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Determinants of Utilization of Maternal Healthcare Services in Ethiopia

Master's Thesis

For Master of Science in Population Studies

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Abstract

Utilizing maternal healthcare services, such as antenatal care, professionals' assistance during delivery and postnatal care contributes significant role in reduction of maternal and child mortality. There are many factors that affect utilization of maternal healthcare (MHC) services at individual and country level. In this study an emphasis has given to determine the levels of effects of the socio-economic and demographic covariates on uses of MHC services. Theoretical frameworks that are used to choose the background factors are: Anthropological and social-medical healthcare research in developing countries by Kroeger (1983), The Behavioural model and Access to Medical Care developed by Anderson D. (1995), and Attitudes, Social influence, Self-efficacy model by Amooti-Kaguna et al (2000).

In order to assess the effects of these factors, 7764 women who had given birth at least one child has taken from the 2011 Ethiopian DHS. The results showed that the rate of safe motherhood practices among reproductive age group were too low. About 51 percent of them did not use any health care services during pregnancy, childbirth, and post-delivery periods. As WHO recommend only 6.9 percent of women were attending ANC at least four times, assisted by health professional during delivery and received PNC.

The result of logistic regression showed that antenatal care, skilled delivery and postnatal care utilizations were commonly influenced by place of residence, wealth status, women's and husband's education and parity. Whereas, mother's working status and husband's education were found to be uniquely influence the uses of ANC and PNC services, respectively. In addition, both religious affiliation and age of women were also prominent predictors on utilization of ANC and uses of skilled assistance during delivery. Based on these significant factors, it is important to design and promote uses of maternal healthcare services in order to minimize the risk of maternal and child mortality.

Key Words: *Antenatal care, skilled delivery, postnatal care, logistic regression, Ethiopia*

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Acronyms

ANC   Antenatal Care

DHS   Demographic and Health Survey

EDHS   Ethiopian Demographic and Health survey

HIV   Human Immunodeficiency Virus

MDG   Millennium Development Goals

MHC   Maternal Healthcare

MMR   Maternal Mortality Ratio

PNC   Postnatal Care

SSPC   Survival Status of Previous Child

UNDP   United Nation Development Programme

UNICEF United Nations International Children's Emergency Fund

USAID   United States Agency for International Development

WHO   World Health Organization

CHAPTER ONE
INTRODUCTION

1.1. Background

Complications allied to pregnancy and child-birth is one of the leading causes of morbidity and mortality for reproductive age group of women in many developing countries. According to UNFPA (2012) report poor maternal conditions account for the fourth leading cause death for those reproductive age group of women's next to HIV/ADIS, malaria and tuberculosis in the world. Empirically every day approximately 800 women die globally from reasons related to pregnancy and childbirth (WHO, 2014). In which about 99% of all maternal deaths occur in developing countries. Among these regions, Sub-Saharan Africa countries had the highest maternal mortality ratio (MMR), which is 500 per 100,000 live births (WHO, 2014). In definition, "Maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy and its weak management but not from accidental or incidental causes"(WHO, 2005)

Mostly, the observed maternal mortality in different country is highly influenced by a huge diversity of country's contexts and causes of maternal health. In developing countries, the most leading factors for high maternal death are lack of health facilities, lack of transport, cost of services, motivations of staffs, inadequate skilled attendants, lack of care during ANC, delivery and PNC, lack of health equipment's, and weak referral systems (Bell *et al*, 2003; UNICEF, 2011). Another issue associated with high maternal mortality are also poor physical condition of women, such as food deficiencies (poor diet and nutrition), domestic/sexual violence and weak prevention of infectious and sexually transmitted diseases (Gwatkin, et al, 2007).

In addition to these in developing countries, for instance in Ethiopia, one explanation for poor health outcome among women is the non-use of available modern health care service by a large proportion of women in the country (EDHS, 2011; Mekonen et al, 2002). A research conducted in Nigeria also demonstrates existence of variation of maternal mortality between North and South Nigeria due to disparities on uses of maternal health care services (Doctor, 2011). In general, these studies showed that utilization of maternal health care and its outcome have significant association with health care systems of region/country and also individuals' socio-economic and demographic backgrounds.

Thus, these all suggests utilization of healthcare services is not a simple behavioural phenomenon. It is directly and indirectly influenced by several associated factors. Other scholars explained that using these healthcare services, in general, are highly related with the availability, quality and cost of services, as well as social structure, health beliefs and personal characteristics of the users (Amooti-Kaguna et al, 2000; Anderson, 1995). It shows the socio-economic and demographic characteristics of women have significant association on utilization of maternal health care services.

Identifying the barriers for non-utilizing of maternal healthcare services is a crucial issue that need intensive contribution to save mothers when they strives to realize their potential as mothers, family members and also as citizen of a large community. At individual level, morbidity of women due to poor maternal healthcare is one of a reason for lack of employment, poor income and low empowerment (Gill et al, 2007). Poor maternal health and its outcome also become a cause for huge costs of health treatment and other economic overheads. In addition to these, maternal morbidities and mortalities have direct relation with well-being and sustainability of children, and also highly influence family's relationship (Gill et al, 2007).

1.2.   The Ethiopia Context

Ethiopia, officially known as the Federal Democratic Republic of Ethiopia, is a country located in the Horn of Africa. Recently, the population size is about 93 million people, which account the second most populated nation in African, next to Nigeria (CIA, 2013). Furthermore, maternal morbidity and mortality in Ethiopia are among the highest in Sub-Saharan countries. In 2010 more than 9000 maternal deaths occurred due to pregnancy and childbirth complications (UNFPA, 2012). According to World Bank estimates the maternal mortality ratio in Ethiopia was 350 per 100,000 live births in 2013, implies, for every 1,000 live births about four women (3.5) died during pregnancy, childbirth, or within two months of child termination. This is an indication of low coverage of maternal health in the country.

Since Ethiopia has huge diversity in culture and other background factors, such as wealth-status, education, religion, etc. the proportion of women who use ANC, skilled assistance delivery and postnatal services within different regions and also different groups of people are not similar (Ethiopian Society of Population Studies, 2008; Mekonnen et al, 2002). For instance, in Ethiopia there are more than 80 different ethnic groups; which have their own language and cultural schemes (CIA, 2013). Differences in socio-economic, demographic and

cultural backgrounds among people within a country expected to have variations on health seeking behaviour, in particular maternal health care utilizations. For instance, according to the 2011 EDHS report, the coverage of antenatal care was 34%. This varied from 76% for women residing in urban areas to 26% of women in rural areas. Even among those who used ANC, lower proportions of women were received care according to WHO recommendations (beginning ANC in the first trimester, and making four antenatal care visits during time of pregnancy). Again, a large majority of the births (90%) in Ethiopia occur at home, and only 10% of births received assistance of trained health professionals' during delivery (EDHS, 2011).

1.3. Statement of the problem

Identifying the main factors influencing utilization of maternal healthcare services is one of important research field in developing countries, especially in Ethiopia. Even if there are many factors contributing for high maternal death in these regions, utilizing MHC service is one of significant protective measure for maternal and child deaths. However, the current prevalence of using MHC such as, ANC, skilled delivery as well as PNC services in Ethiopia is much lower than required average (EDHS, 2011; GHO, 2014). While, the maternal mortality ratio is too high, that is, 350 per 100,000 live births in 2013 (GHO, 2014).

Reducing maternal mortality by three quarters is one of the Millennium Development Goals needed to be achieved by 2015. This can be realized through identifying barriers of health seeking behavior of women and through advocating universal access of reproductive health. Here, along one side of situation we need to identify the effects of socio-economic and demographic factors on uses of MHC services. It is hoped to give clear information for policymakers' to intervene aimed at improving the low utilization of healthcare services in the country.

Moreover, several studies have been conducted in Ethiopia in order to identify factors influencing the women's healthcare seeking behaviour (Birmeta et al. 2013; Gebremariam, et al, 2009; Mekonen et al, 2002; Nigussie et al, 2004). However, most of these studies are restricted in scope of some specific regions or towns. Again, these all failed to consider together what influences the women's health seeking behaviour during pregnancy, delivery and post-delivery period at country level based on recent Ethiopian DHS data. These are the most features of this study that I would focus on.

It is well known that, using ANC service is necessary to detect early complications during pregnancy and further it suggests attaining of safe delivery. Using health professionals' assistance during delivery also helps to minimize the risk of difficulties for mother and children by diagnosing and treating problems; and again using postnatal care benefits for both mother and child in order to handling any complications after child-birth. Hence, these three components of maternity care are often important in order to reduce risk of mothers and children morbidity and mortality. This is why I am interested to look the determinants of using all these three components of maternity care. The result, therefore, is expected to give better understanding for policy makers in order to make further intervention and more improvement on utilization of MHC services in the country.

1.4. Objective and Research questions

Objective: The general objective of this study is to identify socio-demographic and economic factors influencing utilizations of antenatal care, health professionals' assistance during delivery and postnatal care services in Ethiopia.

Research question: To achieve the objective of this study the following research question is developed: What are the background factors that influence utilization of maternal healthcare services in Ethiopia? Furthermore, the following specific enquiries are required in order to answer main research question:

i) What are socio-demographic and economic factors influencing utilization of maternal healthcare services i.e. ANC, assisted delivery and PNC in Ethiopia?

ii) What are the unique and common factors which influence women to use ANC, skilled assistance delivery and PNC services?

iii) To what extent uses of ANC service influence utilizations of skilled delivery and postnatal care?

1.5. Structure of the Study

The study contains six chapters apart from abstract and reference parts. The first chapter covers introduction about study problem that highlights the prevalence of using maternal healthcare services, possible reasons for difference of using MHC services, and also its consequences. Significance of the study, objective and research questions are also presented in this section. Chapter two includes information about maternal health components, theoretical frame-works, literature, conceptual model and testing hypothesis. In chapter three,

the research design, description of data and methods of analysis are presented. Furthermore, in chapter four and five results of the study and its discussion have provided. At the last in chapter six, the conclusion of findings and possible recommendation are stated.

CHAPTER TWO

THEORY AND LITERATURE REVIEWS

In this chapter theoretical frame-works, which help to identify the socio economic and demographic determinants that expected to influence maternal healthcare utilizations; and relevant studies (literature) that help as guidance for our finding through choosing of methods of analyses and related issues are discussed.

2.1. Maternal Healthcare Components

Before discussing about theoretical frameworks and some literature, having idea about the components of maternal healthcare services is appropriate. Therefore, in this subsection an emphasis is given to define and discuss their relative importance of different components of maternity care.

In definition, "Maternal health refers the health of women during pregnancy, childbirth, and the postpartum period. It encompasses the healthcare dimensions of family planning, preconception, prenatal, and postnatal care in order to reduce maternal morbidity and mortality" (WHO, 2014).

***Anten*atal care (ANC):** which is also known as prenatal care services, that state the regular medical and nursing care of women during time of pregnancy in order to ensuring both the health of mother and fetus. During pregnancy it is highly recommended to regularly check-up the health status of women for early detection and timely treatment of side effects or complications of pregnancy. It is also helps to manage the health conditions of fetus (WHO, 2005). For instance, high blood pressure is the most common side effect at time of pregnancy due to women's biological and physiological changes (McCaw-Binns et al, 2004). Others which could complicate pregnancy and delivery, like multiple pregnancies are also need to be detected and managed early. Counselling and tutoring of pregnant women about their own health and their child(ren) condition are also another opportunity that could be provided during ANC. Again, prenatal care also helps to screen women who had sexually transmitted diseases like HIV in order to protect the risk of transmission to child.

Utilizing ANC service, therefore, plays important role to early identifying associated risks of pregnancy and then to suggest possible mechanisms in order to keep the health of mother as well as her child(ren) (WHO, 2005). For every pregnant woman World Health Organization

recommends to attain health services at least ones in each trimester, that is, a minimum of four antenatal visits during time of pregnancy.

Skilled Delivery service: Skilled delivery refers giving birth in health facility places with help of health professionals' in order to safeguard a woman's and child's health because it hastens the timely delivery of emergency obstetric and new born care when life-threatening complication arise. This service must have given by educated and trained health professionals' such as a midwife/nurse or a doctor who can manage normal pregnancies and process of childbirth. Those health professionals must have also good knowledge and skill to easily identify, manage and refer complications of women and babies at postnatal period (WHO, 2005).

However, skilled attendance requires established health systems, which includes well equipped health facilities, adequately trained and motivated health professionals, transportation and rapid referral systems (Bell *et al*, 2003). Behind individual motive and awareness to use those services, these are the main mitigating factors for observed low proportion of skilled delivery attendants in most of developing countries like Ethiopia. In this study, however, the focus has given to assess the effects of individuals' socio-demographic and economic variation on utilization of maternal healthcare services. Hence, some of the macro constraints at country level are smooth-out and individual difference will be assessed.

Postnatal Care (PNC): PNC refers utilization of required healthcare services by mother and new-born child with assistance of trained health professionals starting from time of childbirth up to 6 weeks (WHO, 2005). During postpartum period the most common problem, which is actually easily treatable are haemorrhage, infections and hypertensive disorders (Gill et al, 2007). Hence, early detecting and adequate treatment of these difficulties are required to minimize the risk of mother or new-born baby.

In addition to such type of medical treatments, several important advices can be addressed during postnatal period. These include information about family planning services, child spacing, techniques to reduce unintended pregnancy and other related issues. Again, relevant information that can be provided during PNC are maternal and child nutrition, immunization, hygiene/sanitation, prevention of HIV and other sexually transmitted disease (USAID, 2009).

Therefore, these three components of maternal healthcare services are often important in reduction of mothers' and children's morbidity and mortality.

2.2. Theoretical Frame-work

In this research, three important theoretical frameworks that demonstrate factors influencing utilization of maternal healthcare services are provided. These are i) The Behavioural model and Access to Medical Care (Anderson, 1995) ii) Anthropological and social-medical health care research in developing countries (Kroeger, 1983) and (iii) Attitudes, Social influence, Self-efficacy model (Amooti-Kaguna et al, 2000). These three theories conjointly provide detail information about all dimensions of factors, at micro and macro level, through demonstrating individuals' difference on utilization of healthcare services. Mainly, focus had given to indicate determinants that influencing individual's capability to use required healthcare services depends on availability and healthcare systems found in a region/country, and also variation of personal background factors. These are often important to choose the socio-demographic and economic factors influencing the utilization of maternal healthcare services in Ethiopia.

A behavioural model that has developed by Andersen (1995) describes the multiple effects of using healthcare services, in particular, on the determinants of using maternal healthcare facilities. This model suggests that people's awareness on utilization of health care services as well as their practices about health is a function of the following three main categories.

A) **Predisposing characteristics:** includes factors allied with individuals' characteristics that mainly represent prior habits cause to ill and also that could help through using of healthcare services, such as demographic factors, health beliefs and social structures. Demographic characters such as age and gender represent biological factors that determine the likelihood of individuals healthcare needs. Social structure refers a broad array of factors that govern the health-status of people in the community, how his or her capability to cope with and allocate resources to face health problems, and in what way healthy and unhealthy condition of them is treated likely to be. Examples of social structure are education, occupation, ethnicity, etc. Health beliefs include personal attitudes, values and knowledge that people have about health and healthcare services. These all expected to influence their subsequent perceptions of need and practicing of healthcare services (Andersen, 1995).

B) **Enabling resources:** It helps patients as means to utilize healthcare services when it is required. Enabling resources at community and personal level must be obtainable to use in anytime looked-for. For example, health facilities need to be available and anyone should know how to acquire and make use those health services. Specifically, income, resource for regular care, health insurance, transportation and waiting times are some of means that can be important in this respect (Andersen, 1995).

C) **Need:** It refers how people view their health status and their curiosity to utilize healthcare services. This healthcare need also include how the health status of individuals' is evaluated by the health providers and how they accept it (Andersen, 1995). In general, health need states about how people look their health condition and how they treat the symptoms of illness, pain and worries; and whether or not they decide about their health condition in order to use professional healthcare.

In order to extend the measures of healthcare users, this theoretical model also includes additional factors that are particularly important for health reforms as well as for health policy makers. Again, it also includes feedback loops that possibly affect consequent disposing factors and perceived needs for uses of healthcare services as well as health behaviours of people (Andersen, 1995).

Another similar and important theoretical model that helps to identify determinants of using healthcare services is the Kroeger (1983) behavioural model. He developed the model through classifying the determinants of using healthcare services into three broad categories: (1) predisposing factors of using healthcare, such as age, sex, education, household size and sex or age composition, ethnic group and religious affiliation (2) characteristics of illness, expected benefits from using health treatment and beliefs about illness or disease causation; and (3) healthcare systems that found around individuals living boundary including acceptability, quality, accessibility and cost of healthcare services. This framework is designed to answer the question about how people go into the sick condition and make choices to use or non-use of different kinds of health services.

In addition, there is another conceptual framework by Amooti-Kaguna et al (2000), that used to identify and choose determinants of using MHC services. Mostly, a person's health seeking behaviour can be changed by altering people's attitude, individual's view for social norms and also their self-efficacy expectations (Amooti-Kaguna et al, 2000). The three main psycho-social factors that help to determine the health seeking behaviour of person's are their

attitude, social influences and self-efficacy. Individual's attitude towards a particular action is a result of performing that specific activity. For example, a person's attitude in deciding whether to use professionals' assistance during delivery or traditional practice has a direct relation with practical experience of these choices and/or other factors like exposure. Social influence is a result of social norms. Individual's probability to perform a specific behaviour is influenced by other people, how they have practiced the activities and also whether other people in society doing that behaviour or not. Self-efficacy expectations can be seen as a person's belief to perform the anticipated behaviour and handle the barriers that may prevent her/him from doing a specific behaviour (Amooti-Kaguna et al, 2000).

The implication of this model, in general, is that a person's health behaviour can be changed by altering a person's attitudes, perception of social norms and social support and her/his self-efficacy expectations (Amooti-Kaguna et al, 2000).

2.3.   Empirical literature reviews

In this sub-section scientific studies that are used to choose methods of analyses and also developing of testing hypothesis are discussed. Specifically, in this research a focus has given to see the impact of individuals' difference in socio-economic and demographic backgrounds on utilization of MHC services. To realize such objective majority of scientific literature follows a quantitative analysis in order to see the degree of association between uses of MHC and important background factors (Addai, 2000; Babalola et al, 2009; Charles, et al, 2011; Mekonen et al, 2002). However, some of qualitative studies that focused mainly assessing of women's perception and barriers on seeking of MHC services are also accessed (Simkhada, et al, 2008; Yousuf, et al, 2011). The most common socio-demographic and economic variables that are found in theoretical frameworks are: women's age at giving birth, women's and husband's education, parity (birth order), wealth index, woman's working status, residence, survival status of previous child(ren), religion and women's decision making power. Hence, these factors are viewed and discussed below:

Most of the studies recognized that mother's age at child-birth plays an important role for utilization of MHC services, even if the direction of the effect often inconsistent. Mother's age my sometimes help as a proxy to have experience and knowledge about benefit of healthcare and then it contribute positive effect on utilization of these services (Charles, et al, 2011; Babalola et al, 2009; Chakraborty et al., 2003). Most of these literatures explanation showed that higher use of MHC service by older women is may be due to more confident and

have higher household decision-making power than younger women, which could advance the likelihood of healthcare uses.

However, other literatures indicated that high proportion of younger women relatively more likely to use MHC services than older ones due to continuous improvement of educational opportunities that could help younger generation to have an enhanced knowledge in utilizing maternity care (Ofra, 2004; Mekonnen et al, 2002). Such type of results is predictable in many developing countries, like Ethiopia, because education attainment for high proportion of young women still progressively increasing. It is also demonstrated that younger mothers, mostly, might not have more experience on childbirth, and hence their likelihood of using maternity care could be higher compared with older ones due to perceived risks (Mekonnen et al, 2002). However, there are also some studies that showed existence of non-significance difference between mother's age at birth and maternal healthcare utilizations (Addai, 2000, Ethiopian Societies of Population studies, 2008). Addai (2000) only found the odds of using professionals' assistance during delivery for women aged 15-24 was 25% less likely than women aged 35-49. But, non-significance differences were showed in using ANC and PNC services from different age categories.

It is well-known that woman's education plays a significant role on variation of utilizing MHC services, particularly, in developing countries where high proportion of women are not using health care services (Charles, et al, 2011; Mekonnen et al, 2002; Ononokpono et al, 2013; Simkhada, et al, 2008). These studies revealed that the covariate has strong positive association with utilization of health care services. For example, a study based on 2000 EDHS data by Mekonnen et al (2002) found that compared to mothers with no-education those primary and above educated women were more likely to use antenatal, assisted delivery and postnatal services. It is factual that better educated women are more aware about health problems, know more about the availability of required healthcare services, and have better ability to use effectively those health care inputs to maintain good health status. However, some literature questioned the strong association between MHC utilization and educational attainment of women. They argued that, especially, to access skilled assistance delivery and PNC other factors such as place of residence, family income, etc interact and dilute this strong positive effect (Gage et al, 2006; Ononokpono et al, 2013). Particularly, Ononokpono et al (2013) based on 2008 Nigeria DHS data demonstrate that community factors acted as moderator for the association between educational attainment of women and ANC attendance.

Alike education of women, several studies showed birth order (parity) has inconsistent effect on health seeking behaviour of women, in particular, utilization of MHC services. Many studies (Ethiopian societies of Population Studies, 2008; Mekonen et al, 2002; Nigussie et al, 2004) showed that during first pregnancy and child-birth high proportion of women likely to use MHC than at higher birth orders because of perceived risks. They argued also that having many children mostly are cause for limitation of resources i.e. time and other possessions, which have a negative outcome on health care utilizations. Meta-analysis based on eighty nine studies, conducted in developing countries from 1990 to 2006 (Simkhada et al, 2008) demonstrated the existence of negative association between parity and maternal health care utilizations.

Husband's education is also another important factor that found to be significantly associated with uses of maternity care services (Kemal, 2009; Simkhada et al 2008). Among many literature reviewed by Simkhada et al (2008), majority shows positive relation between husband's education and health seeking behaviour of women. Because better educated husband could have greater knowledge about maternal healthcare services (where and how to seek care/admits in health facilities); and hence he can contribute these potential information for utilization of required health care services.

It is well-documented that the economic stability of household highly determines the health seeking behaviour of women. The low income women in less developed regions of the world have the lowermost healthcare service coverage (Gwatkin, et al, 2007). Demand and accessing of professional health care are mostly associated with costs of transportation, medications, user fees, and other supplies. Hence, women from low financial resources may have difficulties to pay-off easily such costs and are likely to be discouraged from utilizing health care services (Simkhada et al 2008). A research conducted in over 50 countries indicated also that on average more than 80% of births from richest women assisted by health professionals compared with only 34% from low-income women (Gill *et al*, 2007)

Similarly, a study in Nigeria by Ononokpono et al (2013) showed that women from richest household quintile were 5.7 times more likely to use MHC than women from poorest households. A comparative research conducted in rural Burkina Faso based on 435 sampled women showed also that after reduction of user's fee household wealth is negatively associated with antenatal utilization and not to have significant effect on using assisted delivery (Allegri et al, 2011). All these studies, in general, identified that costs of services

and related expenses are tumbling factors on the uses of MHC services. Means, women from better economic status have better chance to use the services compared with counter parts.

Mainly in developing nations, a difference in place of residence is a reason on significant discrepancies of health facilities, i.e. availability of health providers, medicines, health equipment, etc. (Gwatkin, et al, 2007; UNCIF, 2011). That means, in this region health facilities do not equally distributed for rural and urban places. Due to such concomitant factors so many studies assured that a place where woman is located has influenced her use of maternal health care services (Babalola et al, 2009; Mekonen, 2002; Ononokpono et al, 2013). It is often thought that low quality of services, cost and lack of transportation and other are mitigating factors for low utilization of MHC services in rural places. In addition to this, urban women probably been more educated and they could have good knowledge about benefits of using maternal health care services.

In contrast, a study based on 2003 Ghana DHS data using probit regression showed that high proportion of women residing in rural areas utilized ANC, skilled assistance delivery and PNC compared with urban women (Charles, et al 2011). For this unique outcome, the researcher suggested in some cases using MHC services might partly be taken as a status symbol. Hence, some form of computation may ensue and women who lived in rural area may promote the utilization of these health services than urban counterparts.

Women's decision making power is also among one of the prominent factors that is studied by many researches to see its role in determining of healthcare needs (Fotso et al; 2009; Gebremariam, et al, 2009; yousuf et al 2004). Most of these scholars concluded that having credible contribution on decision of household resources exerts to develop self-stem and independence, which further enlarge the likelihood of utilizing maternal healthcare services. In Ethiopia context, majority of men are regulator of household resources and decision makers when and where women should use health care services. For example, a study by yousuf et al (2004) in Afar, one part of Ethiopia, revealed husband and senior family members, such as in-laws strongly influenced women's use of health services.

A study using multi-level regression by Gebremariam, et al (2009) based on 2005 EDHS data indicated that women's autonomy was a significant predictor of health-seeking behavior. Specifically, this result showed that when the scale of women's autonomy increases by one the odds of seeking health care was increased by 46%. Their explanation addresses Ethiopian

women's healthcare seeking behavior is not independent of their autonomy because patriarchy and social norms limit their freedoms to make important decisions.

A study by Fotso et al (2009) also showed that among rich to least poor households, the women's decision power (autonomy) has positive relation with place of delivery. Specifically, this mediator factor displayed strong positive association with receiving skilled assistance delivery from poorest women. However, Ethiopian Societies of Population Studies (2008) based on 2005 EDHS using logistic regression found household decision making autonomy was unimportant covariate for women's health seeking behaviour.

The effect of religion in determining the utilization of maternal health care plays an important role through shaping belief, norms and values on health seeking behaviour of individuals (Amooti-Kaguna et al, 2000; Anderson, 1995). Different empirical literatures also assured existence of relation between religious affiliation and utilization of maternal health care (Charles et al; 2011; Mekonen et al, 2002; Ononokpono et al, 2013). However, its degree of effect is mostly accredited to the differences in culture and social belief of study population. A study in Ethiopia by Mekonen et al (2002) showed that women who have traditional religion were 50 percent less likely to use antenatal care compared with orthodox/Catholic religion followers; and women belong to Muslim religion were 30 percent more likely to use ANC compared with Orthodox or Catholic followers. However, in this study significant difference had not observed on utilization of professionals' assistance during delivery and PNC based on variation of religious background. A study conducted in Bangladesh by Kamal (2009) also showed that skilled birth attendants were relatively higher among non-Muslim women than Muslims. Moreover, it failed to find a significant association between the use of antenatal care and religious background.

On the other hand, based on 2005 EDHS Ethiopian Society of Population Studies (2008) religion had not displayed significant effect on women's preference to use maternal health care services.

Another important factor that affecting the uses of maternal healthcare is working-status of women. In Ethiopia, high proportions of women have no formal jobs and they spends more of their time in house through caring children, cooking, cleaning and by doing related tasks than moving outside for other professional or non-professional jobs (Ethiopian Societies of Population Studies, 2008; Mekonen, et al, 2002). It is thoughtful that having exposure with many people outside home suited discussion about benefits of using MHC services. A study

conducted by Mekonen et al (2002) based on 2000 Ethiopian DHS data showed within urban place women who had working were about 140% more likely to receive antenatal care for at least four times compared to those were not working. However, in this study women's working status were not found to be significant on utilization of skilled delivery and PNC services.

To summarize, based on majority of literatures including meta-analysis (Simkhada et al, 2008) found in developing countries the socio-demographic and economic characteristics, such as women's age, parity, survival index of previous child and religion showed negative association with utilization of healthcare services. Whereas, women's education, husband's education, family income (wealth), work status, place of residence and sex of household head had positive association with uses of ANC, assisted delivery and postnatal services.

However, according to these scientific literatures the degree of relation between these background factors and uses of each component of maternal health services depends on the study population and time frames. For example, the effects of women's age at birth on utilization of MHC had shown inconsistent direction. Some of studies displayed the presence of positive relation (Charles, et al, 2011; Babalola et al, 2009; Chakraborty et al., 2003), others demonstrated negative association (Ofra, 2004; Mekonnen et al, 2002) and else showed absence of relationships (Addai , 2000). Therefore, in this research the direction and level of effects of each socio-economic and demographic characteristic will be identified based on recent data. Furthermore, in Ethiopia setting an attempt would also give to find unique and common factors influencing uses of prenatal care, skilled delivery and postnatal care.

2.4.   Conceptual Model

In this sub-section a summarized conceptual model is given to show a clear inter-relation between those fundamental factors and outcome-measures through guidance of conceptual frameworks developed by Andersen (1995), Kroeger(1983) and Amooti-Kaguna et al (2000). Meanwhile, it was not found to be important of using the entire spectrum of determinants mentioned in all frameworks; and hence a modified conceptual-model that contain list of variables which are going to test and other expected factors of maternal healthcare services are presented below.

Figure 1: A framework to study the determinants of MHC services utilization in Ethiopia
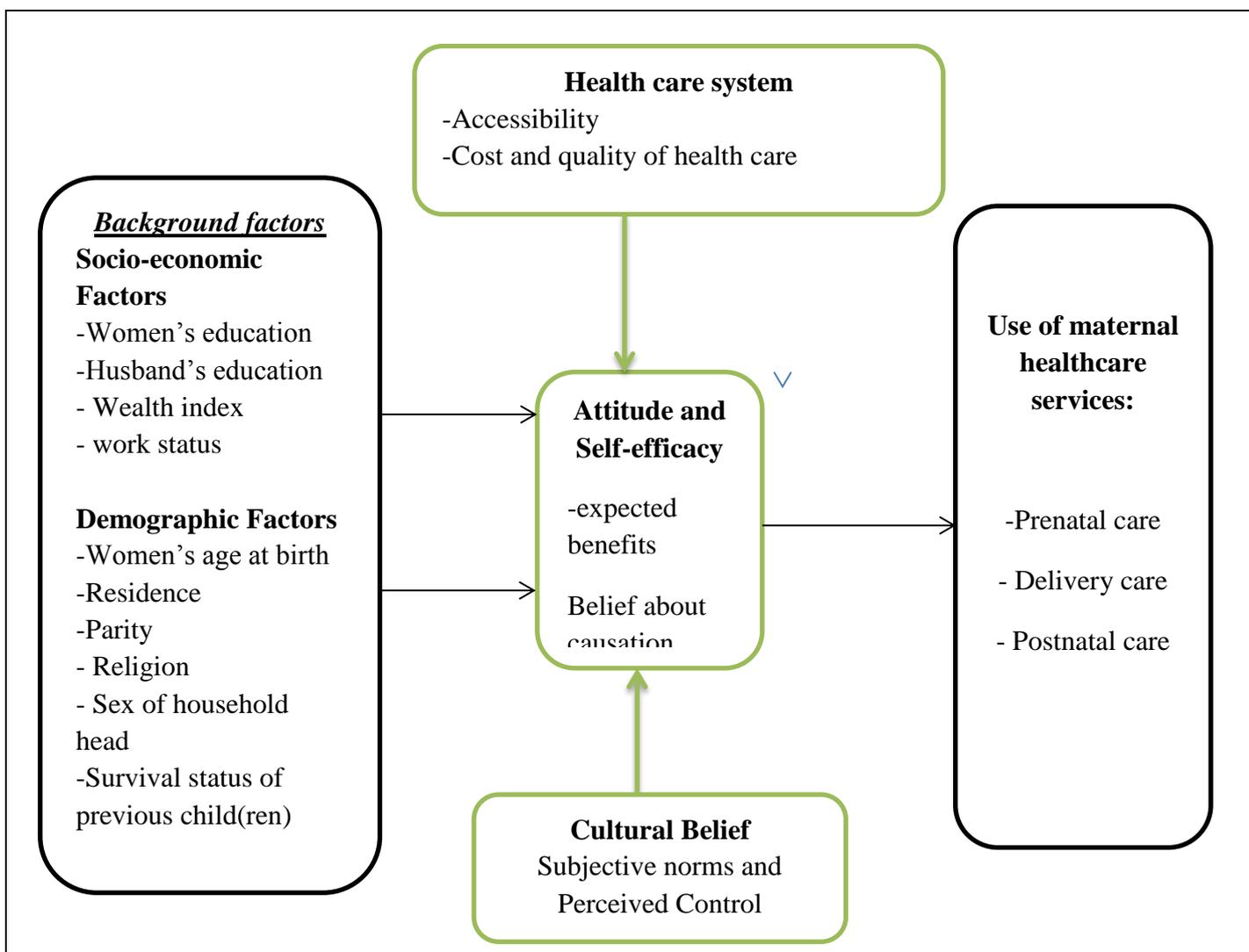
In this conceptual model, the expected influential factors that could affect the use of maternal healthcare service in Ethiopia are mentioned. The main finding is to identify the socio-economic and demographic factors influencing uses of ANC, delivery and PNC services. So, in the conceptual model the black line indicates the desired study variables in this specific research. Whereas, the green line shows other hypothetically contribute factors on utilization of MHC services in Ethiopia.

2.5. Definition and some Clarifications of Concepts

This subsection gives information about operational definition of main concepts which are stated in figure-1 above.

Health systems: It refers the arrangements of people, institutions and resources that directly or indirectly help through using of healthcare services in a given Population (Frenk, 2010). To meet the health needs of a targeted population, there are a variety of healthcare systems in different countries. In some countries health provision may be carried and distributed by government organizations. However, in other parts of country it perhaps delivered by private health market providers, charities and/or other trade union organizations. These variations expected to have strong relation with costs, accessibility and quality of healthcare. So, the healthcare system (the quality, efficiency, acceptability, and equity of health need) may have its own effect for variability of utilization of MHC services in different regions of the country.

Demographic Characteristics: This relates to personal background of individuals, such as age at child-birth, place of residence, birth order/parity, sex of household head, religious affiliation and related information of respondents.

Socio-economic status: The condition which defines individuals' financial status in a society and that is viable for their personality, attitudes and lifestyle. The socio-economic factors that are considered in this study are women's education, husband's education, working condition of women and wealth status of household.

Cultural Belief: Cultural beliefs are the ideas and thoughts common to several people that govern interaction between these individuals, their gods, and other groups, differ from knowledge in that they are not empirically discovered or analytically proved (Avner, 1994). Therefore, different groups of individuals might have their own systems of health beliefs to determine what causes illness, how it can be cured or treated, and who should be involved in the process. For instance, in Afar (one of the regions of Ethiopia) women are reluctant to be examined by male midwives at child-birth time. They have a perception that "It is only God and my husband has the right to see me naked" (Yousuf et al, 2011). In this region, it is not culturally acceptable to expose the reproductive organs of women to men health providers. Therefore, use of maternal health services is highly influenced by cultural beliefs, attitudes and practices of the pastoralist community.

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Attitude and Self-efficacy: A person's attitude towards a specific activity is a result of performing the behaviour, for example a person's attitude in deciding whether to use modern family planning or traditional practices. Again, self-efficacy expectations can be seen as a person's belief whether he/she can perform the desired behaviour and manage the barriers that may prevent him/her from doing specific behaviour (Amooti-Kaguna et al, 2000).

Maternal Healthcare Services: Definitions and detail descriptions about maternal health components are discussed in part 2.1.

2.6. Methods of measuring the outcome and predictor variables

In this sub-section, the three outcome variables that are used as indicators of maternal health care services, and the background factors that expect to influence this response variable have been discussed with how to operationalize.

Dependent *Variables*	Way of operationalizing
- Antenatal care - Skilled assistance delivery - postnatal care	These three outcome measures are obtained from questions included in DHS questionnaire that were asked as following forms: 1) How many times you were checked by a trained health professional, that is doctor, nurse or midwife during pregnancy; and in survey data it filled in form of 0, 1, 2, 3,… 2) Whether they were assisted by a trained health professional during last child birth and 3) whether they received a medical check-up from a health professional within 42 days after delivery, and hence both columns answered by yes/no responds.
Socio-economic predictors	**Way of operationalizing**
- *Women's educational level*	- In the DHS survey, the column that contain education-status refers the highest education level attained by a woman during the survey and it characterized into four groups as no-education, primary, secondary and higher
- *Husband's Education level*	- Similar to women's education, husband's education was also categorized into four clusters as no education, primary, secondary and higher.
- *Wealth index*	- This is a measure of the standard of living of the family the woman belongs to. It measured by a composite score of several indicators of household possession, such as piped water, toilet, type of floor,

	electricity, radio, television, bicycle, etc. Based on these facilities, households classified as poorest, poor, middle, rich and richest.
- *Working status*	- A woman were asked to know whether she has work outside home or not; and the column of variable filled by working and not-working responses.
Socio-demographic predictors	**Way of operationalizing**
- *Sex of household head*	- This group of variable classified into categories based on sex of household-head, that is male or female
- *Residence*	- The demographic variable residence refers the location where a respondent lives, that is, rural or urban
- *Religion*	- In Ethiopian DHS survey, individuals are grouped associated with their religious affiliation, that is orthodox, protestant, catholic, Muslim, traditional and others.
- *Parity*	- This refers to the number of children a mother had given birth to preceding the survey and which is provided in form of number 0, 1, 2, …
- *Age of mother at birth*	- This measure shows the age of mother at last child's birth. That can be found by subtracting ages of mother during survey with ages of last child.
Survival status of previous child(ren)	- The column data has two options zero and one. Zero- refers woman who had no child died before his/her ages of 5, and one- refers woman who had at least one child died before his/her 5th birth date.

2.7.   Hypothesis/ Expectation

Based on the objective or research questions of this study, and with guidance of both theoretical frameworks and scientific literature the following hypotheses have been formulated.

1. The socio-economic and demographic factors such as, women's education, education of husband, place of residence, working status, wealth index and sex of household head assumed to have positive impact on utilization of MHC services. Whereas, woman's age at birth, survival status of previous child, parity and difference on religion assumed to have negative influence on use of maternal healthcare services.

2. Women who have had better awareness on utilizations of antenatal care still expected to have high chance to use skilled assistance delivery and postnatal care.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Study Design

The objective of this research is to identify the socio-economic and demographic factors that affect utilizations of MHC services in Ethiopia. To achieve this objective a quantitative analysis was done based on cross-sectional secondary data obtained from Ethiopian DHS. Hence, the methods of analyses are a combination of descriptive and explanatory technique in such a way that possible descriptions and also detail investigation for the current status of utilization of MHC services can be made about the important background factors.

Meanwhile, an attempt would go to assess how variations of socio-economic and demographic backgrounds influence the health seeking behaviour of women (utilization of MHC) and what explain possible differences by using logistic regression. Scientific explanation will be provided for inter-relation between dependent and predictor variables based on statistical values. Again, an attempt is made to relate the discussion of the result with recent scientific literatures in order to enrich the reasons behind stated theories.

3.2. Sources of Data

The data for this study we used is from 2011 Demographic and Health Survey conducted in Ethiopia. The survey designed to obtain wide-ranges of information for socio-economic and demographic indicators at individual and household levels. In such way that the sample data collected represents the population at regional and national level.

Specifically, this study is based on women's information that include entail data on histories of fertility, family planning, child mortality, maternal mortality, use of maternal and child health services, children's nutritional status and knowledge of HIV/AIDS, including household information. Hence, the source of data for this study is the 2011 Ethiopia DHS, which is the most recent available data that retrieved from http://measuredhs.com.

3.3. Sampling Technique of the study Population

In order to drawn required sample for 2011 Ethiopian DHS, the 2007 Ethiopian Population and Housing Census were used as the sampling frame. The survey was designed based on women and men whose ages were between 15-49 years and 15-59 years, respectively, to provide information on the health and demographic variables of the country. Thus, to collect information on health, demographic and socio-economic indicators of women about 17,018

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numbers of eligible participants were proposed for interview. Among the proposed participants, the required information was obtained only from 16,515 women because of non-response case (EDHS, 2011). Despite the fact that, the analysis for antenatal care and skilled assisted delivery were computed based on 7764 sampled women. The reason is that from total of 16,515 responses only 7764 women had at least one birth within five-years preceding the survey. It is also important to exclude women's where their infant's had died within four weeks of delivery. Finally, 7542 women are used to see the required outcomes in the case of postnatal service.

Figure 2: Method of sample selection that have used for anlysis
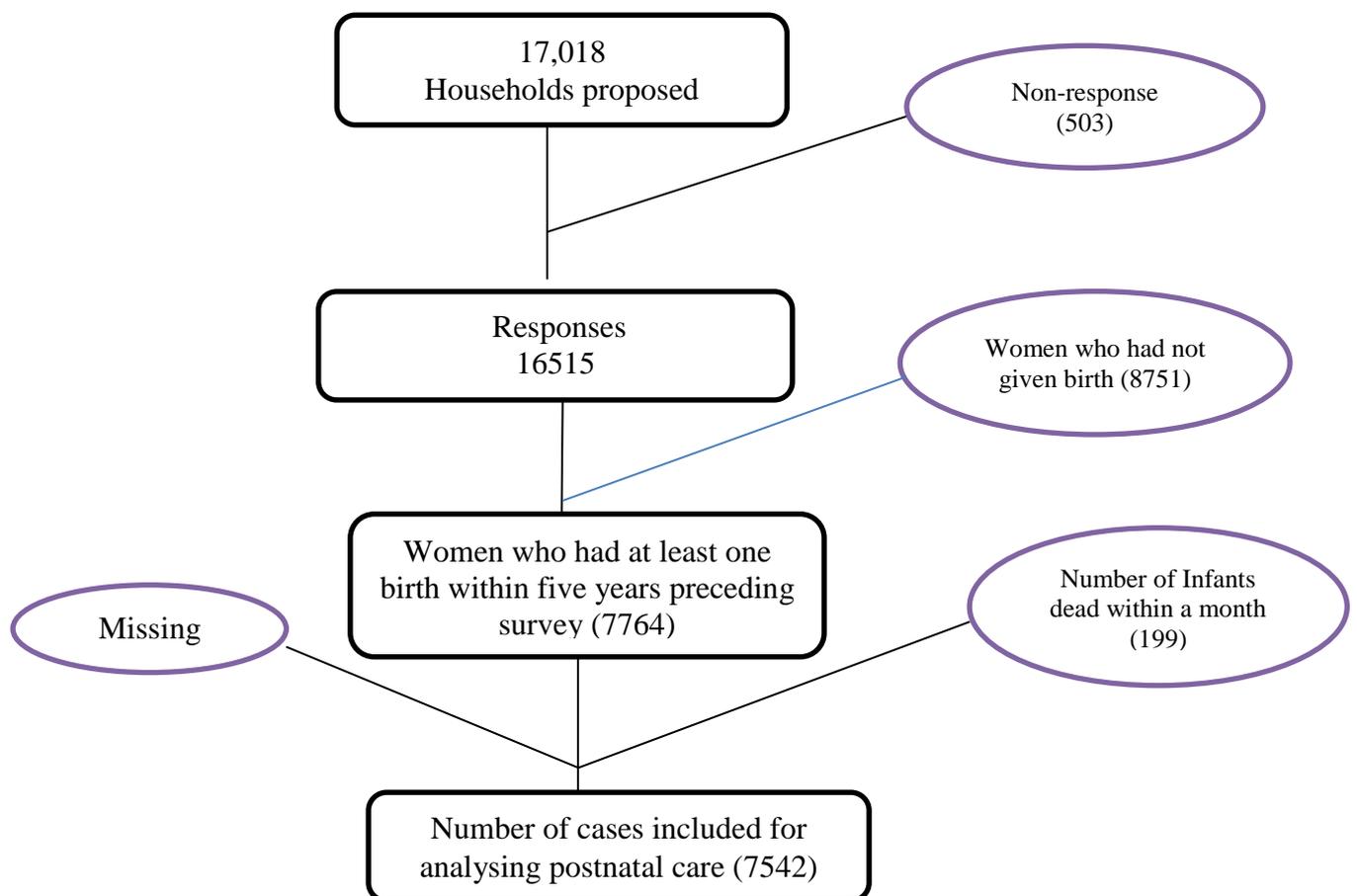
3.4. Methods of Analyses

In this study, in order to assess the effect of socio-economic and demographic factors on utilization of maternal health care three dependent variables were constructed. These are: the number of visiting health centre during pregnancy, the use of skilled assistances during delivery and the utilization of postnatal care from trained health professionals. In order to

facilitate comparisons between women based on their background factors, number of ANC visit has grouped into four categories (0, 1, 2, 3, 4+ times). Where, 0-represents when women did not receive any health services, 1- when women received health service only one time during pregnancy, and the same for the rest. For the others dependent variables, we built a binary categories to indicate whether or not a woman used health care services from health-professionals.

Meanwhile, it is required to see the descriptive statistics of these response variables and also individuals' likelihood of using healthcare services through fitting proper model with respect to study factors. To see likelihood of using healthcare services with respect to socio-economic and demographic factors, binary and multinomial logistic regressions were used.

3.4.1. Descriptive and Bivariate Methods

Exploring the descriptive statistics mainly used to see the main features of study variables. For example, the descriptive statistics provides characteristics of study variables, such as response rates, number of missing values and proportion of observations in each category of variable. In addition it is used to assess the suitability of data for further analysis.

In the bivariate analysis, cross tabs and the chi-square test are computed to examine the degree of association between each predictor variables with outcome measures. Through these, the chi-square values could indicate the predictor variables that would include in multivariate logistic regression.

3.4.2. Logistic regression

Logistic regression is useful for situations in which we want to predict the presence or absence of a characteristic or outcome based on values of a set of predictor variables (Hosmer et al, 2000). That is, logistic regression is a model used to predict the probabilities of possible outcome of a categorically distributed dependent variable given a set of independent variables. The independent variables may be real-valued, binary or multi categorical values.

3.4.2.1. Binary Logistic Regression

Binary logistic regression is a generalized linear model with dichotomous response variable. Means, the response variable can take the value 1 with a probability of success p, or the value 0 with probability of failure 1- p. While, the explanatory or predictor variables can take any form. In this model, the relationship between the explanatory and the response variables is

not a linear function. Thus, logit transformation is important in logistic regression analysis in order to generate a continuous logarithmic curve from categorical dataset (Agresti, 2007). Hence, linear relationship exists between the log-odds of the response variable and predictor variables.

Therefore, the binary logistic regression model based on k explanatory variables i.e. $X' = (X_1, X_2, \ldots, X_k)$ with the conditional probability of success denoted by P is defined as:

$$Ln(p/(1-p)) = logit(p) = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k$$

where, β_o is the constant of the equation and, β_i is the coefficient of the ith predictor variable.

After the model is fitted the next step is checking the adequacy of the model in order to assessing how close the observed values are predicted by the fitted model. Furthermore, the importance of the explanatory variables is assessed by carrying out statistical tests. The Hosmer-lemeshow and Wald tests are commonly used to check the adequacy of the fitted model and significance of the regression coefficients, respectively. Thus, comparing the relative odds of utilizing the MHC services, such as assistance delivery and PNC between women who have different backgrounds have made based on the odds ratios. In such a way that, the effects of each socio-economic and demographic variable on health seeking behaviour of women would assess.

3.4.2.2. Multinomial Regression

Multinomial logistic regression is an extension of binomial logistic regression. It has used when the dependent variable has more than two unordered categories. In multinomial logistic regression, the dependent variable that has m-categories further dummy coded into (m-1) several 1/0 value variables. Then, there will be m-1 separate binary logistic regression model, where, each model tells the effect of the predictors on the probability of success in that category, in comparison to the reference group (Agresti, 2007).

Therefore, the multinomial logistic regression model that has m-categories and k explanatory variables i.e. $X' = (X_1, X_2, \ldots, X_k)$ with the conditional probabilities of success $(p_1, p_2, \ldots \ldots \ p_{m-1})$ is defined as:

$$Ln(p_i/p_j) = \beta_{oi} + \beta_{1i} X_1 + \beta_{2i} X_2 + \cdots + \beta_{ki} X_k$$

where, β_{oi} is the constant of the equation and, β_{zi} is the coefficient of the zth predictor analogous to i[th] category of response variable ,and $i \neq j$ can contain 1, 2, …, m-1.

Specifically, in this study multinomial logistic regression is applied in order to see the joint effects of socio-economic and demographic variables on utilization of ANC services. To facilitate comparisons, we grouped the outcome variable into four response, that is, whether woman had ANC service for '0' or '1-2' or '3' or '4+' times during her pregnancy. Finally, the levels of effects of each and/or joint predictors on respective categories of response variable will be assessed by using suitable measures (it could be odds ratio, Wald-test, or p-values).

3.5. Ethical considerations

The data used for this analysis consists of secondary data collected by Ethiopia central statistics Agency in 2011. This is officially approved by both Ministry of Health Ethics committee (Addis Ababa, Ethiopia) and Opinion Research Corporation Macro International Incorporated (ORC Macro Inc., USA). Hence, no further ethical approval didn't need anywhere for validity and acceptability of data. The results of the study could not specifically notice individuals or personal character. However, ethical considerations for the study are still required. In conducting the research, I would try to display both positive and negative results found from analyses, and all bias or unclear results will be discussed.

CHAPTER FOUR

RESULTS

4.1. Descriptive information of the Respondents

The analysis of this study is based on 7764 women respondents who had given at least one birth within five years preceding the survey. According to descriptive information found in Table-1, the total sample women's median age at time of survey was about 28 years with inter-quartile range of 11 years. However, the median age of women to have first birth was 20 years. Again, the descriptive information of this sampled population reveals 50% of those women who had given birth within five years preceding the survey had also two or more prior children because the median parity shows two children per woman (Table-1). The average year of schooling for those reproductive age groups of women was about 3.6 years with standard deviation of 2.22 years.

Table 1: Some descriptive measures of the study population

No.	Characteristics that has measured	Outcome/unit (N = 7764)	*Standard deviation/ Inter quartile rage*
1.	Mean years of schooling	3.6 years	2.22 year
2.	Median age of sampled women	28.0 year	11 year
3.	Median age of women at time of first birth	20.0 year	5 year
4.	Median parity	2.0 children	4 children

Note: The measure of deviation computed in the above table indicates standard deviation for mean and inter-quartile range for median.

Information found in Table-2 shows among the total sample, 54.9% of mothers were not visited by any health professionals (midwifes, nurse or doctor) at least one times during their pregnancy. Whereas, 11.2% and 11.6% of women were visited "1-2" and "3" times to get prenatal services, respectively. Small proportions (22.3%) of women were following antenatal care four or more times. Parallel to this, large proportion (82.6%) of mother had not received assistance during delivery from any health professionals. Through excluding cases (mothers whose child had died within 4 week of delivery) an attempt has also made to assess the levels of utilizations of post maternity care. In such a way that, only 13.5% of women respondents were received health care services from health professionals within 42 days of delivery (Table-2).

Table 2: Percentage distributions for utilization of ANC, assistance delivery and postnatal care

Maternal health care components	Responses	N	%
Antenatal care	*None*	*4266*	*54.9*
	"1-2"	*865*	*11.2*
	"3"	*901*	*11.6*
	"4+"	*1732*	*22.3*
	Total	*7764*	*100*
Health professionals' assistance during delivery	*No*	*6411*	*82.6*
	Yes	*1347*	*17.3*
	Missing	*6*	*0.1*
	Total	*7764*	*100*
Utilization of postnatal care	*No*	*6521*	*86.2*
	Yes	*1021*	*13.5*
	Missing	*23*	*0.3*
	Total	*7565*	*100*

Figure-3 shows percentage distribution of women through cross bars by well-disposing the three indicators of maternal healthcare services. According to information obtained in Figure-3, in the country half of the proportion (51%) of women had not received any health care during pregnancy, at time of delivery and after delivery. Looking the percent of cross bars in different angles, 52% of women did not receive both prenatal services and skilled assistance delivery during childbirth (Figure-3). Too small proportion (6.9%) of women used three required maternal healthcare services, such as antenatal care at least four times during pregnancy, professionals' assistance during childbirth and heath check-up within six weeks of birth.

Figure 3: Bar graph for percentage distribution of mothers who were received the three indictors of MHC services

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4.2. Cross-tabulation and Bivariate Measures based on Socio-economic and Demographic Factors

Among total female participants, a significant percentage (66.8 %) of women had no formal education, whereas 27% were at primary level and lower proportion (6.2%) of sampled women had both secondary and higher education (Table-3). Of the total sample, 34% were from Orthodox, 19% were protestant, 43.3% along Muslim religion and the remaining small proportion (3%) were from Catholic and Other religion followers. A significant proportion (80.5%) of women was residing in rural areas. While, only 19.5% of women participated from urban residence. The percentage distribution of women analogous to wealth status also showed different proportions. Twenty nine percent of women were from lowest wealth quintile, 17.4% from poor families, 21.4% from richest and remaining 31.9% were from middle and rich family groups (Table 3).

The cross-tabulation in bivariate analysis (Table-3) displayed that only 13.3% of sampled women with no-education attained prenatal services at least four times; and 32.7, 70 and 79.8 percent of women from primary, secondary and higher education groups used the ANC service four or more times during pregnancy, respectively. These indicated, through holding other covariates' effect constant, women with higher education were six (79.8% /13.3%)times more likely to have four or more antenatal visits than women with no formal education. As expected, the utilization rate of skilled assistance delivery and postnatal care increased almost linearly with level of education of women. Means, in all cases the Pearson chi-square test (p-value) showed the presence of significant variation among different groups of education; and also the percentage outcome displayed progressive increment along higher education ranks. Therefore, education was significantly related with prenatal visits and utilization of health professionals' assistance during delivery as well as postnatal care.

Table 3: Percentage and chi-square measures of women who used ANC, skilled delivery and PNC services based on socio-economic and demographic characteristics

Characteristics	Number of women		Women who used ANC at least 4 times		Women who were assisted during delivery		Women who used PNC	
	N	*%*	*%*	X^2	*%*	X^2	*%*	X^2
education level								
No-education	*5184*	*66.8*	*13.3*		*8.1*		*6.9*	
Primary	*2095*	*27.0*	*32.7*		*25.8*		*18.8*	
Secondary								

	n	%						
Higher	312	4.0	70.8	P< .001	75.6	P< .001	57.9	P< .001
	173	2.2	79.8		86.7		68.0	
Religion								
Orthodox	2694	34.7	31.7		24.8		19.4	
Catholic	79	1.0	21.5		16.9		9.7	
Protestant	1479	19.0	17.7	P< .001	12.7	P< .001	10.6	P< .001
Muslim	3359	43.3	17.5		13.8		10.8	
Others	60	0.8	5.0		8.3		1.3	
Missing	93	1.2						
Husband's education level								
No-education	3932	50.6	11.4		6.0		5.9	
Primary	2790	35.9	26.3	P< .001	18.8	P< .001	13.2	P< .001
Secondary	594	7.7	48.3		53.0		40.4	
Higher	372	4.8	60.3		62.5		49.4	
Missing	76	1.0						
Sex of household head								
Male	6202	79.9	21.6		15.6		11.8	
Female	1562	20.1	25.3	P< .001	24.2	P< .001	20.3	P< .001
Residence								
Urban	1513	19.5	56.5		62.7		43.7	
Rural	6251	80.5	14.0	P< .001	6.4	P< .001	6.2	P< .001
Wealth index								
Poorest	2279	29.4	7.8		5.8		4.7	
Poor	1354	17.4	11.7		5.1		5.1	
Middle	1241	16.0	15.5	P< .001	8.8	P< .001	5.1	P< .001
Rich	1229	15.9	22.5		11.6		10.5	
Richest	1661	21.4	55.9		58.4		41.1	
Respondents working	5309	68.4	18.8	P<.001	14.5	P<.001	12.0	P<.001
No	2445	31.5	29.9		23.7		17.6	
Yes	10	0.1						
Missing								
Age group								
<=19	805	10.4	20.0		18.9		14.4	
20-24	1911	24.6	26.5		22.9		16.2	
25-29	2061	26.5	22.5	P<.001	17.7	P<.001	14.6	P<.001
30-34	1353	17.4	22.8		16.0		12.5	
35-39	898	11.6	19.0		10.1		9.6	
40+	387	5.0	13.4		5.7		7.5	
Parity								
0	1477	19.0	34.8		36.6		26.4	
1	1336	17.2	30.2		25		17.3	
2	1083	13.9	19.7	P<.001	15.2	P<.001	12.5	P<.001

3	*973*	*12.5*	*18.0*		*10.6*		*10.3*
4	*805*	*10.4*	*17.9*		*10*		*8.5*
5+	*2090*	*26.9*	*13.5*		*6*		*6.9*
Any child had died before							
None has died	*5493*	*70.7*	*25.4*	*P<.001*	*21.1*	*P<.001*	*16.1* *P<.001*
One or more	*2271*	*29.3*	*14.9*		*8.3*		*8.0*
All respondent	*7764*	*100*	*22.3%*		*17.3%*		*13.5%*

Note that: In the above table, in order to reduce redundancies in bivariate analysis, we only consider one group of cases that are used ANC services at least four times during their pregnancy.

Again, from bivariate analysis, religion was significantly associated with utilization of maternal healthcare services. Women from orthodox religion were more likely to use prenatal care, assistance during delivery and postnatal services from health professionals than other religion groups (Table-3). Graphical presentation is mostly showed clearly for casual observers about proportion of cases aligned with each categories of variable. Hence, Figure-4 display the percentage of antenatal care utilizers based on their religious background.

Figure 4: Proportion of women who used antenatal care based on their religious background
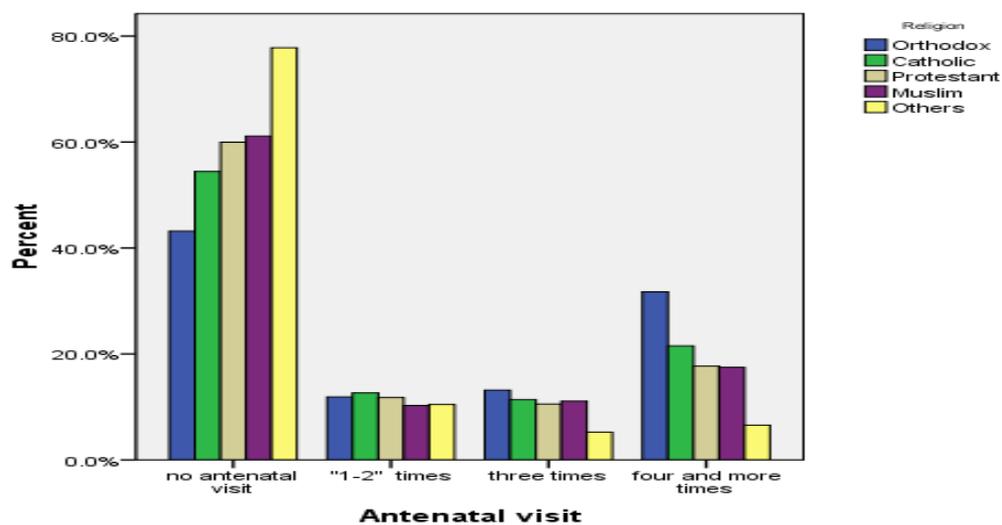
Consistent with cross tabulation and bivariate outcome found in Table-3, Figure-4 also shows slight variations on utilization of antenatal care based on difference of religious affiliation. Specifically, high proportion (around 80%) of "Other" religion followers did not receive ANC at least one times during their pregnancy. Compared to women from "Other" religion followers, less proportion (42%) of women from orthodox religion did not receive any health care during time of pregnancy. But, there were no significant difference on proportion of women who used ANC "1-3" times based on religious variations. While, Figure-4 shows

comparatively high proportion (31.7%) from Orthodox and too small percentage (5%) of women from "Other" religion were received ANC at least four times.

Regardless of effects of women's education, husband's education also found to be a significant background factor on utilization of maternal healthcare services. A higher proportion of women along with better education of husband were utilized ANC, assistance during birth and postnatal care. Women who possibly had taken decision for self and their family choice were more likely to attend four or more times antenatal care, to use professionals' assistance during delivery and also to receiving postnatal care.

Lower proportion (14%) of women who were residing in rural area had received ANC at least four times from health professionals. That means, comparatively women who lived in urban places were 4(56.5/14) times more likely to use antenatal care four or more times; 9.6 time more tends to receive skilled delivery, and 6.9 more likely to use postnatal care compared with women residing in rural place (Table-3). Wealth status also found to be prominent factor that influences the utilization of maternal health services. Utilization of these MHC services increased steadily with increment of women's wealth quintile. Implies, women along with rich and richest wealth quintile were more likely to admit ANC for at least four times, to receiving assistance delivery and postnatal care compared to those in the lowest household wealth index. In particular, women in richest family were 7.1 (55.9% ÷7.8%) times more likely to attend antenatal care at least four times compared to poorest women. Again, women among richest category about 4.77 times were more likely to use ANC four or more times compared to women from poor families.

Controlling other variables effect, the chi-square output also shows the women's working status was an important predictor for utilization of maternal health care services. Relatively, high proportion of women who had been working were more likely to use ANC, assistance during delivery and postnatal care than women who were not working. For instance, about 18.8% and 29.9% of women who were not working and were working, respectively, used antenatal services at least four times during their pregnancy. ANC, skilled assistance delivery and postnatal coverage are also associated with mother's age, number of children they have had and with survival status of previous child(ren). Parity was negatively associated with utilization of all maternal health components. Specifically, 36.6% of mothers with no-child before and 6% of mothers who had 5 or more children received assistance from health professionals during delivery, respectively (Table-3). Figure-5 shows the proportion

of women who had used skilled delivery and PNC services by considering condition that at least one of their children had died before his/her fifth birth day.

Figure 5: Proportion of women who used skilled delivery and PNC services based on their survival status of previous child(ren)
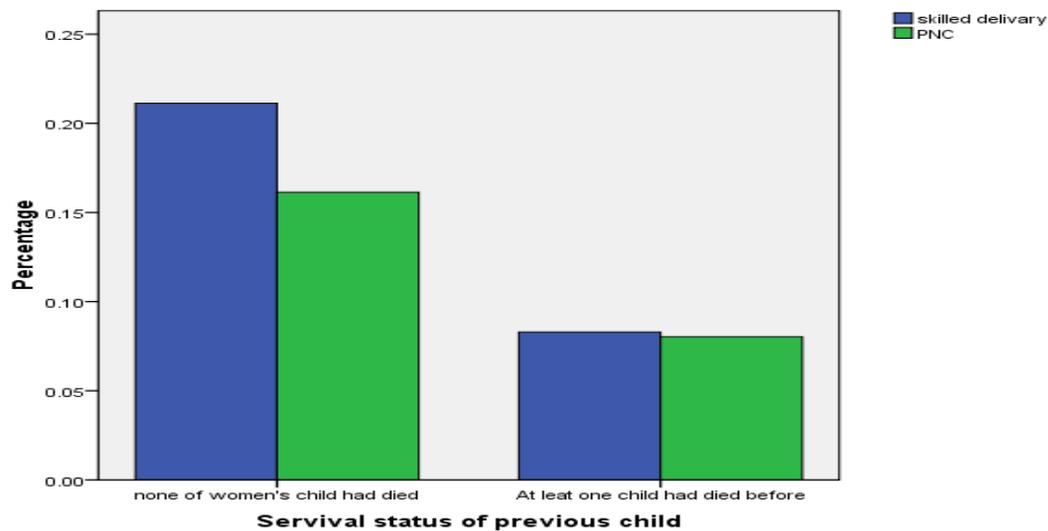
Hence, from the result women whose child(ren) had died before showed less tendency to use maternal health care services than counter parts. Around 21% and 16% of women whose child had not died before used assistance delivery and postnatal care compared with 8.3 and 8.0% of women where at least one of their children had died before, respectively.

To summarize, in the bivariate analysis an attempt is made to see the marginal effects of each independent variables on utilization of maternity care. As expected the graphical view and the bivariate analysis showed all socio-economic and demographic predictors displayed a significant association with utilization of maternal healthcare services. Hence, all variables that are measured in bivariate analysis will be also considered in multivariate logistic regression analysis in order to assess the joint effects of all predictors on utilization of maternal health care services.

4.3. Multivariate Logistic regression

4.3.1. Antenatal Care

In this sub section, the multinomial logistic regression is applied in order to see the combined effects of studying factors on uses of prenatal care. Alike bivariate measures, the regression output in Table-4 indicated that including all characteristics in one logistic-regression did not alter the existence of significant association between many predictors and number of ANC visits. However, the degrees of association between utilization of ANC and few variables, such as survival status of previous child (SIPC) and sex of household head showed somewhat different from observed in bivariate analysis. Particularly, among different education backgrounds, the proportion of women who were received ANC for "1-2" times did not show significant variations. Women with no formal education were 70% less likely to received ANC service for three times compared with higher educated women (OR = 0.3; 95% CI (0.12, 0.73)). Again, there were no significant differences between primary, secondary and higher educated women to utilize prenatal care for "3" times. Parallel to this, the odds of utilizing ANC for at least four times were 0.33 and 0.16 times for women with primary and no-education compared to those higher educated women (Table, 4). That means, women at higher education were about 203 and 525% more likely to use antenatal care for at least four times than women from primary and no-education, respectively. The 95% confidence interval of odds ration shows no-existence of significant difference between secondary and higher educated women in order to use antenatal care from health professionals.

Similar to other predictors, religious affiliation had not shown significant impact on uses of ANC for one or two times. Whereas, the proportion of women who were received antenatal care for three and more times displayed marked difference between Orthodox and "Other" religion followers. As compared to followers of "Other" religion, Orthodox women showed 163% and 231% more tendency to visit health professionals for "three" and four or more times during pregnancy, respectively. On the other hand, antenatal coverage between Muslim, Catholic, Protestant and Other religion followers were not significantly different (Table-4).

Table 4: Unadjusted odds ratio and its 95% CI from multinomial logistic regression to identify the effects of background factors on utilization of prenatal care

Variable	Used ANC "1-2" times OR [95% CI OR]	Used ANC "3" times OR [95% CI OR]	used ANC "4+" times OR [95% CI OR]
Education			
No-education	0.64 [0.18, 2.26]	0.30 [0.12, 0.73]	0.16 [0.07, 0.35]
Primary	0.90 [0.26, 3.17]	0.50 [0.21, 1.21]	0.33 [0.15, 0.72]
secondary	1.70 [0.43, 6.76	1.39 [0.52, 3.76]	1.15 [0.47, 2.78]
higher (ref)	1 ----------	1 --------	1 -------
Religion			
Orthodox	1.67 [0.95, 2.92]	2.63 [1.26, 5.53]	3.31 [1.65, 6.63]
Catholic	1.21 [0.48, 3.01]	1.88 [0.66, 5.34]	1.71 [0.65, 4.50]
Protestant	1.12 [0.63, 1.99]	1.64 [0.77, 3.47]	1.58 [0.78, 3.20]
Muslim	1.08 [0.62, 1.90]	1.85 [0.88, 3.87]	1.82 [0.91, 3.64]
Others(ref)	1 ---------	1 --------	1 --------
Husband's education			
No-education	0.70 [0.35, 1.42]	0.94 [0.43, 2.06]	0.46 [0.25, 0.83]
Primary	1.03 [0.51, 2.10]	1.21 [0.55, 2.65]	0.78 [0.43, 1.41]
Secondary	1.09 [0.50, 2.36]	1.26 [0.55, 2.90]	0.89 [0.47, 1.69]
Higher(ref)	1 ------	1 ------	1 -------
Residence			
Rural (ref)	1 ------	1 ------	1 -------
Urban	1.36 [0.96, 1.92]	1.49 [1.11, 2.02]	2.19 [1.71, 2.82]
Wealth index			
Poorest	0.72 [0.50, 1.03]	0.25 [0.18, 0.35]	0.18 [0.13, 0.23]
Poor	0.91 [0.62, 1.32]	0.45 [0.32, 0.62]	0.26 [0.20, 0.36]
Middle	1.08 [0.74, 1.57]	0.47 [0.34, 0.66]	0.37 [0.28, 0.49]
Rich	0.95 [0.66, 1.37]	0.57 [0.41, 0.77]	0.47 [0.36, 0.62]
Richest (ref)	1 -------	1 -------	1 -------
Age group			
<19(ref)	1 ------	1 -------	1 -------
20-24	1.04 [0.78, 1.38]	1.46 [1.08, 1.97]	1.85 [1.42, 2.42]
25-29	0.90 [0.65, 1.24]	1.26 [0.89, 1.77]	2.03 [1.50, 2.74]
30-34	0.90 [0.61, 1.31]	1.82 [1.24, 2.68]	3.07 [2.18, 4.32]
35-39	0.89 [0.58, 1.37]	1.86 [1.21, 2.86]	3.38 [2.31, 4.95]
40$^+$	1.14 [0.70, 1.87]	1.92 [1.15, 3.22]	3.24 [2.02, 5.19]
Sex of household head			
Male	0.97 [0.80, 1.19]	0.91 [0.75, 1.11]	1.11 [0.93, 1.33]
Female (ref)	1 ---------	1 --------	1 --------
Is a mother			

working			
No	1.07 [0.90, 1.28]	0.81 [0.69, 0.96]	0.74 [0.64, 0.86]
Yes (ref)	1 --------	1 --------	1 -------
No. of child(ren) died before			
none	0.97 [0.80, 1.17]	1.01 [0.82, 1.23]	0.93 [0.78, 1.12]
one or more (ref)	1 -----------	1 ---------	1 -------
Parity			
0	1.28 [0.87, 1.89]	1.70 [1.15, 2.49]	2.85 [2.03, 4.01]
1	1.20 [0.85, 1.71]	1.47 [1.04, 2.07]	2.34 [1.72, 3.17]
2	1.18 [0.86, 1.63]	1.32 [0.95, 1.82]	1.38 [1.03, 1.86]
3	1.16 [0.85, 1.57]	1.41 [1.04, 1.91]	1.51 [1.14, 1.99]
4	1.28 [0.95, 1.72]	1.42 [1.06, 1.92]	1.62 [1.23, 2.12]
5+(ref)	1 ---------	1 --------	1 ------

Note: In order to facilitate comparisons of utilizing ANC service among groups of women, those who did not use the service for at least one times are taken as reference.

Through controlling all other variables in the model, the odds of using of antenatal care for women whose husband's had no formal education showed about 54% lower compared to women whose husbands' had higher education. Whereas, other groups of women clustered by their husband's level of education did not show any significant difference on uses of maternity care during pregnancy. Residence and wealth quintile of women were also other important predictors that influence utilization of ANC services from health professionals. In particular, women residing in urban area were about 49 and 119% more likely to receive ANC services for "three" and "four or more" times than women who were lived in rural places, respectively. Consistent with cross-tabulation and bivariate analysis, the logistic output also shows existence of significant positive association between women's economic condition and utilization of prenatal care. Implies, women with better wealth quintiles more tends to use antenatal care compared to those with low wealth quintiles (Table-4).

Women that were age under 20 exhibited less likelihood on uses of ANC service for "3" and "four or more" times compared with other higher age groups. From logistic regression in Table-4, other than reference category, the overlaps of the 95% confidence interval of odds ratio suggests the existence of non-significant disparities on utilization of ANC among all other age groups of women. Another important characteristic, which was associated with number of antenatal visits, is woman's working status. Mothers who were not working in any private or governmental organization had less possibility by 19% and 36% to receive ANC for "3" and "4+" times, respectively (Table-4).

The number of children a mother had had before found also an important predictor that clearly affects the level of utilization of antenatal care. Women with no-child or with lower number of children relatively had high probability to use MHC services during pregnancy. For example, the estimated odds of receiving prenatal check-up for "3" and "4 or more" times by women at parity zero were 1.70 and 2.85 times higher than women at parity 5 or more.

4.3.2. Uses of skilled assistance during delivery and postnatal care

In this section, binary logistic regression is computed to assess the effects of socio-economic and demographic variables on utilization of skilled delivery and postnatal care. Alike bivariate result, the logistic regression output in Table-5 reinforces women's and husband's education, place of residence, wealth status, parity and number of ANC visit as the most relevant determinants to utilize both skilled delivery and postnatal care. Women's age and disparities on religion also were important determinant factors on using skilled assistance delivery; but not were for postnatal care utilization. On other hand, women who had better position on decision of their and family's choice were more likely (around 42%) to receive postnatal care, but not showed significant difference on uses of antenatal care or assistance delivery.

Education background of women was most significant predictor on utilizations of skilled delivery and PNC. In particular, women from higher education were three times more likely and those women with secondary education were about 1.9 times more likely in order to use professionals' assistance during childbirth compared with women from no-education (Table-5). However, there was no significance difference between those had no formal education and primary educated women's on uses of assistance during delivery. On other hand, women from primary, secondary and higher education were 25%, 103% and 145% more tends to have health check-up after childbirth compared with non-educated women, respectively. Alike of ANC, differences on religion background of women was cause on difference of utilization of skilled assistance during delivery. Women from Orthodox religion were with high chance to attend assisted delivery compared with Protestant and Muslim religion followers. That means, Orthodox religion women was in advance by 46% and 51% to use maternity care during delivery than protestant and Muslim women, respectively (Table-5). A significant difference was not observed between Orthodox and Catholic, and again between

Orthodox and Other religion factions. In order to use postnatal care, religion difference of women did not show statistically significant variations.

Table 5: Unadjusted odds ratio and its 95% CI to assess the effects of background factors on uses of skilled assistance delivery and postnatal care

Variable	Category	Assisted during delivery		postnatal care	
		Exp(β)	95% CI of exp(β)	Exp(β)	95% CI of exp(β)
education level	No-education (ref)	1		1	
	Primary	0.88	[0.72 1.07]	1.25	[1.02 1.53]
	secondary	1.87	[1.27 2.76]	2.03	[1.46 2.83]
	higher	3.06	[1.69 5.56]	2.45	[1.56 3.85]
Religion	Orthodox(ref)	1		1	
	Catholic	0.64	[0.27 1.52]	0.61	[0.25 1.52]
	Protestant	0.54	[0.42 0.68]	0.94	[0.74 1.20]
	Muslim	0.49	[0.41 0.57]	0.91	[0.76 1.09]
	Others	0.64	[0.33 1.22]	0.25	[0.06 1.03]
Husband's education	No-education(ref)	1		1	
	Primary	1.01	[0.83 1.23]	1.09	[0.88 1.35]
	Secondary	1.73	[1.28 2.33]	1.99	[1.50 2.65]
	Higher	1.21	[0.82 1.79]	1.79	[1.26 2.55]
Residence	Rural (ref)				
	Urban	5.66	[4.36 7.35]	2.51	[1.93 3.26]
Wealth index	Poorest (ref)				
	Poor	0.93	[0.74 1.12]	1.01	[0.72 1.40]
	Middle	0.84	[0.69 1.01]	0.89	[0.63 1.25]
	Rich	1.27	[1.13 1.42]	1.46	[1.09 1.96]
	Richest	1.43	[1.12 1.74]	1.95	[1.40 2.72]
Age group	<19 (ref)				
	20-24	1.16	[0.83 1.51]	0.96	[0.72 1.29]
	25-29	0.52	[0.39 0.69]	1.15	[0.83 1.60]
	30-34	0.63	[0.44 0.89]	1.03	[0.70 1.51]
	35-39	0.55	[0.37 0.84]	1.12	[0.72 1.74]
	40$^+$	0.52	[0.29 0.95]	1.31	[0.75 2.31]
-Sex of household head	Male (ref)				
	Female	0.83	[0.68 1.01]	1.42	[1.18 1.72]
-Is a mother working	No (ref)				
	Yes	0.94	[0.79 1.12]	0.96	[0.81 1.14]
-No. of child(ren) died before	none (ref)				
	one or more	1.0	[0.80 1.30]	1.01	[0.80 1.28]
Use of ANC	None (ref)				
	1-2	0.95	[0.71 1.25]	2.04	[1.51 2.75]
	3	1.35	[1.05 1.75]	3.11	[2.40 4.03]
	4+	2.78	[2.25 3.43]	4.65	[3.71 5.83]

	0(ref)						
Parity	1	0.33	*[0.26*	*0.42]*	0.68	*[0.53*	*0.87]*
	2	0.26	*[0.19*	*0.35]*	0.69	*[0.51*	*0.94]*
	3	0.20	*[0.14*	*0.28]*	0.75	*[0.53*	*1.06]*
	4	0.20	*[0.13*	*0.29]*	0.64	*[0.43*	*0.95]*
	5+	0.15	*[0.10*	*0.22]*	0.67	*[0.45*	*0.99]*

According to logistic regression result in Table-5, one of important characteristic that showed huge difference in the proportion of uses of assistance during delivery as well as on uses of postnatal care was husband's education. Through controlling the effects of other variables in the model, women whose partners had secondary education were 73 percent more likely to receive skilled assistance during delivery compared to women where whose spouse had no formal education. On another hand, the proportions of women along whose husbands' educations were higher, primary and no-education comparatively did not show significant difference on utilization of skilled delivery.

Alike effects observed in prenatal care, women's place of residence contributes significant variation on utilizations of skilled delivery and postnatal care. The odds of receiving assistance during delivery and postnatal care for women's who were residing in urban area, respectively, were 5.66 and 2.51 times higher than those living in rural places (Table-5).

Another important factor found to be significant on the uses of maternal healthcare is wealth status of household a woman belongs to. The binary logistic regression reveals that, the odds of receiving assistance during delivery was 1.43 times higher if the woman was from richest wealth quintile as compared to those poorest woman (OR =1.43; 95% CI OR 1.12, 1.74); and about 1.3 times higher the odd if the woman was from rich compared to poorest women (OR 1.27; 95% CI (1.13, 1.42)). For other groups of women, such as middle and poor wealth quintiles, the odds of using both skilled assistance delivery and postnatal care were found to be statistically non-significant compared to poorest ones. Table-5 also shows that the survival status of previous child(ren) and mother's working status were not significant predictors for uses of skilled delivery and postnatal care. However, age of women was negatively associated with uses of professionals' assistance during birth, but not was with uses of postnatal care. Unlike age of women, sex of household head did not significantly influences the uses of assistance delivery, whereas, it was positively associated with postnatal care. That is, women who had better position on guiding or managing their family's preference were in advance by 42% in order to receive healthcare service after delivery (Table-5).

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Using antenatal care during pregnancy was positively influenced the level of utilization of skilled assistance delivery and postnatal care from health professionals. For instance, women who had received antenatal care for "three" and "four or more" times, respectively, were more likely to admit assistance delivery by 35 and 178 percent. While, using ANC for "1-2"times during pregnancy did not show a significant impact on utilization of skilled assistance during delivery. On other hand, the odds of receiving postnatal care was 2.04 times higher if the women attained ANC for one or two times; about 3.11 times was more if the woman attained ANC for three times, and about 3.56 times greater the odds if the woman visited ANC "four or more" times compared with those women who had not received any prenatal care.

Similar to the result obtained from use ANC above, professionals' assistance during delivery and utilization of health care after child-birth is substantially influenced by birth-orders (parity). The results of the multivariate logistic regression shows women at lower birth order have high probability of receiving skilled assistance delivery and postnatal care (Table-5). For example, the estimated odd of using skilled delivery care by mother at her second birth compared to the reference case at first birth was 0.33. This means, through controlling other variables in the model, at first birth mothers nearly three-fold more likely to use health professionals' assistance during delivery compared to mothers at their second birth (Table-5).

In general, from both binary and multinomial logistic regression we identified the common and unique socio-demographic and economic factors that influence utilization of ANC, skilled delivery and PNC. Despite the fact that, one covariate that was considered in the study, that is, survival status of previous child found to be non-significant factor on utilizations of all three components of maternity care. Regardless of the degree of association, Table-6 spectacles the common and unique factors influencing uses of antenatal, skilled delivery and postnatal care.

Table 6: Common and unique factors influencing uses of three components of MHC services

Common background factors that affect uses of three components of MHC services	Unique socio-demographic and economic factors that influencing following maternity care		
	ANC	**Skilled delivery**	**PNC**
- Education of mother - husband's education - Residence - Wealth status - Parity	- Working status - Religion - Age of mother	- Religion - Age of mother - Number of ANC visit	- Sex of household head - Number of ANC visit

CHAPTER FIVE
DISCUSSION

In this study a total of 7764 women who had at least one birth preceding the survey were taken in the analysis to investigate the factors that influencing the uses of maternal health care services in Ethiopia. It was seen that around 45% of women were received antenatal care at least one time, about 17.3% of them assisted during their child birth and 13% attained health care within six weeks of delivery (see Table-2). Moreover, only 22.3 % of women were received health care at least four times during pregnancy as WHO recommendation. This status indicates the use of maternity care services in the country is among the lowest from sub- Saharan countries (GHO, 2014). Hence, consistent with related studies conducted in Ethiopia and other developing countries, relatively high proportion of women were used ANC service compared with utilization of skilled assistance delivery and postnatal care (Ethiopian Societies of Population Studies, 2008; Mekonnen, et al, 2002, Ononokpono, et al, 2013). This possibly explained by one due to unpredictability of onset of labor and other constraints, such as poor infrastructure (road, transportation, ambulance, etc.), high cost of delivery services and also cultural influence for preference of healthcare during child-birth (Gwatkin, et al, 2007; Gill et al, 2007).

From logistic regression results, different socio-economic and demographic predictors were found to be strongly associated with the uses of antenatal, skilled delivery and postnatal healthcare services.   Among these, the most significant variables which affect the utilization of ANC includes mother's and husband's education, religion, residence, wealth status, age, parity and working status of mother. Survival index of previous child(ren) and sex of household head were not found as prominent factor influences the number of antenatal visits in the country (see Table-4). On other hand, sex of household head, working status and number of children died belongs to woman did not contribute measurable impact on uses of professionals' assistance during delivery. It has also seen that among all variables considered in this study, women's education, wealth status, husband's education, residence, parity and numbers of ANC visit were strong attributers on uses of healthcare service within six weeks of childbirth. However, working status of women, religion, age and survival index of previous child were not strong predictors for uses PNC (see Table-5).

Therefore, alike other many studies (Babalola et al, 2009; Ethiopian Societies of Population Studies, 2008; Mekonnen et al, 2002), women who residing in urban area were in better

position to utilize all three components of maternity care compared with women living in rural areas. For instance, in order to attain ANC for at least four times during pregnancy, women who residing in urban place were 2.2 times higher than women living in rural places (Table-4). In most of developing countries, it is common that health facilities, such as health providers, health equipment, medicines etc. are not equitably distributed between urban and rural residences (Gwatkin, et al, 2007; UNCIEF, 2011), which became reason for poor quality of services and also low utilization of maternal healthcare services in rural places.

Compatible with other studies (Ethiopian Societies of Population Studies, 2008; Mekonnen et al, 2002; Ononokpono et al, 2013; Simkhada, et al, 2008), this finding also confirmed the strong positive association between women's education attainment and levels of utilization of maternity care (see Table-4 &5). Women with higher education, respectively, showed 54, 206 and 145 percent more to use ANC, skilled assistance delivery and PNC compared to non-educated women (see Table 4 & 5). It is factual that better educated women could have more awareness for maternity care. Because, they might have better understanding about the outcomes of poor maternal healthcare; and they expected to have enhanced knowledge to use required healthcare services effectively. Parallel to this, husband's education also found to be positive significant predictor for the number of antenatal visits, skilled delivery and postnatal care. It is also believed that partners from higher education have advanced information where and when/how his wife used that important maternity care (Kemal, 2009; Simkhada et al, 2008).

As discussed in literature, the result showed that wealth status of women was one of tumbling factor to use maternal health care services in Ethiopia. Women with low wealth quintiles often indicate lowermost maternal healthcare coverage. It is expected that demand and accessing of professional health care are mostly correlated with family's fortune or stipend to easily cover costs of transportation, treatment fees and other related supplies (Gill *et al*, 2007; Gwatkin, et al, 2007).

This study found mother's age as important predictor that influences utilization of maternal health care services. However, the direction of effect on different components of maternity care was not persistent (see Table-4 & 5). The relation between mother's age and uses of ANC was positive. It is compatible with other studies (Charles, et al, 2011; Babalola et al, 2009; Chakraborty et al., 2003), which asserted mother's age as one character that could help to have experience and knowledge about the benefit of maternal health care. On other

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hand, in this study we found that high proportion of younger mothers practiced professionals' assistance during delivery that has quiet reverse direction compared with its effects on ANC. This might be due to older mothers have more experience about child-birth and have high confidence for labor that could affect their likelihood of receiving health professionals' assistance at time of delivery.

Hence, younger women found in better position to use skilled assistance during delivery compared to older age groups. Other studies are supported this concept (Mekonnen et al, 2002; Ofra Anson, 2004); and also postulated other possible contributing factor, such as improvement of educational opportunities that could help younger generation to have better knowledge in utilizing of MHC services. Means, in Ethiopia high proportion of younger mothers have higher educational attainment compared to older women's due progressive improvement of education opportunities. However, the logistic regression result showed an age of mother was not a significant factor on uses of postnatal care (see Table-5). Similar finding conducted by Ethiopian Society of Population studies (2008) based on 2005 EDHS found that ages of women was not a strong predictor on uses of postnatal care.

From result, difference of women's religion showed significant effect on variation of ANC attendants as well as on users of skilled delivery service. But, not was on utilization of postnatal care. Specifically, the result showed high proportions of Orthodox women were more likely to access ANC services than other religion groups. Moreover, there was no significant difference between Protestant, Muslim, Catholic and "Other" religion groups to use health care during pregnancy. Similarly, the logistic regression in Table-5 shows high proportions of Orthodox women were more alert to use skilled delivery than Muslim and Protestant women. Hence, as discussed in theoretical frame work, religion could affect individuals' belief, norms and values on health seeking behaviour that became reason for variation of outcome measures among different religion groups of women. For example, in bivariate analysis and graphical view, "Other" religion group was the lowermost category who used ANC service than Orthodox, Muslim, Catholic and Protestant women. Since "Other" religion followers of women mainly includes traditional followers who practiced traditional beliefs that obviously have negative effect on utilization of modern health care services.

One of interesting result obtained in this study is also about sex of household head. Women who had better power on decision of their and family's interest were more likely to utilize PNC service. However, in this study sex of household head did not found to be significant

factor on uses of ANC and professionals' assistance during delivery. Similar result had obtained from 2005 DHS by Ethiopian societies of population studies (2008). It may need further study to answer why this character only influences the use of postnatal care than utilization of ANC and skilled delivery. Nevertheless of the result, it is likely that having potential contribution on decision of household resource and related issues have positive outcome on uses of maternal health care (yousuf et al, 2004). Especially, in Ethiopia majority of men partners are regulator of household resources and decision makers when and where women should have health care services.

As expected, the result confirms that birth order or parity was a significant predictor on utilization of maternity care. High proportion of women with higher parity did not tend to use ANC, skilled assistance delivery as well as PNC service. The effect has similar direction compared with other studies conducted based on 2000 and 2005 Ethiopia DHS data by Mekonen et al, (2002) and Ethiopian Societies of Population Studies (2008), respectively. It is thoughtful that women with no-child or few children moderately need to receive health care due to perceived risks. In addition to this modest confidence, women that have higher parities (high number of children) may face limitation of resources i.e. time and related properties (Simkhada et al, 2008).

At the last, the finding of this study shows a wide significant variation on utilization of professionals' assistance during delivery and postnatal care between women who used ANC and who did not used the service. It is not surprise that, a woman who had better understanding for utilization of antenatal care expected to have also good awareness to access healthcare services during delivery and postnatal period. This result is consistent with a study conducted in Ghana by Samuel et al (2007) using logistic regression. They indicated also that using ANC services do not merely benefit to check the health status of women during pregnancy. Instead, it also helps to identify the possible risks of a mother as well as a child during delivery. Thus, the result verified that uses of antenatal care positively intensifies the likelihood of receiving maternal healthcare during time of delivery and also post-delivery.

Again, one of the important measures that have done in this study is identifying common and unique factors that influencing the three components of maternity care (Table-6). It is important in process of promoting the utilizations of required healthcare services as long as the unique and common influential factors of MHC services are distinguished. Beside some other unique factors, studies conducted by Mekonen et al (2002) and Ethiopian societies of

Population studies (2008) based on 2000 and 2005 Ethiopian DHS data, respectively, identified individuals' background factor, such as residence, education of women and wealth status found to be common significant determinants on uses of ANC, skilled delivery and PNC. In this study, these background factors have also showed consistently significant effect in all components of maternity care.

CHAPTER SIX
CONCLUSION AND RECOMMENDATIONS

The purpose of this study was to identify the socio-economic and demographic factors that credibly influence the utilization of maternal healthcare services in Ethiopia. Hence, the study has identified several important factors which were measurably influences the uses of three components of maternity care (ANC, skilled assistance delivery and PNC). Even though the degree of association of the covariates are varied, the regression result displayed that women's place of residence, wealth status, women's and husband's education and parity found to be significant on utilization of antenatal, skilled assistance delivery and postnatal care. Whereas, mother's working status and husband's education were uniquely influencing the uses of ANC and PNC, respectively. Both religious affiliation and age of women were significant predictors of ANC and utilization of skilled delivery. Moreover, the proportion of mothers who used maternal healthcare in the country found to be very low and the rate was not equally distributed in all groups of women. Especially, those women who were living in rural areas and also those from low socio-economic groups exhibited less likelihood in using maternal healthcare services.

Hence, possible interventions are required through taking an account of these significant characteristics of the study population in order to promote uses of maternal healthcare services; and further to reduce children and mothers' morbidity and mortality in the country. It is also important to design appropriate package in order to address the services to those vulnerable groups, and minimizing the devastating consequences associated at time of pregnancy and birth delivery. Because of the level of utilizations of ANC, skilled delivery and PNC have direct relation with husband's education, and the use of PNC was significantly influenced by sex of household head, it is important to consider the role of partners in promoting of using maternal healthcare services.

Moreover, I recommend that policy makers to consider the strong positive association of using antenatal care on choices of professionals' assistance during delivery and health check-up after childbirth.

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