnatal checkup among newborns in Kenya where f PNC within 48 hours was the dependent variable of interest.

Selected explanatory variables included in this study were region (counties), woman's education level, location of birth (health facility or elsewhere), child's birth order, age of the mother when giving birth, household wealth index and place of residence.

Table 3. 4: Definition and measurement of variables

Variables		**Measurement**	**Definition and Literature Source**	**Expected Sign**
Dependent Variable				
First Postnatal Checkup f PNC		Within 48 hrs. 1 Otherwise 0	According to the National Maternal and Obstetric guidelines, three visits required. The first before 2 days, the next at 1st or 2nd week and at the 6th week (Republic of Kenya, 2014)	
Variables (Independent)	**Variable code**	**Measurement**	**Definition and Literature Source**	**Expected Sign**
Region (county)	V024	The previous 47 districts in the old constitution	Refers to the de facto region of residence	Inconclusive

		dispensation	(existing in fact whether with lawful authority or not) (dhs program)	
Variables (Independent)	**Variable code**	**Measurement**	**Definition and Literature Source**	**Expected Sign**
Place of residence	V025	Urban Rural	Refers to the de facto place of residence (existing in fact whether with lawful authority or not) (dhs program)	Positive Urban residence (Bwalya et al., 2017; Dansou et al., 2017).
Woman's education level	V106	No education Primary incomplete Primary complete Secondary +.	This is the highest mother's level of education attended	Positive. Additional years of schooling are linked with higher initial visits. (Neupane&Doku, 2013; Akunga et al., 2014)
Wealth Quintile	hv270	Poorest Poorer Middle Richer Richest	This is the economic status of the family	Positive Increase in wealth (Bwalya et al., 2017; Dansou et al., 2017)

Variables (Independent)	**Variable code**	**Measurement**	**Definition and Literature Source**	**Expected Sign**
Age of the mother at birth	V212	<20 20-34 35-49 Individual years	This is the age of the respondent at first birth (dhs program)	Inconclusive
Birth spacing	b11	Yes No	Age difference between the current birth and the previous	Inconclusive
Age of household head	hv220	<25 years 25-34 years 35-44 years	The age in years of the individual in charge of the household	Inconclusive
Sex of household head	hv219	Male Female	Whether headed by a man or a woman	Inconclusive
Number of household members	hv009	1 – 3 members 4 – 8 members 9 – 23 members	Refers to the total number of entries	Positive Fewer members increase care. (Mekonnen &Mekonnen, 2002)
Place of Delivery	m15	Health Facility Elsewhere	The place of delivery of the child.	Positive (Mrisho et al., 2009; Bwalya et al.,2017; Paudel et al., 2013)

Variables (Independent)	**Variable code**	**Measurement**	**Definition and Literature Source**	**Expected Sign**
Timing of mother's first PNC	m51	No check <4 hours 4-23 hours 1-2 days 3-6 days 7-41 days Don't know	Under what time period did the woman receive her first PNC check.	Inconclusive
Provider of mother's PNC	m52	No check Medical doctor Nurse/midwife Non-skilled personnel	Skilled /unskilled worker that assessed the mother post-delivery.	Positive Skilled workers delivery leads to care. (Anwar et al., 2008)
Provider of newborn's PNC	m72	Medical doctor Nurse/midwife Non-skilled personnel	Skilled /unskilled worker that assessed the newborn post- delivery	Positive Skilled workers delivery leads to care. (Anwar et al., 2008)
Mother's ANC visits	m14	< 3 visits > 4 visits	Number of antenatal care visits during pregnancy	Positive (Dixit et al., 2013)
Mother's ANC timing	m13	Check No check	Timing of the first ANC visit from onset of pregnancy and given in months	Positive (Dixit et al., 2013)

Source: KDHS, 2014

3.5 Data Source

The study focused on the KDHS 2014 cross-sectional data assessing the socioeconomic and demographic factors associated with the first postnatal care among newborns. The birth's as well as children's recode data sets were used in this study. The data sets had a record of every newborn in the two years preceding the survey from the interviewed women. Data sets also contained information related to delivery, immunization, pregnancy among other indicators. The data for the mother of each of these newborns was also included therein.

CHAPTER 4: RESULTS

4.0 Introduction

The results of the study on the determinants of the first postnatal checkup among newborns in Kenya are presented here. Results for the univariate analysis carried out are presented first, which include the percentage level of uptake and non-uptake of the initial visit according to the socio-economic, demographic and health service factors. The percentage distributions according to the predictor variables are enumerated.

Secondly, results on the bivariate analysis carried out are presented. This analysis shows the unadjusted effect of each independent variable on the dependent outcome of interest using Pearson's chi-square and logistic regression. Lastly, from the multivariate analysis the adjusted effects of all predictor variables on first postnatal checkup among newborns in Kenya are shown.

4.1 Percentage levels of 1ST PNC uptake among newborns in Kenya according to the predictor variables

This study sought to highlight uptake levels of the first PNC checkup among newborns in Kenya as per the selected independent variables in line with the first objective of this study thus forming the descriptive statistics as shown in the table below.

Table 4. 1: Percentage distribution of first PNC checkup among newborns in Kenya by socio-economic, demographic and health service factors.

Variable	Weighted count Newborn Received 1st PNC within 48 hours	%	Weighted count Newborn Did not receive 1st PNC within 48 hours	%
Wife's age				
15-24	513	36.96	875	63.04
25-34	744	36.38	1301	63.62
35-49	126	22.59	431	77.41
Wife's education				
No Schooling	91	16.78	449	83.22
Primary	649	31	1445	69
Secondary	493	49.41	505	50.59
Higher	150	41.91	208	58.09
Timing of first mother PNC check				
No check	304	16.2	1571	83.8
<4hrs	773	53.5	672	46.5
4-23hrs	184	53.22	162	46.78
1-2 Days	105	51.27	100	48.73
3-6 Days	4	12.1	26	87.9
7-41 Days	10	12.49	73	87.51
Don't know	3	49.27	3	50.73
Provider for mother's PNC check				
No check	321	16.09	1673	83.91
Medical Doctor	461	53.07	408	46.93
Nurse/Midwifes	543	54.79	448	45.21
Non-Skilled personnel	58	42.74	78	57.26
PNC check within two days for mother				
No Visit	321	16.09	1673	83.91
Visited within two days	1062	53.22	933	46.78
Timing of first ANC check				
No check	1004	32.8	2057	67.2
Checked	369	45.5	442	54.5
ANC checkups during pregnancy				
< 3 times	502	29.14	1221	70.86
Higher than 4 times	881	38.85	1386	61.15

Birth Spacing				
No	132	26.93	357	73.07
Yes	860	33.24	1728	66.76
Place of delivery				
Home	252	17.75	1169	82.25
Health Facility	1125	43.9	1437	56.1
Head of household's age				
<25 Years	112	34.42	213	65.58
25-34 Years	487	39.05	760	60.95
35-44 Years	322	35.15	594	64.85
45-54 Years	185	31.41	404	68.59
>55 Years	278	30.38	636	69.62
Gender of household head				
Male	985	35.71	1774	64.29
Female	398	32.31	833	67.69
Household wealth				
Poorest	232	22.48	799	77.52
Poorer	224	30.83	501	69.17
Middle	256	33.99	497	66.01
Richer	315	40.35	465	59.65
Richest	357	50.93	344	49.07
Number of household members				
1-3 Members	668	39.86	1008	60.14
4-8 Members	660	31.66	1424	68.34
9+Members	55	23.96	175	76.04
Region				
Coast	143	32.66	295	67.34
Northern East	6	3.75	140	96.25
Eastern	213	44.82	263	55.18
Central	219	59.85	147	40.15
Rift valley	303	25.14	901	74.86
Western	107	21.71	386	78.29
Nyanza	221	44.76	273	55.24
Nairobi	171	45.79	203	54.21
Residence				
Urban	681	44.34	855	55.66
Rural	702	28.6	1752	71.4

Source: Author's computation from KDHS, 2014

Table 4.1 shows that 77.41% of the babies that did not receive the first PNC check, were of women between the ages of 35-49 years and the majority who received the service were of women between 15-24 years. A majority of the newborns with a first checkup were of women with a post-primary level of education (49.41%) while 83.22% of the newborns who did not receive a check were of mothers with no formal schooling.

Slightly more than half of the newborns, 53.5% who received the first crucial service that is within the recommended 48 hours, were of those mothers who received their first check in less than four hours after delivery. 83.8% of babies received no PNC check in the first 48 hours and were of mothers who also themselves did not receive a postnatal care checkup.

More than half, 54.79% of the newborns received the first PNC within 48 hours and these were of mothers who received a PNC checkup from the nurse/midwife. This was slightly higher than those newborns whose mothers received care from a medical doctor (53.07%). More than 80% of the newborns did not receive the first 48 hour checkup and were of mothers who had no PNC check within two days post-delivery from any provider. 67.2% of the newborns were of mothers who did not receive the first antenatal care checkup while less than half, 45.5%of the newborns who received care, were of mothers who timed their first ANC checkup.

More than 70 % of the newborns did not receive the recommended care within the time duration and they were of mothers who made less than three ANC checks during their pregnancy. 26.93% of the newborns received the first PNC care and were born to mothers who did not observe birth spacing (ideally, a birth every 24 months according to the WHO standards). The place of delivery was seen as having 82.25% of the newborns born at home, not receiving the first postnatal care. Surprisingly, 43.9% of them born in a health facility received the initial care, while a majority, more than half 56.1% also born in a health facility did not receive the crucial service.

A majority of the newborns with the first PNC check were of those household heads whose ages ranged from 25 to 34 years. While a significant proportion that had no care, 69.62%, of household heads aged more than 55 years. Interestingly, 35.71% of babies

received care in households headed by a male compared to 32.31% of newborns receiving care in households headed by females. Babies born in the richest quintiles recorded the highest proportion of receiving initial care (50.93%). Households whose members were between one and three had the highest proportion of newborns receiving the crucial first care. 59.85% of the newborns born in the central region of Kenya received the vital first PNC care while 96.25% of the newborns born in the north eastern part did not receive the recommended first PNC checkup. 44.34%of the babies who received the first PNC care were of those residing in an urban setting.

4.2: Individual predictor variable association with first postnatal care checkup among newborns in Kenya

The second level of examination was to carry out a bivariate analysis where Pearson's chi-square test was employed examining whether there was a statistically significant relationship between each predictor variables with first PNC checkup. A logistic regression was also carried out.

The results are presented in table 4.2 below.

Table 4. 2: Bivariate associations between socio-economic, demographic and health service variables on first PNC checkup among newborns in Kenya

	N (weighted)	%	95% CI	X^2 P-value
Overall	1383	34.66	[30.48,39.09]	
Wife's age				**0.0449**
15-24	513	36.96	[28.9,45.82]	
25-34	744	36.38	[31.12,42]	
35-49	126	22.59	[17.67,28.42]	
Wife's education				**0.0000**
No Schooling	91	16.78	[11.63,23.6]	
Primary	649	31	[26.92,35.4]	
Secondary	493	49.41	[38.69,60.19]	
Higher	150	41.91	[28.8,56.26]	
Timing of first mother PNC check				**0.0000**
No check	304	16.2	[10.26,24.63]	
<4hrs	773	53.5	[46.65,60.23]	
4-23hrs	184	53.22	[42.91,63.25]	
1-2 Days	105	51.27	[31.35,70.78]	

3-6 Days	4	12.1	[4.756,27.53]	
7-41 Days	10	12.49	[6.857,21.69]	
Don't know	3	49.27	[11.02,88.39]	
Provider of mother's PNC check				**0.0000**
No check	321	16.09	[10.44,23.99]	
Medical Doctor	461	53.07	[43.91,62.04]	
Nurse/Midwifes	543	54.79	[46.67,62.66]	
Non-Skilled personnel	58	42.74	[29.96,56.56]	
PNC check within two days for mother				**0.0000**
No Visit	321	16.09	[10.44,23.99]	
Visited within two days	1062	53.22	[47.39,58.97]	
Provider for newborn's PNC check				**0.0000**
Medical Doctor	518	100		
Nurse/Midwifes	605	100		
Non-Skilled personnel	66	100		
Timing of first ANC check				**0.0402**
No check	1004	32.8	[28.84,37.02]	
Checked	369	45.5	[33.83,57.68]	
ANC checks during pregnancy				**0.0210**
< 3 times	502	29.14	[23.67,35.28]	
Higher than 4 times	881	38.85	[33.1,44.94]	
Birth Spacing				**0.2373**
No	132	26.93	[18.75,37.05]	
Yes	860	33.24	[29,37.77]	
Place of delivery				**0.0001**
Home	253	17.75	[10.46,28.49]	
Health Facility	1125	43.9	[38.97,48.96]	
Head of household's age				**0.0581**
<25 Years	112	34.42	[25.45,44.66]	
25-34 Years	487	39.05	[33.37,45.05]	
35-44 Years	322	35.15	[29.18,41.62]	
45-54 Years	185	31.41	[26.1,37.27]	
>55 Years	278	30.38	[25.62,35.61]	
Gender of household head				**0.1574**
Male	985	35.71	[30.89,40.83]	
Female	398	32.31	[28.02,36.92]	
Household wealth				**0.0000**
Poorest	232	22.48	[18.83,26.6]	
Poorer	224	30.83	[26.16,35.93]	
Middle	256	33.99	[28.93,39.44]	
Richer	315	40.35	[31.48,49.89]	

Richest	357	50.93	[42.72,59.08]	
Number of household members				**0.0010**
1-3 Members	668	39.86	[33.34,46.77]	
4-8 Members	660	31.66	[28.08,35.46]	
9+Members	55	23.96	[17.21,32.32]	
Region				**0.0000**
Coast	143	32.66	[23.03,44.01]	
Northern East	6	3.75	[2.225,6.265]	
Eastern	213	44.82	[28.06,62.84]	
Central	219	59.85	[47.06,71.43]	
Rift valley	302	25.14	[18.37,33.38]	
Western	107	21.71	[15.35,29.78]	
Nyanza	221	44.76	[36.83,52.97]	
Nairobi	171	45.79	[30.2,62.24]	
Residence				**0.0008**
Urban	681	44.34	[35.7,53.34]	
Rural	702	28.6	[25.11,32.36]	

Source: Author's computation from KDHS, 2014

Bivariate analysis was used to compute the weighted number of observations (1,383) with their percentages. Chi-square p-value tests ($p<0.05$) validated the newborn records in this study.

Household characteristics

The wealth of the household was highly significantly ($p<0.00001$) associated with the first PNC checkup. 50.93% of the newborns who received the first check were from the richest quintiles while 22.48% of the newborns receiving the service were from the poorest quintile. Proportions increased as the household wealth increased.

The number of household members was also significantly associated with the first postnatal care checkup among newborns ($p<0.001$). Households with more than nine members had the lowest proportion of newborns receiving the initial care, while households with one to three members had the highest proportion at 39.86%.

However, the gender of the household head and their age, were seen not be statistically significant with the first PNC checkup among newborns at 0.1574 and 0.0581 p-values respectively ($p <0.05$).

Individual characteristics

The woman's education level was highly significantly associated with the first PNC checkup ($p<0.00001$) among newborns in Kenya. Babies whose mothers had no schooling and received the first PNC stood at 16.78%, while those whose mothers had a secondary school education at 49.41% and those whose mothers had a tertiary or higher education, stood at 41.91%.

A postnatal check within two days for the mother was also seen to be highly significantly associated with the newborns first check ($p<0.00001$). 16.09% of the newborns with a first check were of mothers who had no visit within two days while a majority of the newborns who received the crucial check, 53.22% were of women who received the service within 48 hours.

The timing of the mothers first antenatal care check was also seen to be significantly associated with the newborns first PNC uptake ($p<0.0402$).Newborns who received the first check were at a proportion of 32.8% and were of women who did not time the first ANC checkup while 45.5% of them were of mothers who timed their first antenatal care service.

The ANC checks made during her gestation was also significantly associated with the first PNC checkup ($p<0.0210$). Close to thirty percent of the newborns receiving the crucial care were of mothers who made less than three antenatal care visits while 38.85% of the newborns were of women who had four or more ANC checks during their gestation.

The woman's age at birth was also significantly associated with newborn's first PNC check at $p<0.0449$. Those between 15 to 24 years had 36.96% of their newborns receiving the first care, those between 25 to 34 years 36.38% and 35 to 49 years, 22.59% of their newborns received care. The proportion of newborns receiving care, decreased as woman's age increased.

Timing of the first PNC checkup by the mother was also seen to be highly significantly associated with newborn's check within 48 hours ($p<0.00001$). A majority of the

newborns who got this service were of mothers who received their first checkup in less than four hours while the least proportion of newborns that received their check, 12.1%, were of mothers who got their first checkup between the third and sixth day.

However, birth spacing was seen not to be statistically significant with first PNC check among newborns ($p<0.2373$), whereby 26.93% of the newborns who received the initial care, were of mothers who did not observe birth spacing, while 33.24% of them who received care, were of mothers who observed birth spacing.

Health facility characteristics

The provider of the mothers' postnatal checkup was highly significantly associated with the first PNC check for the newborn ($p<0.00001$). A majority of the newborns receiving care were of those mothers having a PNC assessment from a nurse (54.79%). The least proportion of the newborns, 16.09% of the babies who received care were of women who had no PNC assessment at all from any provider.

The provider of the newborns PNC care check was also highly significantly associated with the first PNC check for the newborn ($p<0.00001$). Place of delivery, that is, home or health facility birth, also emerged as being highly significant ($p<0.0001$). 43.9% of the newborns who received the first check were born in a health facility, while 17.75% of them were delivered in the home setting.

Community characteristics

The region of the country was also highly significantly associated with the first PNC checkup among newborns ($p<0.00001$). Children born in the central region had the highest proportion, 59.85% of receiving the first care, while newborns in the north eastern region had the least proportion, 3.75% of them receiving the initial service.

Place of residence was also seen to be significantly associated with the first postnatal care checkup ($p<0.0008$). A majority of the newborns receiving care, 44.34% were those from an urban setting while 28.6% of them were those in a rural setting.

4.3 Relationship between all predictor variables and dependent variable of interest

A logistic regression was employed examining the relationship between all predictors with dependent variable, examining their unadjusted and adjusted effects on the first PNC among newborns in Kenya as shown in table 4.3 below.

Table 4. 3: Multivariate associations between socio-demographic and health service factors on 1st PNC checkup

Variable	Full		Reduced	
	OR	95% CI	OR	95% CI
Wife's age				
15-24	1.00			
25-34	1.17	[1.27,1.97]		
35-49	0.73	[1.23,2.10]		
Place of delivery				
Home	1.00		1.00	
Health Facility	6.67*	[2.314,19.21]	6.75*	[2.31,19.71]
ANC checks during pregnancy				
< 3 times	1.00			
Higher than 4 times	0.645*	[0.446,0.933]	0.625*	[0.42,0.93]
Provider for mother's PNC check				
No check	4.03*	[2.54,6.406]	4.21*	[2.617,6.76]
Medical Doctor	5.47*	[3.42,8.757]	5.53*	[3.42,8.76]
Nurse/Midwifes	1.00		1.00	
Non-Skilled personnel	29.08*	[9.30,90.9]	28.53*	[8.89,91.5]
Wife's education				
No Schooling	1.00		1.00	
Primary	0.698	[0.284,1.714]	0.72	[0.29,1.793]
Secondary	1.372	[0.536,3.511]	1.47	[0.544,3.97]
Higher	0.880	[0.322,2.39]	1.03	[0.388,2.75]
Household and Community Characteristics				
Number of household members	1.121	[0.882,1.425]		
Household wealth	1.07	[0.959, 1.19]		
Region	0.99	[0.916, 1.07]		
Residence				
Urban	1.00			
Rural	0.97	[0.651, 1.44]		

Source: Author's computation from KDHS 2014

Unadjusted effects

The results showed that children born to mothers with a health institution delivery had higher odds (OR=6.67; 95%CI=2.314 – 19.21) of receiving the first postnatal care checkup. Children born to mothers who had more than four antenatal care visits had lower odds (OR= 0.645; 95% CI = 0.446 – 0.933) of receiving the first check within 48 hours compared to those of women who made less than three ANC visits.

The provider of the mothers PNC check was significant. Children born to women who received no check had higher odds (OR= 4.03; 95% CI= 2.54 – 6.406) of receiving the first checkup. When the provider for the mothers PNC was a medical doctor, the newborns also had higher odds (OR = 5.47; 95% CI= 3.42 – 8.757) of receiving the initial care. Where, there was no skilled personnel involved in the delivery, the newborns had the highest odds (OR = 29.08; 95%CI = 9.30 – 90.9) of receiving care compared to when the delivery was with the assistance of nurses/ midwives.

The multivariate analysis showed that mother's age, the mother's education level, the number of household members, the household wealth, region and residence were not statistically significant with the first PNC checkup among newborns in Kenya.

Adjusted effects

The adjusted odds ratio (OR) identified the determinants of the first PNC checkup among newborns in Kenya. Place of delivery remained significant. Children born to mothers with a health institution delivery had higher odds (OR = 6.75; 95% CI = 2.31 – 19.71) of receiving the first care compared to those whose delivery was away from a health institution. The frequency of ANC checks during pregnancy also remained significant. However, children born to mothers who had four or more visits had lower odds (OR = 0.625; 95% CI = 0.42 – 0.93) of receiving the first check within 48 hours.

The association of the first PNC and the provider of the mothers postnatal care check also remained significant. Newborns whose mothers received a check from a medical doctor had higher odds (OR = 5.53; 95% CI = 3.42 – 8.76) of receiving the initial care compared to those whose mothers' provider was a midwife. Those whose mothers had

no check also had higher odds (OR = 4.21; 95% CI = 2.617 – 6.76) of receiving care within 48 hours compared to those with the assistance of a nurse. Newborns of mothers who received PNC check from a non-skilled personnel had the highest odds (OR = 28.53; 95% CI = 8.89 – 91.5) of receiving care compared to those whose provider was a skilled nurse.

The mother's education level remained insignificant at the reduced multivariate level of analysis.

CHAPTER 5: DISCUSSION AND CONCLUSION

5.0 Introduction

The findings of the study are discussed in this chapter. The discussion hereunder compares the findings of the current study (first postnatal care uptake among newborns in Kenya), with previous studies by different authors as well as highlighting any similarities or differences that are observed. Conclusions drawn from this study on determinants of first PNC check among newborns in Kenya, probable policy recommendations and limitations of this study are also provided in this chapter,

5.1 Determinants of first PNC check

The overall goal in this study was to investigate the factors attributed to the first PNC checkup among newborns in Kenya. From the findings, the timing of the first PNC check that is, within 48 hours was very low as documented (KDHS, 2014). Approximately, 34.66% of the newborns received the first crucial check from a weighted number of newborns of 1,383. These findings were relatively consistent with that of the KDHS 2014, which reported that 36% of the newborns had the first PNC checkup within the critical 48 hours after delivery (KDHS, 2014).

This study identified the following factors attributable to the first care; place of delivery, frequency of ANC visits made by the mother during her pregnancy and the provider of the mothers' postnatal check. These were seen to be consistent with other studies by different authors (Anwar et al., 2008; Mrisho et al., 2009; Paudel et al., 2013).

Newborns whose birth was in a health institution had higher odds of receiving the first postnatal check compared to those born away from a health facility (home). This finding was consistent with other authors (Anwar et al., 2008; Mrisho et al., 2009). The authors noted that facility deliveries leads to higher uptake of first PNC regardless of whether the delivery was in private or public health institutions (Dansou et al., 2017). The finding in this study was also consistent with Kenyan studies where delivery in a health facility significantly increased PNC use by about 37% (Akunga et al., 2014).

Children born to mothers who had four or more antenatal care checks during their gestation emerged as a significant determinant of first postnatal care checkup uptake

and utilization among newborns. This finding highlighted that such newborns had lower odds of receiving the timely care. This was an unexpected finding as studies done in Zambia point to the contrary. They point out that newborns, whose mothers had more than four antenatal care visits during her pregnancy, had higher odds of receiving PNC within 48 hours after birth (Bwalya et al., 2017). Other authors also came to a similar conclusion where the frequency of ANC checks was a vital determinant of postnatal care use (Titaley et al., 2009; Dahiru et al., 2015).

The provider of the mothers postnatal visit checkup, emerged as a significant determinant in newborn's first PNC uptake and utilization. Children born to mothers who received a PNC check from non-skilled personnel had the highest odds of having their babies receive the crucial check followed by those who received a check from a medical officer and finally, babies born to mothers who did not have a check at all. All these are in comparison to the provider of the mothers' PNC checkup being a midwife. This was contrary to a study in Kenya whereby, mothers' whose delivery was conducted by unskilled healthcare workers were 81% less likely to utilize PNC compared to those who gave birth with the assistance of skilled workers (Akunga et al., 2014).

Our results may probably be because mothers who deliver at the health facility may feel quite confident about their health and the health of their newborn and may not see the need to return for check-ups while those that did not deliver in health facility and subsequently would like the health of the child to be checked and hence, are more likely to utilize PNC services.

5.2 Insignificant determinants of first PNC check among newborns

The woman's age at birth and their level of education, number of household members, region of the country where the birth took place, household wealth and residence were not significant determinants associated with the first postnatal care checkup among newborns in Kenya.

The age of the mother appeared not to be a significant determinant in uptake of the first postnatal checkup among their newborns. As the woman's age increased, the odds of

having the child receive the first care, decreased. Other studies carried out pointed to the contrast. They suggested that mature older women were thought to be more experienced and knowledgeable in seeking care for themselves and their newborns and as such had a higher likelihood of postnatal care services utilisation (Glei et al., 2003; Reynolds et al., 2006).

Education level of the mother showed that those with a tertiary level of education had lower odds of seeking care for their newborns, while those with a secondary level education had higher odds. This variable however remained insignificant. Studies that have been carried out in developing countries, most of them being in SSA, have shown a direct relationship in the woman's education level and uptake of PNC. In their conclusion, the studies highlighted that the higher the education level, the higher the probability of utilisation of care for themselves and their newborns (Dhakal et al., 2007; Neupane & Doku, 2013; Rahman et al., 2011).

The number of household members in a family setting was also shown not to be a significant determinant in seeking first PNC care. Household wealth also surprisingly was not significant in warranting initial care for the newborn. However, other studies have shown that the family's economic and social position based on their household income has been shown to have a direct relationship with PNC utilisation. In Zambia for instance, studies have shown that the number of newborns receiving the initial care within 2 days, increases as family wealth increases. Babies that were born in families categorized as rich were twice as likely to receive the initial PNC check within 48 hours compared to those in poor households (Bwalya et al., 2017). This is also consistent in Benin republic where mothers and newborns in rich or richest quintiles had a higher likelihood of receiving PNC as to those in the poor or poorest quintiles (Dansou et al., 2017). This has been seen to be due to high expenses of medical care in SSA. Due to the competing needs within the family for the limited financial resources, studies have shown that women from poor families, due to this prioritization, may opt not to use the PNC services.

The region of the country also emerged as not being a significant determinant in first postnatal care uptake among newborns in Kenya. Studies done in Kenya but focusing on PNC among women pointed to the contrast. They concluded that women residing in all eight provinces in Kenya apart from the rift valley province had lower odds of postnatal care utilisation for their newborns and themselves in comparison to women in Nairobi (Akunga et al., 2014).

Urban and or rural residences, was also shown not to be a significant determinant in uptake and utilisation of care. However, from the results, women in rural settings had lower odds of seeking care for their newborns. Although not being significant, this finding was consistent with other studies where women in rural areas had a lower tendency of PNC utilisation in relation to those in urban centers. Among the newborns that received first postnatal checkup within the recommended 48 hours in the urban areas were twice as high as those in the rural centers (Bwalya et al., 2017; Dansou et al., 2017). Similar studies in Ethiopia came to a similar conclusion (Mekonnen &Mekonnen, 2002). Several factors seen to contribute to these differences include; higher levels of knowledge in urban areas, easy access to healthcare services and health promotion and education activities geared towards an urban audience (Singh et al., 2011).

5.3 Conclusion

Postnatal care still remains an area of great concern along the maternal, neonatal and child health continuum of care (Mohan et al., 2015; WHO, 2013; Warren et al., 2006). Few studies have looked at PNC from a newborns' perspective globally and more so in Kenya. This is because health care workers have worked on the assumption that PNC for mothers can be equated to that of the newborns and as such more often than not, left out the baby during this fundamental service. Therefore, this study focused squarely on newborns and what household, individual, health service and community characteristics influence the uptake and utilisation of this service within 48 hours.

This study highlighted that on overall, 34.66% of the babies received care in the first 48 hours from KDHS data sets analyzed. A majority did not receive the recommended first

care. The results further showed a significant level of association between selected predisposing, need and enabling characteristics with the first postnatal care checkup among newborns in Kenya. They included wife's age, wife's education level, timing of the first mothers' PNC, provider of the mothers' PNC check, PNC check within two days for the mother, provider of newborns' PNC check, timing of first ANC check, frequency of ANC checks made during pregnancy, place of delivery, wealth of the household, number of household members, region and residence.

Further analyses carried out exhibited three independent variables emerging as significant determinants of the first postnatal care check-up among newborns in Kenya. They included; place of delivery, number of ANC checks made by the mother during her pregnancy and provider of the mothers' PNC check.

5.4 Policy implications

From the findings, the Government of Kenya (GoK) through the Ministry of Health (MoH) should ensure that birth deliveries take place in health institutions in order to receive this crucial first service from qualified healthcare workers within the appropriate time (48 hours). The study also showed that the frequency of ANC attendance plays a role in uptake of first PNC. As such, programs focusing on MNCH should continue enhancing antenatal care utilization (at least three visits) as this proved to be effective in the uptake and utilization of the first care among the newborns.

The role of unskilled personnel could not be overlooked because the mothers who delivered with their assistance were more likely to seek the first PNC. The MoH through the preventive and promotive directorate should formulate and accelerate programs targeting TBAs, community healthcare workers (CHWs) that encourage mothers to seek delivery in a formal setting with the assistance of skilled care.

5.5 Limitations and recommendations

The nature of the KDHS 2014 data was cross-sectional in nature and as such the study had several limitations. First, only the variables collected in this survey could be used. Factors that may affect postnatal care but not available here could not be used.

Secondly, there is a difference in receiving the actual service and the contents of the service involved therein. The contents of PNC could not be examined due to data unavailability. Thirdly, as stated, due to the cross-sectional nature of the data, we could only do probabilistic conclusions. It was impossible to infer causality in the associations between the independent variables in this study and the outcome variable of interest. Also, the study focused on recall of past events when the actual survey was being carried out. Hence, the quality of the information being relayed could not be accurately and completely verified.

More research is also needed to look into the following areas: the babies who came for the first check after discharge. More predictor variables such as religion, mass media influence, marital status and child size could be incorporated examining their effects on first PNC uptake. A quality based study could also be done looking at the quality of facility based PNC and community related services useful to link homebirths with postnatal care.

REFERENCES

Adam, T., Lim, S., Mehta, S., Bhutta, Z. (2005). Cost effectiveness analysis of strategies for maternal and neonatal health in developing countries.

Ahmed, S (2005). Exploring health-seeking behavior of disadvantaged populations in rural Bangladesh. (PhD) dissertation, Karolinska University, Stockholm, Sweden.

Akunga, D., Menya, D., & Kabue, M. (2014). "Determinants of Postnatal Care Use in Kenya." *African Population Studies 28* (3): 1447-1459.

Andersen, R., & Newman, F. (1973). 'Societal and individual determinants of medical care utilisation in the United States', Milbank Memorial Fund Quarterly, 51(1): 95-124.

Andersen, R., & Newman, F. (2005). Societal and individual determinants of medical care utilization.

Anwar, I., Sami, M., Akhtar, N., Chowdhury, E., Salma, U., Rahman, M., & Koblinsky, M. (2008). Inequity in maternal health-care services: evidence from home-based skilled-birth attendant programmes in Bangladesh. Doi: 10.2471/BLT.07.042754.

Aye, N., Tippawan, L., Thein, H., Myint, M., Johanne, S., &Espen, B. (2018). Inequity in the utilization of antenatal and delivery care in Yangon region, Myanmar: a cross-sectional study.

Baqui, H., Ahmed, S., Arifeen, S., Darmstadt, L., Rosecrans, M. & Mannan, I. (2009). Effect of timing of first postnatal care home visit on neonatal mortality in Bangladesh.

Bhutta, Z., Das, J., Bahl, R., Lawn, J., Salam, A., & Paul, K. (2014). Can available interventions end preventable deaths in mothers, newborn babies, and stillbirths, and at what cost? Lancet. 2014; 384:347–70. Doi: 10.1016/S0140-6736(14)60792-3.

Bwalya, B., Mulenga, C., & Mulenga, J. (2017). Factors associated with postnatal care for newborns in Zambia: analysis of the 2014-14 Zambia demographic and health survey.

Chelagat, D., Roets, L., & Joubert, A. (2016). A Framework to improve postnatal care in Kenya.

Dansou, J., Adekunle, A., & Arowojolu, O. (2017). Factors associated with the compliance of recommended first postnatal care services utilization among reproductive age women in Benin Republic: an analysis of 2011/2012 BDHS data.

Dhakal, S., Chapman, G., Simkhada, N., Teijlingen, P., Stephens, P., & Raja, A. (2007) Utilisation of postnatal care among rural women in Nepal.

Dixit, P., Dwivedi, L., & Ram, F. Strategies to improve child immunization via antenatal care visits in India: a propensity score matching analysis. PLoS One. 2013;8:e66175.

Every Newborn, An Executive Summary for The Lancet's Series. May 2014.

Glei, D., Goldman, N., & Rodriguez, G. (2003). Utilization of care during pregnancy in rural Guatemala: Does obstetrical need matter?

Islam, M., & Odland, .D. (2011). Determinants of antenatal and postnatal care visits among Indigenous people in Bangladesh: A study of the mru community.

Kante, A., Chung, E., Larsen, A., Exavery, A., Kassimu, T., & Phillips, J. (2015). "Factors Associated with Compliance with the Recommended Frequency of Postnatal Care Services in Three Rural Districts of Tanzania." BMC Pregnancy and Childbirth 15: 341.

Kearns, A., Onda, S., Caglia, J., Tuncalp, O., & Langer, A. (2014). Postnatal Care in Nepal: Components of Care, Implementation Challenges and Success Factors. Boston, (MA) Harvard School of Public Health.

Kenya Demographic and Health Survey (2014).

Kenya Service Provision Assessment Survey (2010).

Kerber KJ, et al. Continuum of care for maternal, newborn, and child health: from slogan to service delivery. Lancet. (2007).370:1358:1369.

Kosgey, N. (2009). Factors influencing the timing of postnatal care services in Kenya.

Kyomuhendo, G. (2003). Low use of rural maternity services in Uganda: impact of women's status, traditional beliefs and limited resources.

Lawn, J., Cousens, S., & Zupan, J. (2005). 4 million neonatal deaths: When? Where? Why? Lancet; 365:891-900.

Lukonga, E., & Michelo, C. (2015). "Factors Associated with Neonatal Mortality in the General Population: Evidence from the 2007 Zambia Demographic and Health Survey (ZDHS): A Cross Sectional Study." *Pan African Medical Journal 20* (64). doi:10.11604/pamj.2015.21.321.6527.

Lwelamira, J., Safari, J., & Stephen, A. (2015). Utilization of maternal postnatal care services among women in selected villages of Bahi District Tanzania.

Machio P. (2008), Demand for maternal Health care services in Kenya. Masters of Arts Thesis, University of Nairobi (Unpublished).

Mackian, S., Nafisa, B., & Hermione, L. (2004). 'Up the garden path and over the edge: where might health-seeking behavior take us?' *Health Policy and Planning 19* (3): 137–146.

Mechanic, D. (1972). Public expectations and health care: essays on the changing organization of health care services.

Mekonnen, Y., & Mekonnen, A. (2002). Utilization of maternal health care service in Ethiopia.

Millennium Development Goals Report (2013). United Nations, (2013). UNDP, UNFPA; UNICEF; UN Women; WHO.

Mohan, D., Gupta, S., LeFevre, A., Bazant, E., Killewo, J., & Baqui, A. (2015). Determinants of postnatal care use at health facilities in rural Tanzania: Multilevel analysis of household survey.

Mrisho, M., Obrist, B., Schellenberg, A., Haws, A., Mushi, K., Mshinda, H., …. Schellenberg, D. (2009). The use of antenatal and postnatal care: perspectives and experiences of women and health care providers in rural southern Tanzania. BMC Pregnancy and Childbirth 2009, 9:10.

Muldoon, K., Galaway, L., Nakajima, M., Kantes, S., & Hogg, R. (2011). Health system determinants of infant, child and maternal mortality: A cross-sectional study of UN member countries.

Neupane, S., & Doku, D. (2013). Utilization of postnatal care among Nepalese women. *Maternal Child Health Journal*.doi:10.1007/s10995-012-1218-1.

Onokpono, D., Odimegwu, C., Imasiku, E., & Adedini, S. (2013). Contextual determinants of maternal health care service utilisation in Nigeria.

Paudel, M., Khanal V., Acharya B., & Adhikari, M. (2013). Determinants of Postnatal Service utilization in a Western District of Nepal: Community Based Cross Sectional Study. *J Women's Health Care* 2: 126. doi:10.4172/2167-0420.1000126.

Rahman, M., Haque, E., & Zahan, S. (2011). Factors affecting the utilization of postpartum care among young mothers in Bangladesh. Health and Social Care in the Community, 19(2), 138–147.

Rai, R., Singh, P., Kumar, C., & Singh, L. (2013). Factors associated with maternal healthcare services among adolescent women in Malawi.

Regassa, N. (2011). Antenatal and postnatal care service utilization in southern Ethiopia a population based study. *Afr Health Sci*. *12*(3):390–397.

Reynolds, H., Wong, E., & Tucker, H. (2006). Adolescents' use of maternal and child health services in developing countries.

Sarker, A., Mahumud, R., Sultana, M., Ahmed, S., & Khan, J. (2014). The impact of age and sex on healthcare expenditure of households in Bangladesh.

Save the Children. (2014). Ending newborn deaths: Ensuring every baby survives.

Sikder, H., Jahan, A., Howlader, R., Sultana, N., Ishaq, F., & Rahman, T. (2015). "Health Care Seeking Behavior of Slum-Dwellers in Dhaka City: Results of a Household Survey". Report prepared for Health Economics Unit (HEU) of MoHFW and World Health Organization (WHO).

Sines, E., Syed, U., Wall, S., & Worley, H. (2007). Postnatal Care: A Critical Opportunity to Save Mothers and Newborns. Washington DC. Population Reference Bureau.

Singh, A., Padmadas, S., Mishra, S., Pallikadavath, S., & Johnson, A. (2012) Socio-Economic Inequalities in the Use of Postnatal Care in India.

Singh, L., Rai, K., & Singh, K. (2011). Assessing the utilization of maternal and child health care among married adolescent women: Evidence from India. *Journal of Biosocial sciences*.doi:10.1017/S0021932011000472.

Somefun, D. (2014). Determinants of postnatal care non-utilization among women in Nigeria.

Suchman, E. (1965). 'Stages of Illness and Medical Care', *Journal of Health and Human Behavior*, 6(3): 114-128.

The Inter-agency Group for Child Mortality Estimation (UN IGME). (2014). Levels & Trends in Child Mortality, Report 2014. United Nations Children's Fund.

Titaley, C., Dibley, R., & Roberts, M. (2009). Factors associated with non-utilisation of postnatal care services in Indonesia. *Journal of Epidemiology and Community Health*. 2009: 827–31.

UNICEF. (2012). Levels & Trends in Child Mortality. Report 2012. Estimates Developed by the UN Inter-agency Group for Child Mortality Estimation. New York: UNICEF; 2012:32.

UNICEF. (2015). A Promise Renewed. New York: UNICEF.

Warren, C., Daly, P., Toure, L., & Mongi, P. (2006). Postnatal care. in Opportunities for Africa's Newborns

WHO. (2005). Make every mother and child count. Geneva, Switzerland.

WHO. (2006). Neonatal and perinatal mortality: regional, country and global estimates... Geneva, Switzerland.

World Health Organization. (2013). WHO Recommendations on Postnatal Care for the Mother and Newborn 2013. Geneva, Switzerland: WHO.

World Health Organization. (2015). Essential Care Practice Guide: Pregnancy, Childbirth and Newborn Care. Integrated Management of Pregnancy and Childbirth. Geneva (Unpublished).

Yunus, A., Iqbal, S., Munawar, R., Zakar, R., Mushtaq, K., Sadaf, F., & Usman, A. (2013). Determinants of Postnatal Care Services Utilization in Pakistan- Insights from Pakistan Demographic and Health Survey (PDHS) 2006-07. Middle-East *Journal of Scientific Research 18* (10): 1440-1447, 2013.