ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DETERMINANTS OF MATERNAL HEALTH CARE SERVICES UTILIZATION: THE CASE OF GOZAMN WOREDA, EAST GOJJAM ZONE OF AMHARA REGION, ETHIOPIA

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NIGUSS BERIHAN GELAW

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BY

NIGUSS BERIHAN GELAW

Institute of Population Studies
College of Development Studies

Approved by the Examining Board

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Chairman, Department Graduate Committee	Signature
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Advisor	Signature
_____	_____
External Examiner	Signature

DEDICATION

To My Father Ato Berihun Gelaw

And

My Mother w/o Aleshign Chanie

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Above all I commend the Almighty God for his compassion for all what I have ever achieved.

It is a pleasure to record here those persons whose assistance was indispensable and who, in all cases, made my task easier than it other wise would have been.

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LIST OF ABBREVATIONS

ANC Antenatal Care

CSA Central Statistics Authority

EDHS Ethiopian Demographic and Health Survey

FGD Focus Group Discussion

FMOH Federal Ministry of Health

HI Health Institution

HW Health Worker

MOH Ministry of Health

MMR Maternal Mortality Ratio

MHC Maternal Health Care

MOFED Ministry of Finance and Economic Development

TBA Traditional Birth Attendance

TTI Tetanus Toxic Injection

UNICEF United Nations Children Fund

WHO World Health Organization

Abstract

Many of women in developing countries are at a great risk in terms of high maternal morbidity and mortality due to factors related to pregnancy and childbirth in these countries. A cross sectional study was conducted from February 15 to March 15, 2010 in Gozamin Woreda in Amhara Regional State to assess factors affecting utilization of maternal health care services. A total of 587 women who had at list one live births in the five years preceding the survey were selected systematically. Data were collected using a pre-tested and structured questionnaires and FGD were used to collect quantitative and qualitative data, respectively. The analysis revealed that about 59.3% of the women had at least one prenatal visit during their recent pregnancy. About forty five percent of those women attending antenatal care had their first visit during their first trimester of pregnancy. Among ANC users 64% of had less than four antenatal care contacts in the recent pregnancy. The most important reasons for not attending ANC care were being healthy and being too busy. Majority of deliveries took place at home; about 71% of deliveries took place at home. Presence of relatives nearby, Transportation problem, and lack of privacy were the main reasons cited for resorting to home delivery. The majority of the respondents were able to name the danger sign of pregnancy related problems. In multivariate analysis the risk of non-attendance of ANC and home delivery was higher for those women whose residence was rural, low educational status, higher parity and being housewife at old age. In addition ANC service utilization significantly affect utilization of delivery care provided in health institutions (P-value less than 0.05). *In conclusion, the study revealed that more women attend ANC during pregnancy than those derived at health institutions. Demographic and socio-cultural factors were found to be barriers to utilization of maternal health care services.* Educating girls, providing health education on maternal health care services, and improving the services of health extension workers in rural areas were recommended to improve utilization of both services.

***Key words**: Maternal health care, antenatal care, place of delivery, Amhara Region*

CHAPTER ONE

1.1 INTRODUCTION

Maternal mortality and morbidity affect women of all ages in the glob. Particularly, women in developing countries are disproportionately affected. While there are 529,000 women dies every year from complications of pregnancy and child birth, which is about one woman every minute. About 99% of these deaths occur in developing countries, where a women's life time risks of dying from pregnancy related complications is 45 times higher than that of her counter parts in developing countries. The risk of dying from pregnancy related complications is highest in sub-Saharan Africa and in Southern-central Asia, where maternal mortality ratios are more than 1,000 deaths per 100,000 live births (WHO, 2005).

Maternal and child health care begins with the immediate health problems of mothers and children and extends to through out life as chronic diseases and to problem of wellbeing of the community (WHO, 2005). The burden of poor reproductive health outcomes continues to be significantly higher among women in developing countries compared to their counterparts in the developed world. In actual fact, the majority of maternal deaths worldwide are occurring in less developed countries from pregnancy-related complications. In sub Saharan Africa, the risk of maternal mortality and morbidity is alarmingly higher with a ratio of 1 in 22 compared to a ratio 1 in 7,300 in developed regions (UNFPA, 2004).

Maternal health care service is considered as one of the cornerstones for safe motherhood. The importance of antenatal care, delivery care, and postnatal care has been well documented as effective tools for screening, preventing, and treating diseases and pregnancy-related complications. Moreover, many of women's lives could be saved if they had access to basic health care services, including skilled attendants at all births and emergency obstetric care for women who develop complications (UNICEF, 2007).

Access of health care includes at least two dimensions: economic access in terms of affordability, and geographic access in terms of proximity to providers. The poor, most of the time, appeared to

have the least access to health care services. These large differences in access to maternal health care continue to exist between women of richer and poorer, urban and rural, and educated and uneducated. A range of barriers limits women's access to care, including: distance, cost, multiple demands on women's time, poverty and lack of decision-making power. Ensuring women to have access to maternal health care, particularly at ANC and delivery, and in case of complications, is essential to save their lives (Anwar et al., 2004).

In most developing countries, women in reproductive age constitute a little more than one fifth of the total population. In Ethiopia as well, around 24 percent of women are in reproductive age group (MOFED, 2006). These women are repeatedly exposed to the risk of pregnancy and childbirth. Under the existing demographic and socioeconomic conditions, the inadequacy with least utilization of maternal health care services, they are at greater risk of morbidity and mortality from causes related to pregnancy. In Ethiopia, only 28 percent of mothers received antenatal care from a health professional for their most recent birth and 37% received tetanus toxoid injection, only 6 percent of babies were delivered by a health professional and 5 percent at a health facility (CSA and ORC Macro, 2006).

In view of the above argument, one might ask what factors basically affect mothers from getting their maternal health care service in the study area.

1.2 Statement of the problem

Pregnancy and childbirth are natural and often eventful processes that many women are at risk for developing complications during pregnancy and childbirth. Complication of pregnancy and childbirth are the leading causes of disability and death among women in the reproductive age (15- 49) years in developing countries (WHO, 2005).

Maternal mortality in developing countries is a neglected tragedy: a tragedy in terms of magnitude of the problem, equity, and social justice (Mahler H, 1997). At least 35% of women in developing countries still receive no antenatal care, almost 50% give birth without a skilled

attendant and 70% receive no postpartum care. In contrast, maternal health care is nearly universal in developed countries (WHO, 1998).

Demographers are interested in maternal health because of its contribution to maternal mortality; as an indicator of the success of maternal health programmes and explanation for sex differentials in mortality. Research has shown that adequacy of antenatal and delivery services can reduce maternal deaths by 10 to 45%, especially in the developing countries where maternal mortality is highest (WHO, 1997).

However, the single most important proximate determinant of maternal health and survival is the extent to which women have access to and utilize high quality maternal health care services (UNICEF, 1998). The Programme of Action of the International Conference on Population and Development (ICPD) 1994 recognized the above fact and states that:

"*All countries must expand the provision of maternal health services… All births should be assisted by trained persons, preferably nurses and midwives, but at least by trained birth attendants*" (UN, 2006).

Though women comprise a large proportion of the population of a given society, in developing countries, many of them are still at greater disadvantage. A large number of women are helpless and dying due to factors related to pregnancy and childbirth. In Ethiopia the maternal mortality rate has been estimated to be 673 per 100,000 live births (EDHS, 2005). This is one of the highest rates in the world.

Research has shown that Ethiopia ranks lowest in ANC coverage among other Sub-Saharan African countries. In Rwanda, Malawi, Ghana, Lesotho, Kenya and Senegal about nine in ten of the women received ANC service from a health professionals. However, only three in ten of Ethiopian women receive the similar service. Ethiopia also ranks low in terms of delivery assistance from a health professional and delivery in health institutions. The percentage of birth delivered by health professional is 10 times higher in Cameroon (62 percent) than in Ethiopia (6

percent); and the proportion of birth delivered in health facility is 10 times higher in Senegal (62 percent) than in Ethiopia (5 percent) (Macro International Inc., 2007)

Antenatal care coverage of the world is 72% (developing countries 68%, and industrialized countries 98%) (UNICEF, 2004). According to the MOH, Health and health related indicators 2007/08, though potential health service coverage has reached 89.6 percent in 2007/08, utilization rate remains low at 0.24 percent out patient visits per capita. Antenatal care coverage of Ethiopia is 59.4% and percentage of deliveries at health care facilities is 20.3% (Ministry of Health, 2007/8). The health coverage on the study area was 50 percent even which is lower than the Zone, 52% (Gozamin Woreda health office, 2008). In addition to other factors, Shortage and high turnover of Personnel, and inadequacy of essential drugs and supplies have contributed to the highest maternal and child mortality rates (MOH, 2005).

Despite the fact that maternal health care services utilization is essential for further improvement of maternal and child health, little is known about factors affecting the use of these services in Ethiopia in general and Amhara Region in particular. Thus, this paper aims to fill this gap using primary data collected from the study area.

I.3 Rationality and Significance of the study

Maternal health is a crucial problem in many developing countries, particularly in sub-Saharan countries. The following facts enforced the study to focus on maternal health care service on Amhara Region. First; even though the region stood fifth from the least in utilizing antenatal care and tetanus toxoid injection services compared to other regions of Ethiopia. Percentages delivered by a health professional and in a health facility were the least (3.7% and 3.5% respectively). Second; I knew the presence of harmful traditional practices such as early marriage and it has an impact for maternal care utilization in the study area. And also it seems that no enough studies have been done on the issues subsumed in the study area under the title of factors affecting the utilization of maternal health care service.

The anticipated result of this study shows its levels of utilization of maternal health care services. It also identifies the main barriers to the utilization of maternity care services in the study area. If effective implementation is done to avoid the investigated determinants for the utilization of MHC services, it will benefit the society, particularly women and children to have a better utilization of the services which will improve their health status and wellbeing. The findings also help governmental and non-governmental organizations in planning and implementing programs to reduce maternal morbidity and mortality in Ethiopia, particularly, in Gozamin woreda. This study could also serve as an insight for the modification of plans and policies for future development regarding maternal care. On top of this, the study can serve as a spring board for those who are interested for further investigation in depth.

1.4 Research Questions

In view of the problem mentioned above, the research attempted to answer the following basic questions:

1. Do age, parity, occupation, education and marital status are determinants for the utilization of maternal health care services?
2. Are women with history of pregnancy related complications and low knowledge of unhealthy pregnancy negatively associated with utilization of maternal health care services?
3. Do planned pregnancy and positive attitude of husband's or partner's increase utilization of maternal health care services?
4. Do quality of care, length of waiting time, confidence on the services and client privacy at ANC affect utilization of maternal health care services?

1.5 **Objectives of the Study**

1.5.1 General objective: To identify factors influencing the utilization of antenatal care and delivery services in Gozamin woreda in East Gojjam of Amhara region.

1.5.2 Specific objectives:

1. To examine the level of maternal health care service in the study area.
2. To identify demographic factors that affects the utilization of maternal health care services.
3. To explore socio-cultural factors that affect utilization of maternal health care services.
4. To suggest some possible strategies for improving maternal health care services.

1.6 Limitation of the study

- As the study included five years retrospective cross-sectional, there was a possibility of recall bias misreporting of events.
- In this study, variables that determine maternal health care utilization have been investigated and their importance was determined by comparing at a specific point in time. For instance, some factors (religion, parity, ethnicity, etc) obviously preceded ANC attendances or choice of delivery where as knowledge on maternal health care services could either follow or precede the outcomes of interest.

1.7 **Operational definitions**

Antenatal care non-attendant: Pregnant women who had not attended antenatal care clinics at all during the recent pregnancy.

Married women - Refers to those currently married women in the reproductive age group (15 – 49), which are living with their husbands at the time of interview.

Quality of MHC service*:* It refers to the over all effectiveness and appropriateness of health care. Quality of maternal heath care service include issues such as the availability of routine service during normal working hours and emergency services for 24 hours, treating clients with dignity, privacy, short waiting time, giving appropriate information about available services and availability of technical components staff.

Antenatal care: it is health care received by mothers at the time of their pregnancy from health professional. Antenatal care is more beneficial in preventing adverse pregnancy out comes when it is sought early in the pregnancy and continued through to delivery.

Timing of ANC: The number of months from when a woman conceived until she made her first antenatal care visit.

Traditional Birth attendant: is a person who assists the mother during childbirth and initially acquired her skills by delivering babies herself or through apparent ship to other TBAs.

Delivery care: the service given for a pregnant woman during labor; management of normal delivery and detection of complications, management of risk cases in labor and complicated cases. In this study delivery care is considered as a care given at health institutions during delivery.

Utilization of maternity care services**:** Refers to a woman attendance in a maternal health service for Antenatal care, and place of delivery care service at health institutions would be considered as indicators to utilization of MHC services in this study.

Accessibility of service: available of health facility providing ANC service within 2 hours distance on foot.

CHAPTER TWO

2. REVIEW OF LITERATURE

2.1 Overview of Maternal mortality

Maternal death- The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes *(WHO, 1992).*

Of all the health statistics monitored by the World Health Organization, maternal mortality is the one with the largest discrepancy between developed and developing countries. Over 99% of the nearly 600,000 women who annually die due to pregnancy-related causes occur in sub-Saharan Africa. Out of these Maternal deaths during pregnancy and at the time of delivery contribute about 25% and 15%, respectively (Dana A., Noreen G., and German R, 2003).

In Ethiopia, the maternal mortality was estimated to be 673 deaths per 100,000 live births and infant mortality rate was 77 per 1,000 live births, which is among the highest in the world (CSA and ORC Macro, 2006). One explanation for poor health outcomes among women in Ethiopia was the non-use of modern health care services (CSA and ORC Macro, 2006).

2.2 Maternal health care services

2.2.1 Antenatal care service

Studies that focused on maternal mortality and morbidity in developing countries have repeatedly recommended the need for antenatal care and availability of trained personnel to attend women during labor and delivery (FCI and IAG, 1998). The safe motherhood initiative strongly emphasized ensuring the accessibility and use of antenatal services as most of the deaths occurring from obstetric complications are preventable. However, in Ethiopia the proportion of mothers attending ANC was low even for women with access to the services. As observed in 2005 EDHS, only 28% of mothers received antenatal care from a health professional for their most recent birth (CSA and ORC Macro, 2006).

2.2.2 Delivery service

The International Safe Motherhood Initiative made maternal mortality an international priority by way of access to basic maternity care during pregnancy and delivery to all women (Mahler H., 1987; and MOH, 1992). However, discrepancies continue to exist in access to maternal health care between the more developed and the developing world, the richer and poor, urban and rural, and the educated and uneducated societies (UNICEF 1996; and WHO, 1997).

Appropriate delivery care is important for the health of both the mother and the new born, especially if there are child birth complications. To reduce the risk of infections and any complications can be effectively managed in the presence of qualified attendant with suitable equipment and supplies. However, in most Sub-Saharan Africa, delivery care is far from adequate: a large proportion of deliveries occur at home, and in the absence of a qualified attendant (Magadi et al., 2003). The situation in Ethiopia is more disturbing, since percentage of women delivered with the help of health professionals is among the least in the Sub-Saharan Africa (CSA and ORC Macro, 2005; and Macro International Inc., 2007).

Ethiopia ranks low in terms of delivery assistance from a health professional and delivery in a health facility. The percentage of births delivered by health professional is 10 times higher in Cameroon (62 percent) than in Ethiopia (6 percent) and the proportion of births delivered in a health facility is more than 10 times higher in Senegal (62 percent), Malawi (57 percent) and Lesotho (52 percent), than in Ethiopia (5 percent) (Macro International Inc., 2007).

2. 3. Determinant of maternal health care service

The Millennium Development Goals (MDGs) focused on improving maternal health, with a target of reducing the maternal mortality ratio by three quarters between 1990 and 2015, on average annual reduction of 5.4 percent (Wagstaff et al., 2004). Progress towards these goals, however, is surprisingly low and insufficient, especially in Sub-Sahara African and Southern Asia (Pitchforth et al, 2006).

Identification of the factors related to low utilization of maternity care services is pivotal in formulating evidence based policy so that it will reduce maternal mortality rate fast. Different factors affect utilization of MHC services. These are:

2.3.1 Demographic factors

There is a general consensus that the use of maternal health care services reduces maternal and child mortality, and improve the reproductive health of women. Parity and maternal age are mutually correlated, but the direction of correlation depends on the type of services (Anwar et al., 2004). The use ANC and delivery care declines with an increase in parity (Hibret, 2007; and Mills et al., 2007). Women having their first child were twice as likely to have facility based ANC compared to women having their fourth or more birth. Similarly, low parity women were almost three times more likely than high parity women to deliver at a health facility. And both ANC and delivery care were less common among older women (Anwar et al., 2004; Mills et al., 2007).

Other studies also confirm the negative association between high parity and the likelihood of receiving ANC and giving birth in a medical institution (Bloom, 2001). The parity of women is influenced by their age at first marriage. Those who marry early will have a higher probability to be in the high parity than who marry later. In the Amhara region, 48 percent of women are married before the age of 15 (Wilder, 2007), the highest early marriage rate in the country.

Due to the above stated problems, early married women may have a high probability of getting divorced. Studies in Ethiopia and other countries explain the effect of marital status on utilization of MHC services; Widowed/divorced women were found to be more unlikely to attend MHC services compared to married women (Coren, 2003; Mengiste et al., 1996). In contrary, a study in Guinea Equateria showed the highest attendance of ANC among unmarried or divorced women (Jimoh, 2003). In general, these studies emphasize the effect of marital status on utilization of MHC services.

The number of living children determines women's utilization of MHC services. The more children at home, the more limited the women's mobility. Among women with more surviving children at the time of their pregnancy predicted antenatal care scores were lower than among others (Bloom et al., 2001).

2. 3.2 Socio-economic factors

Demographic factors may shape a women's desire to make use of services (for example, younger women may have more positive attitude towards health care), the socio-economic status of an individual and her household determines her economic ability to do so (Stephenson et al., 2002).

Residence in the capital and other urban centers, a high standard of living, and high educational attainment are all positively associated with utilization of antenatal care and the timeliness of such care (Govindasamy et al., 1997). A study in Tajikistan also showed a marked difference between urban and rural areas; women living in urban areas are much more likely than rural women to report having ANC(89 % versus 83%) and to have given birth in a medical facility (89% versus 69%) (Falkingham, 2003).

Women's empowerment includes decision making power on their own health. Decisions on women's health are vital to the health and well-being of both women and children. In many households, notably in those countries examined in South Asia and Sub- Saharan Africa, women have little influence in health-related decisions. In Burkina Faso, Mali and Nigeria, for example, almost 75 percent of women reported that husbands alone make decisions about women's health

care; in the two countries surveyed in South Asia, Bangladesh and Nepal, this ratio was around 50 per cent. This exclusion compromises the health and well-being of all family members, particularly women and children (UNICEF, 2007). Another study in India explains the importance of freedom of movement for high utilization of MHC services (Bloom, 2001).

Education is one of the powerful tools to empower women and different studies verify the positive relationship between mother's education and utilization of MHC services. Higher educational levels improved the ANC attendance and were positively associated with the likelihood of using safe delivery care (Bloom, 2001; Jimoh, 2003). For example, a study in India documented the strong consistent and positive relation between MHC service utilization and mother's education; only half of births to illiterate women received ANC compared with 79 percent of births to literate women with less than middle school education and more than 90 percent of births to women with at least middle school education. Similar differentials are observed for TTI and delivery care services (Govindasamy et al., 1997).

Women's low educational level and their limited decision making power in their maternal health care have made them more vulnerable to the infection and pregnancy complications (UNICEF, 2001).

2.3.3 Psychosocial and personality factors

The use of modern health services is often influenced by individual perception of the quality of modern health services and the religious beliefs of individual women. A women's attitude to wards her pregnancy and the presence of social support have been found to influence ANC use in developing countries (Stock R., 1983). A study revealed that women with low social support, who were younger, more often single, who had lower level of education, and income have higher risks than women with adequate social support (Jeker L., 1994).

In developing countries, the presence of social support during pregnancy has been shown to provide psychological benefits and influence ANC use. For example, in Jamaica, pregnant

adolescents identified the support of close friends as a prerequisite to the initiation of ANC (Mahler H., 1997).

In Ethiopia, studies addressing the factors influencing the utilization of maternity care services are scanty. Few studies that do exist focused predominately on major cities. An earlier community based study in Addis Ababa on maternal mortality found that women who did not have ANC were often those of high risk, i.e. illiterate, had low level awareness of problems of child bearing, had low income and were unmarried (Fantahun M., 1992).

2.3.4 Cultural practices and Women's decision

Another important factor in the utilization of maternal healthcare services, especially in Africa, is the cultural background of the women. Women's have less and unequal access to material and other resources, and their inability to make informed choices are the fundamental causes of maternal death and disability. A range of barriers related to women's powerlessness could harm their health directly or by limiting their access to the services. This includes ignorance of good health practices, as well as lack of awareness of danger signs during pregnancy (WHO, 1994; UNICEF, 1996).

In many parts of the world women's decision making is limited even matters directly related to their own health (UNICEF, 1996). In Bangladesh, it is usually the mother- in law and the husbands who make decision to seek (or not seek) care (Nancy P, Ubaidur R, and Khan M.E., 1999). They are often the least likely to know about pregnancy related complications and their possible fatal consequences.

2.3.5 Accessibility and quality of health services

2.3.5.1Accessibility of health care services

The considerable variation in maternal and child health in the developing world is believed to be partly due to differences in the availability of and access to health services. Accessibility of health services have been shown to be an important determinant of utilization of health services in developing countries. In most areas in Africa, one in three women lives more than five kilometers from the nearest health facility (Vanden B., and Damnyag L., 2002). The scarcity of vehicles especially in remote areas cost of transport, poor road conditions and the difficulty of walking for hours to the nearest health facility may also pose problems for pregnant women (Dana A., Noreen G., and German R., 2003). In rural Tanzania, for example, 84% of women who gave birth at home intended to deliver at a health facility but did not do due to distance and lack of transportation (Mahler M., 1997; UNICEF, 1996).

A study in Jordan has also shown that distance of place of residence from the services and time and cost involved in traveling to services were all highly significantly associated with non-use of the maternal healthcare services (Abbas H., 2004). According to a household survey in Southern Iraq, the relationship between utilization and distance between health unit and place of residence has shown that utilization rates decline sharply with increasing distance traveled (Habib SO, and Vaugan P.J., 1986).

In developing countries distance from and ignorance of the existence or purpose of the health services may compound this. The other important factor determining utilization is family income. Some studies have shown that utilization rates increases substantially with increasing income (Abbas H., 1986; WHO, 1993; Yuster EA., 1995).

2.3.5.2 Quality of health services

Quality of care is an important consideration in the decision to seek care. In a study in southwest Ethiopia, multiple structural deficiencies were identified in all components of reproductive health care. Adequate amount of absolute minimum equipment is required for maternity and neonatal cares were not available in many institutions (Wako G and Berhane Y, 2000). A study on antenatal care services in northwest of Ethiopia reported that 34.7% ANC attendees had one or more high risk factors out of which 77.9% were identified by the health workers. Only 16.8% high risk mothers were appointed earlier than the "normal dates" (Fantahun M, Abubeker A and Assefa M., 2000).

Another study in the Guatemalan highlands, revealed that, government health posts seemed to be conveniently located, yet that proximity did not guarantee utilization, probably the facilities understaffed and under equipped and thus unable to provide quality care (Dana A., Noreen G., and German R., 2003). The two mechanisms through which quality of care affects the decision to seek care are satisfaction or dissatisfaction with the outcome, and satisfaction or dissatisfaction with the service received (WHO, 1996).

2.3.6 Need and Perceived Morbidity

In developing countries most women lack knowledge on risks of pregnancy and childbirth, which in turn influences the felt need for ANC. In Jamaica, for instance, while most women surveyed were able to name obstetric complication they had experienced themselves, fewer than 10% of them identified any other specific risk, danger or problem of pregnancy and birth (Working paper, 1990).

In Ethiopia a study in Addis Ababa showed that absence of illness and lack of awareness are among the major reason for non-attendance of antenatal care (Fantahun, 1992). Another study in Ayssaita and Dubti towns, Afar regional state, indicated that lack of knowledge on the dander signs of pregnancy is one of reasons for non-attendance of ANC and delivery care (Melkamu, 2005).

2.4 Health care provision in Ethiopia

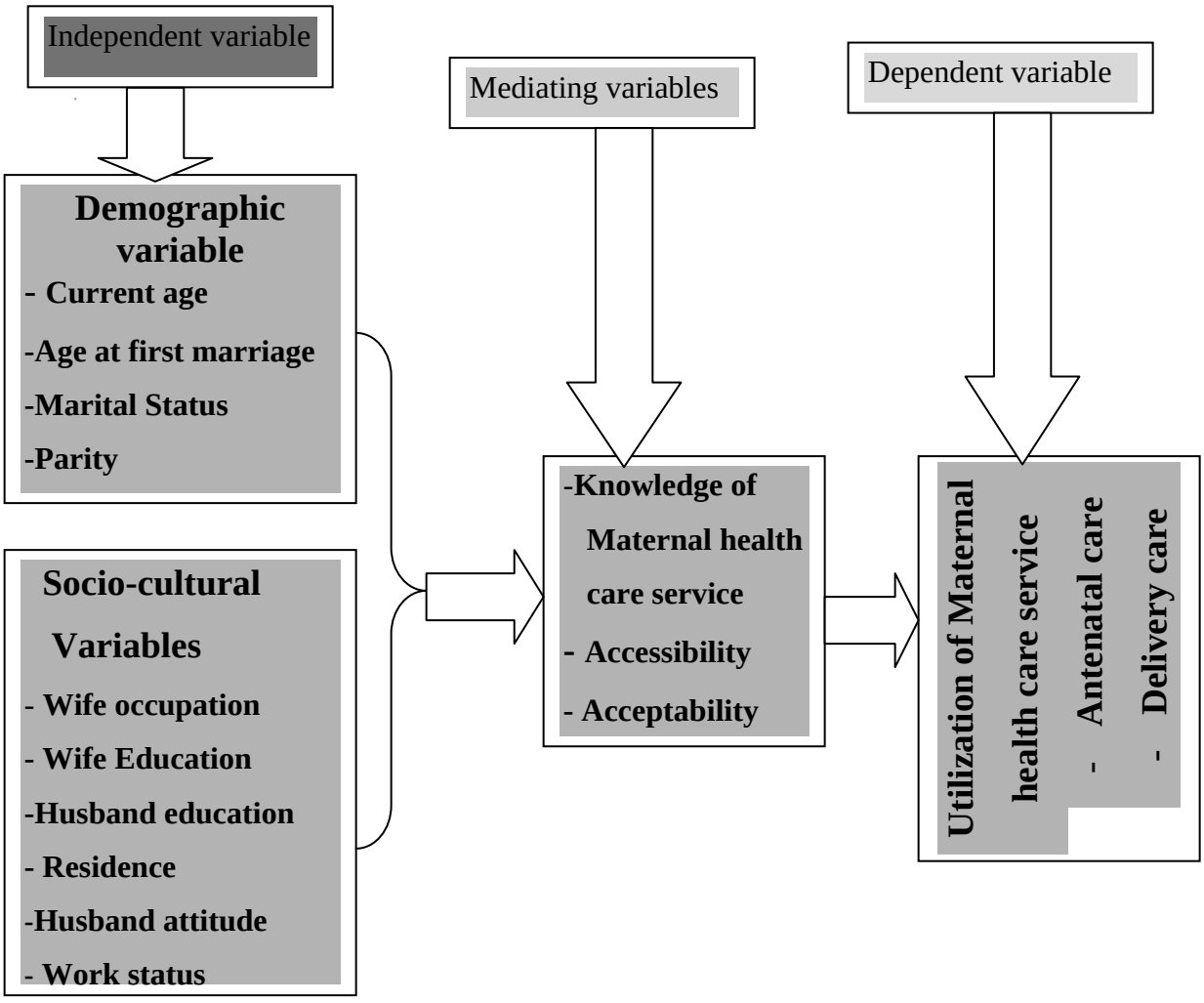
Before 1992, Ethiopia's health service system was highly centralized; with recourses remain heavily centralized in Addis Ababa and some urban areas, with an emphasis on curative, hospital based care. Nevertheless, the majority of Ethiopia's population lives in rural areas where health care coverage is very minimal in addition to diversified health problems.

Considering the seriousness of the problem, the government well understood construction of primary health facilities at the lower administrative unit can at least minimize the situation (Collier, et al, 2002). According to (MOH, WHO, et al, 1999) primary health care units and their five satellite health posts are intended to serve a total of 25000 populations located with 10K.m radius catchments areas. Next in district hospitals, each serving a population of 25000 and acting as a referral and training center for 10 primary health care unites: the regional hospitals will provide a specialized service and serve a population of one million each and the specialized hospitals will provide comprehensive/unitary specialists service and act as a center for research and post basic training (MOH, WHO, 1999).

2.5 CONCEPTUAL FRAMEWORK

Based on related literature the following conceptual frame work is used in the study.

Fig.1: Conceptual framework



Source: prepared by the researcher

CHAPTER THREE

3. METHODOLOGY AND RESEARCH DESIGN

This section of the thesis describes the methods that were used, subjects included in the study, the instruments and procedures were used for data collection, and the techniques were employed for data analysis.

3.1 Study area

Under the new administrative structure Gozamin woreda is one of the 18 Woredas in East Gojjam Zone. It is located the surrounding of Debre Markos town 300 KM far from Addis Ababa in North West Direction, established in 1845. In the Woreda about 79,682 are women out of the total population 140,245 (CSA, 2008) organized 25 rural and 1 urban kebeles. There are 6 health clinics and 25 health posts own by the government and 6 low clinics, 5 middle clinics and 1 higher clinic own by private. The over all health coverage of the woreda was 50% where as 52% of the zone (Gozamin Woreda annual report, 2008).

3.2 Source of data

Both primary and secondary sources of data were used for this study. Primary data were collected by using structured questionnaire and FGD guided questions which was prepared in English and then translated to local language Amharic. Published and unpublished materials like, Books, Journals, area specific health service reports like Gozamin Woreda Health Office were the source of secondary data. The source populations were all women residing in the 26 kebeles in the study area. Of these, eligible (target) populations were all women in the reproductive age whose recent birth occurred within the last five years prior to the survey. This relatively recent time frame was chosen to limit problems of recall bias.

3.3 Study design

A community based cross-sectional study design that employed quantitative and qualitative data collection methods were carried out to assess factor influencing utilization of maternal health care services in Gozamin woreda. Quantitative method was used as the main tool for collecting the data while the qualitative were taken as supplementary.

Statistical data was collected by employing structural questionnaires to measure the determinants of utilization of maternal health care service and focus group discussions were conducted women to gather detailed information about utilization were maternal health service and its determinant on the utilization. Focus group discussions were also used to supplement information on community knowledge and perception of maternal health care services.

3.4 Sample size determination

Sample Size: the sample size was calculated using the following formula of sample size determination (Cocharn W.G, 1977).

$$n= \left(\frac{P(1-p)(Z\,\alpha/(2)^2}{E^2}\right)$$

The total sample size we calculated with assumption of:

n- Total sample size

- Z- Values of standard variance at 95% confidence interval ($Z_{\alpha/2}$ =1.96).
- P- The prevalence of utilization of maternal health service. As the proportion was not known from the previous study. Then by default value p=0.5
- E- A marginal error of 5% were taken by assuming a 95% CI i.e., E=0.05

Design effect of 1.5 (Since the sampling method used multistage to identify the final sampling unit)

Accordingly, n = $((0.5)(0.5)(1.96)^2/(0.05)^2)$X1.5 design effect + 10% contingency

=384X1.5 + 10%

= 576 + 10%

=614

Thus the total sample size of the study was 614.

3.5 Sampling procedure

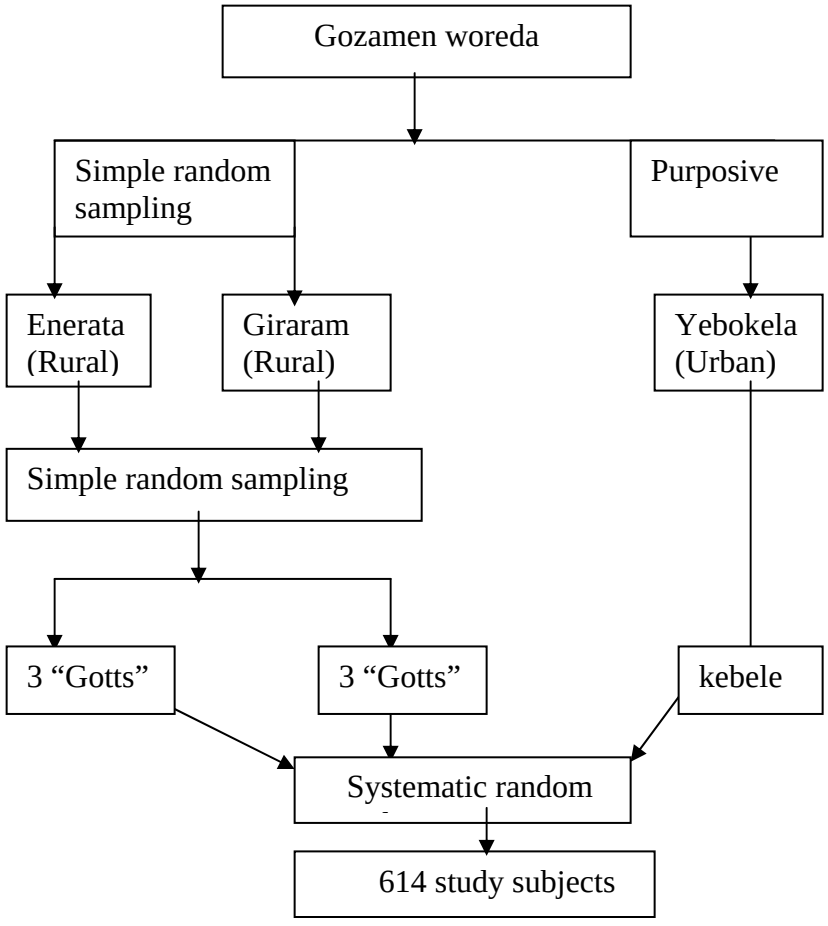
A multi-stage sampling technique was applied to select the study subjects. In the study area, there are 25 rural and one urban kebles in the woreda. First, three kebeles were selected (one from urban, and two from rural). Two rural kebeles namely Enerata and Giraram were selected using simple random sampling method and Yebokila 01 town (the only urban kebele) was selected purposefully so as to see whether some independent variables have differentials across rural and urban residents or not. The second step was in the selected kebles 3 'Gotts'[1] were selected randomly for each rural kebele. The third step households were visited to select a list of households with eligible women among the selected 'Gotts'. Using sampling frame, the number of households to be included in each *kebele/'Gotts'* was determined in proportion (p=0.4) with the total number of households with eligible women found in each *kebele/'Gotts'*.

Finally, 614 eligible respondents were made to be included in the study by using systematic random sampling. Whenever more than one eligible respondent was found in the same selected household, only one respondent was chosen randomly.

Table 1. Distribution of respondents in the sampled kebeles, 2010

Kebele Urban/rural	**Total Population**	**Number of Households (Kebele)**	**Eligible households** (Keble/'Gotts')	**Household sampled**	**Eligible women interviewed**
Yebokila01 (urban)	2930	681	542	250	237
Enerata (rural)	6798	1581	488	195	182
Giraram (rural)	7138	1660	422	169	168
Total	16866	3922	1442	614	587

Figure 2A: Schematic presentation of sampling procedure for Quantitative method

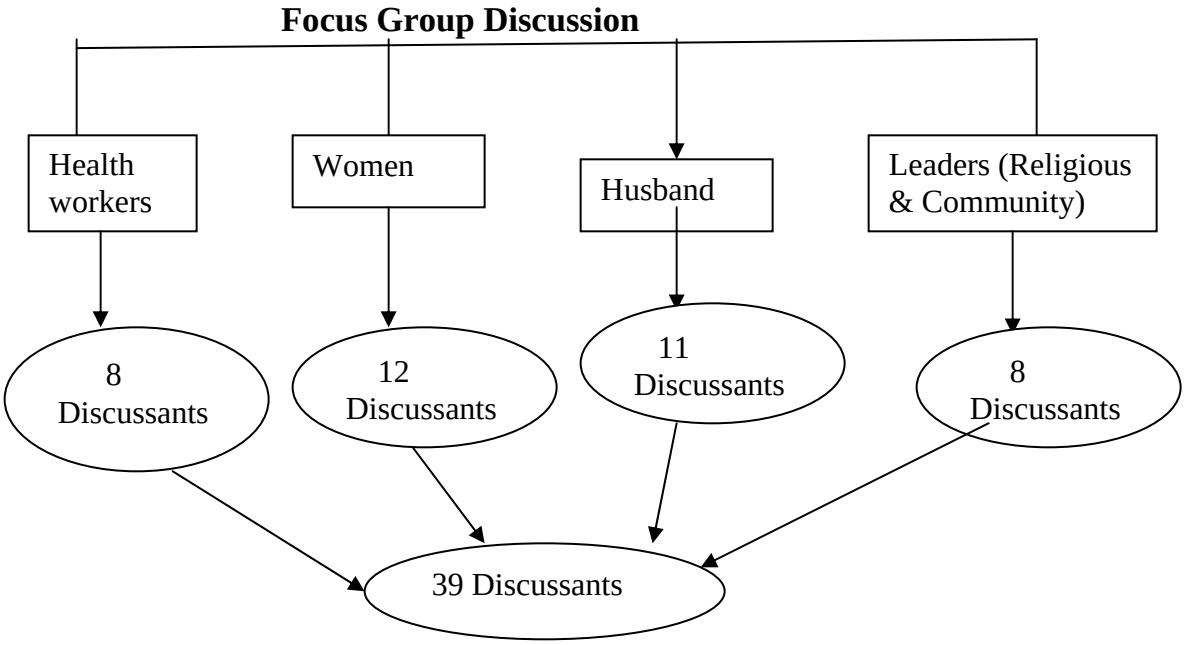


[1] Gott- It is an administrative unit below kebele

Focus group discussion

For the qualitative the kebeles administrator, the head of the District desk, and the supervisors, with principal investigator were used to identify eligible discussants. A total of four FGD each holding 8 to 12 discussants were carried out. FGD discussion were conducted with women aged 15-49 years, health workers, religious and community leaders and husbands separately to get in-depth information on key issues by insuring homogeneity. Awareness about utilization of ANC and delivery care services and the main reasons for the non-utilization were the main issues discussed during the FGD.

Figure 2B: schematic presentation of sampling procedure for qualitative method



On this study, four FGD discussions were conducted on the qualitative data to supplement the quantitative data.

3.6 Field work procedure, training and supervision

In the identification of the target group and collection of the data relevant to the study, assistance was obtained from the selected zone and kebeles administration in the study area (woreda).

Data collection processes

A structured and pre-tested questionnaire which was first prepared in English and translated to Amharic language was used to collect the quantitative data. Ten 12^{th} grade completed interviewers (5 females and 5 males), and four Nurse Supervisors (2 females and 2 males) who were fluent speakers of the local Amharic language were given a through training on the interview techniques and the questionnaire for three days before data collection.

The questionnaire was administered to the mothers with age 15-49 who have at least a child within five years preceding the survey. The questionnaire was checked using range and consistency check methods. The researchers witnessed interviews, re interviewed a sample of respondents and checked as many filled questionnaire as possible each day in all selected sites.

Pre-testing: The pre-test of the questionnaire was carried out in one of the kebeles which was not selected for the study in Gozamin woreda outside of the selected kebeles that has similar socio-demographics characteristics with the people. A total of 30 respondents were interviewed. On average, it took 45 minutes (range from 35 to 60) to complete the interview. Both the interviewers and supervisors assessed clarity, understandability, and completeness of the questions, and then the results were edited and coded.

Data collection: After completing the result of the pre-tested, discussion was made with supervisors, and data collectors and care was taken not to include the kebele where the pretest was made. Then, the data were collected using house-to house interview questions, which consist of 59 variables, categorized into five parts. A maximal effort has been made to insure privacy during interview.

Supervision: During the actual data collection data collectors were assigned for each supervisor. The supervisors had checked the activities of each data collectors by walking with them in each kebele and some times-random spot-checking of the households to ensure reliability of the data collected. Each night the supervisors had checked all the filled questionnaires for completion, clarity and proper identification of the respondents. Then, the principal investigator randomly checked at least 10% of the supervisors' work each day for completeness and relevancies. Incomplete and unclear questionnaires were returned back to the interviewers to the next morning to get it corrected.

Qualitative method: The principal investigator moderated the discussion of the male group, while the female groups were by an experienced female nurse with diploma holder with respect to note takers and/or assistances during the discussion were identified. A two-day training and practical exercise carried out. Group discussions with their respective discussants were conducted in each selected Kebeles hall and District health office. Each discussion was tape recorded not to miss all issues discussed, and finally the principal investigator transcribed the tape recorded after each section, translated and interpreted. Although, divers opinions were expressed with in each group, preliminary coding of transcripts was done and consists theme that are directly related to the objective this study were identified.

3.7 Ethical Consideration

The objectives of the study were explained to the identified study subjects. They were assured that any information concerning them would never be passed to any individual or institution with out their agreement. Their names were not recorded. Women were kindly requested to be included in the study but were told that it was their right to participate or not. All women who were not attending antenatal care and delivery at health institution were briefed about the advantages of it and were advised to go antenatal check up for the present (next) pregnancy and preference of delivery at health institutions.

3.8 Data processing and analysis

Data processing

After data collection, each questionnaire checked manually for completeness and end coding at the right margin of the questionnaire followed by almost all variables in the questionnaire. After this validation the principal investigator entered the data using SPSS version 15.0 statistical software packages for data cleaning and analysis.

Method of Data Analysis

Both descriptive and inferential statistical methods were used in the analysis of the data. Using Univariate, frequency and percentage tables were used in the descriptive analysis part which identifies the important factors that influence the utilization of maternal health care services. While in inferential methods, bi-variate methods were identified the important factors that influence the utilization of maternal health care services including the chi-square test, whether there is an association between use of maternal health care services and the independent variables.

Finally, binary logistic regression models were used as a multivariable analysis tool to obtain odds ratios at 95 percent confidence intervals. Logistic regression analysis was used to estimate the likelihood of use of a specific form of maternity health care service, given a set of factors. It predicts the log of odds of the dependent variable as a linear function of independent variables. The logistic model for K independent variables (X1, X2, X3, …, Xk) in this situation is (Hosmer and Lemeshow, 1989). The equation of logistic regression model is given as:

Logit (Pi) = Ln (Pi/(1-pi))= B0+B1X1+B2X2+------+BkXk
Where the dependent variable Yj and quantitative independent variable
Xij=1, 2, 3-----, k and i=1, 2, 3-----, n.
B0= Constant
B= Regression coefficient
EXP (Bi) = Odd ratio for a person having characteristics i versus not having characteristic i.

Let Pi= P(Xij) denotes the "success probability" when Xij takes the value Xij. We can assume that the transformed variable Ln (Pi/(1-Pi)), has a linear form of this logit probability. Where Bi refers to the effect of Xij on the log odds that Yi=1, controlling for other X.

3.9 Variables included in the model

This study used antenatal care and delivery care as dependent variables. For the antenatal care, a dichotomous variable that indicate whether women had seen by health professionals at least once during pregnancy was used. As an indicator of delivery care use, the study assessed whether women had delivered at health institutions or at home. These were indicators of maternal health care utilization. The following were some of the variables considered in the study.

Table 2: Description of some variables considered in the study

Variable	**Categories**	**Variables**	**Categories**
Age	15-19	Respondent *Educational*	No education
	20-34		Primary Education
	35+		>=Secondary
Marital status	married	Husband Education	No education
	Others		Primary Education
Age at first marriage	<10		>=Secondary
	10-15	*Husband attitude*	*Positive*
	16-18		Negative
	18+	*Current work status*	not working
			Working
Parity	<=2	*Residence*	Urban
	3-4		Rural
	5+	*Illness experience*	*yes*
Respondent Occupation	Housewife		No
	Civil servant	Knowledge of dangerous	Yes
	Marchant	sign of pregnancy	No
	Others		

CHAPTER FOUR

4. DATA ANALYSIS AND INTERPRETATION OF ANC RESULTS

In this study a total of 587 women with age group 15-49 year who delivered within five years before the survey were interviewed from the three kebeles of Gozamine worda. All eligible women in the selected samples responded to the questionnaire. There were 46 missing respondents who full filled the selection criteria due to their unwillingness to participate. The over all response rate was 587(93%).

4.1 Socio-demographic characteristics of the respondents

The largest study group was in the age group 20-34 (38%) years, with a mean age of 27.8± (7.4) years. About (51.6%) of the respondents were no educated and (20.3%) had completed secondary high school and higher education. Out of the total respondents about 60% were lived in the rural and (96 %) were Orthodox Christians and Amhara ethnic group (Table 3).

Regarding the respondents' occupation most were housewives (63.7%). The majorities, (81.6 %) were currently married and out of the total respondents 19.6% had 7 or more family size in the household with the mean numbers of people living in a household were 5.3± (2.1) (Table 3).

Table 3: Socio-demographic characteristics of respondents by ANC attendance in Gozamin Woreda, 2010

Variables	ANC attendance		Total number	Percent
	Yes	NO		
Current age				
15-19	119	38	157	26.7
20-34	135	88	223	38
35+	94	113	207	35.3
Mean/ Std. Deviation				27.78 ± (7.386)
Current marital status				
Married	289	190	479	81.6
Others*	59	49	108	18.4
Ethnicity				
Amhara	336	226	562	95.7
Others**	12	13	25	4.3
Respondents educational status				
No education	142	116	303	51.6
Primary school (1-8)	103	62	165	28.1
Secondary and above	103	16	119	20.3
Residence				
Rural	157	193	350	59.6
Urban	191	95	237	40.4
Religion				
Orthodox	333	220	563	95.9
Others***	15	9	24	4.1

Family size				
<=3	118	95	213	36.3
4-6	166	93	259	44.1
>=7	64	51	115	19.6
Mean/Std. Deviation				5.33 ± 2.078)
Respondent occupation				
Housewife	176	198	374	63.7
civil servant	90	7	97	16.5
Merchant	55	24	79	13.5
Others****	27	10	37	6.3

* Widowed, Divorced and separated

** Agew and Tigray

*** Protestant, Muslim, catholic and traditional believers

**** Student, Daily laborer, self employee

N.B Age was classified as 15-19, 20-34, and 35+. This was mainly to see the ANC attendance of teenagers (15-19) and the old age (35+). Since this age group is affected by high pregnancy related complications and early age at first marriage was very high**.**

Average household income is not included in the analysis because maternal health care is free of charge and it is difficult to compare rural and urban respondents due to living standards. Moreover, majority (90%) of the rural residents travel on foot to attend the nearest health facility with no cost in transportation (World Bank and Ministry of Health, 2005).

4.2 Obstetric characteristics of the respondents

From all respondents, (20.8%) of women had five or more pregnancies. Majority of them (63.5%) responded that their last pregnancy has been planned. Regarding to age at first marriage, the majority of the respondents (82.6 %) were married below the age of 15 years with mean age at first marriage 14.3+ (3.7). Nearly 17% of the respondents have had 5 or more living children with a mean number of children 4.2 ± (2.0) (Table 4).

Table 4: Obstetric characteristics of respondents by ANC attendance in Gozamin woreda

Variables	ANC attendance		Frequency	Percent
	Yes	No		
Age at first marriage	**N=587**			
<10	128	91	219	37.3
10-15	146	121	267	45.5
16-18	15	7	22	3.7
19+	59	20	79	13.5
Mean/Std. Deviation			14.3 ± (3.7)	
Intended pregnancy	**N= 587**			
Yes	251	122	373	63.5
No	97	117	214	36.5
Parity	**N= 587**			
1-2	186	89	275	46.8
3-4	109	81	190	32.4
5+	53	69	122	20.8
Number of living children				
<=2	178	99	277	47.2
3-4	123	88	211	35.9
5+	47	52	99	16.9
Mean/Std. Deviation			4.2 ± (2.0)	

Source: Own survey data, 2010

4.3 Respondents perception on the quality of the ANC service

Out of the respondents about the length waiting time, 49 % of women considered waiting time as short where as 21 % considered as too long. About (52.3 %) of the respondents believe that there was privacy problem. Respondents also asked about the quality of service and (50 %) of women said there was good quality of services while (19.0 %) said poor. And also majority of the respondent (60.1 %) had confidence on the service provided and (23 %) of the respondents said that behavior of health workers was fair (Table 5).

Table 5: Respondents perception on the quality of ANC service in Gozamin woreda

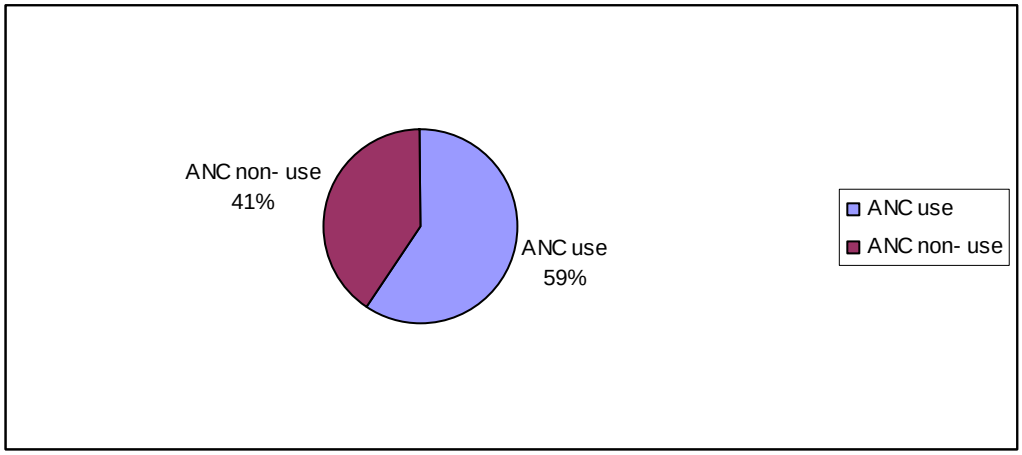
Variables	ANC users	ANC Non-use	Percent
Lack of privacy at ANC service			
Yes	146	134	47.7
No	202	105	52.3
Rank behaviors of health workers			
Very good	65	19	14.3
Good	223	145	62.7
Fair	60	75	23.0
Quality of ANC services			
Good	251	42	49.9
Satisfactory	83	99	31.0
Poor	14	98	19.1
Confidence on ANC services			
Yes	235	45	60.1
No	113	194	39.9
Length of Waiting time			
Short	239	49	49.1
Fair	87	89	30.0
Long	22	101	20.9

Source: Own field data result, 2010

4.4 Antenatal Care Utilization Level

Out of the total women (587) included in the study, 384 (59.3%) had at least one antenatal visit during their last pregnancy within five years before the survey, while 239 (40.7%) had none.

Figure 3: Respondents level of ANC attendance of in Gozamin woreda



Source: Own field work survey data, 2010

Trimester of pregnancy at which attendants have first contact with ANC was found to vary. About (45 %) of women made their first prenatal visit on the first trimester[2] and second trimester[3]. Among the prenatal service users (65 %) had less than four antenatal visits at the time of the interview (Table 6).

[2] ***First Trimester***: the period between the date of conception and the end of the third month of pregnancy.

[3] ***Second Trimester***: The period after the third month of pregnancy till the end of the sixth month.

Out of total antenatal care attendees 47.7% got TT vaccine. About 30% of respondents who have got TT vaccine have got only one injections of tetanus toxoid. From ANC users the majority (55.2 %) had received some health education during any visit while (26.2%) reported having never attended health education (Table 6).

Table 6: Respondents distribution on utilization of antenatal care in Gozamin woreda

Variables	Frequency	Percent
Received ANC N=587		
Yes	348	59.3
No	239	40.7
Timing of first ANC N=348		
1-3 month	159	45.7
4-6 month	156	44.8
7-9 month	33	9.5
Frequency of ANC follow up N=348		
One times	38	10.9
Two times	87	25.0
Three times	101	29.0
Four times and above	122	35.1
Status of tetanus vaccine N=348		
Yes	182	52.3
No	166	47.7
Number tetanus vaccine N=182		
One times	56	30.8
Two times and above	126	69.2
Health education during ANC N=348		
Yes	192	55.2
No	156	44.8

Source: Own survey data, 2010

4.5 Respondents' knowledge/attitude on ANC care services

Among ANC users and non-users the majority (91%) reported that ANC check-up has benefits to the health of both the mother and children and (11.5) follow up ANC at hospital. Concerning the recent pregnancy (43.1%) had experienced some health problems. The majority (72.6%) know some dangerous health problems during pregnancy and delivery (Table 7).

Regarding sources of information about ANC services, (80.9%) mentioned as health institution. ANC users gave different reasons for initiating ANC visit for the first time. Among the several reasons given, (55.7%) were for medical check up and regular follow up. The majority (77.4%) of husbands had positive attitude towards ANC and delivery care services (Table 7).

From FGD, almost all of the groups defined ANC as a care provided during pregnancy to prevent any problems related to pregnancy and childbirth. ANC was also important for the well being of both the women and the fetus. Regarding delivery care services, most of the discussants agreed that delivery care is the care provided for women by trained health professional in the health institution. And also postnatal care is the care given for women after child birth in case of complications.

Table 7: Respondents Knowledge/attitude on ANC care services in Gozamin woreda

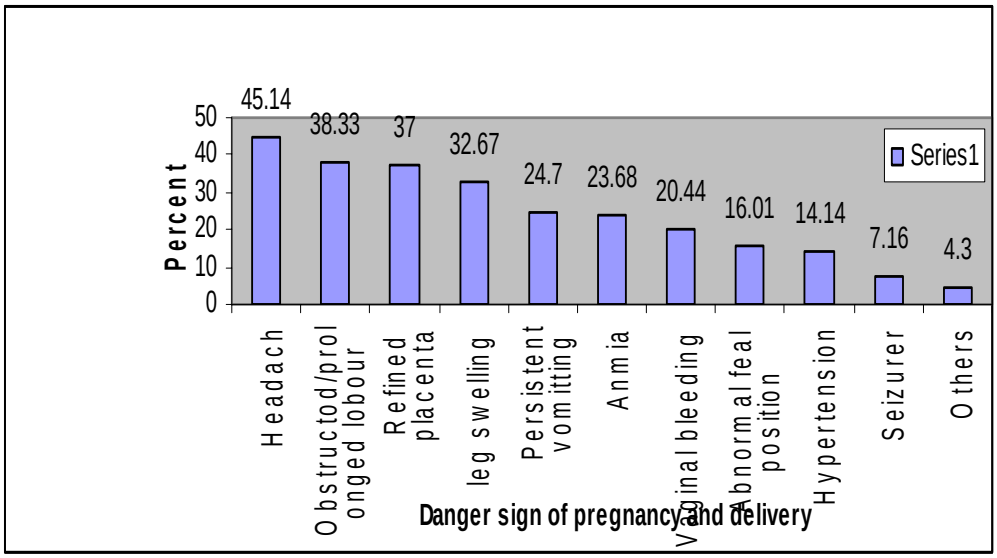
Variables	Frequency (348)	Percent
Benefits of ANC check up N=587		
Maternal health	29	4.9
Child health	24	4.1
Both	534	91.0
Place of ANC follow up N=587		
Hospital	40	11.5
Health center	190	54.6
Clinics	118	33.9
Source of ANC information N=587		
Health institution	475	80.9
Radio/TV	7	1.2
TBA	77	13.1
Health provider	28	4.8
Main reason to start ANC for the first time N=348		
Because of illness	154	44.3
To start regular check-up	194	55.7
Husband attitude to ANC N=587		
Positive	454	77.4
Negative	67	11.4
Don't know	7	1.2
Illness experienced for the recent pregnancy N=587		
Yes	253	43.1
No	334	56.9
Knowledge of dangerous health problems related to ANC N= 587		
Yes	426	72.6
No	161	27.4

Source: Own survey data, 2010

4.5.1 Knowledge of dangerous signs of pregnancy related problems

Out of the total women who said, “yes” regarding to the knowledge of danger signs of pregnancy related health problems, most of the respondents able to name most of the accepted danger signs: severe headache (45.1%), prolonged labour (38.3%), Refined placenta (37%) and the like (Fig. 4)

Figure 4: Respondents Knowledge of dangerous signs of pregnancy in Gozamin woreda



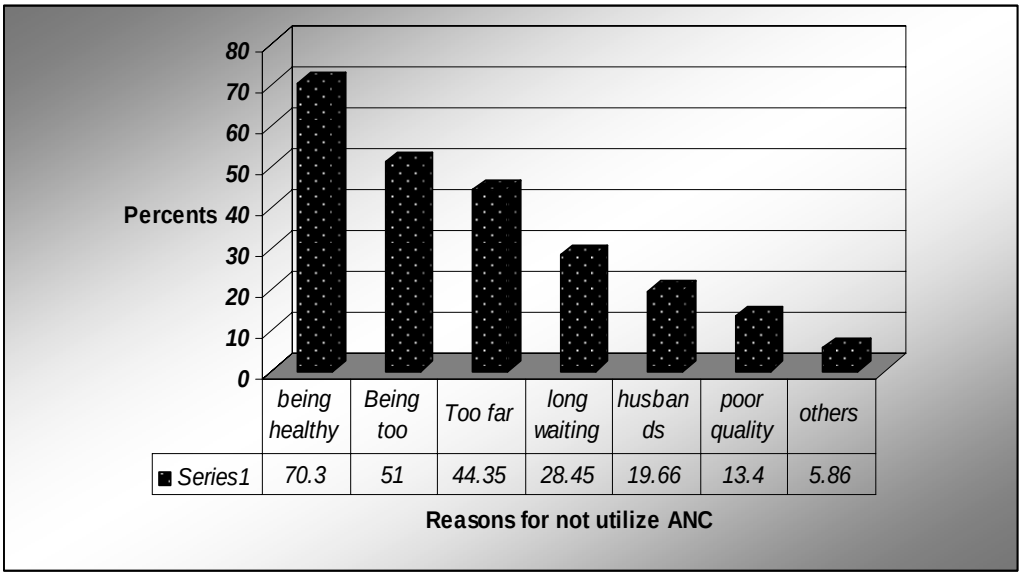
Source: Own multi response field survey data, 2010

From the FGD, Majority of the group discussants able to name the danger signs of pregnancy related health problems. Such as sever hypertension, sever headache, sever anemia, vaginal bleeding, etc. This implies that FGD prevailed similar results as that of the questionnaire result.

4.5.2 Respondents Reasons for ANC non-attendance

Out of the total number of women who did not use ANC, an attempt was made to know the possible reason for the non-use of ANC. On the other hand, women indicated the primary reasons for not attending ANC during their pregnancy to be that being healthy during the recent pregnancy (70.3%) and (51%) work overload (Figure 5).

Figure 5: Respondents Reason for ANC non-attendance in Gozamin woreda



Source: Own multi response field survey data, 2010

Others = women lack of awareness\knowledge about ANC follow up

The group discussants were asked the barriers that affect the utilization of antenatal care services. The main reasons for not using ANC which was supplemented by the qualitative data were most of the focus group discussants reported that *'ANC is not well utilized as expected because of absence of health problem, work overload either in the household or in the field looking after cattle, long waiting time, cultural reasons, and confidence on local TBAs'*. Some of the discussants agreed that most of the women do not go to health institutions for fear they might be seen by male health workers and this is unacceptable by their culture and is preferred to be seen by female's attendant only.

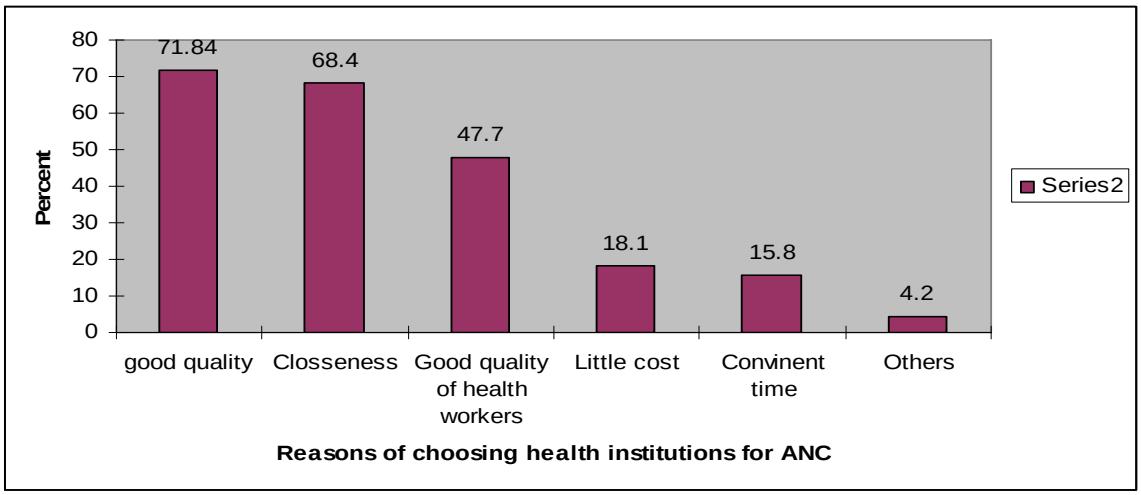
One of the discussants from pregnant women said,*" some of the pregnant women believed that attending ANC is less important, let our creator does up on us what ever he likes. She added if you go to health institution you would acquire disease"*. One of a trained traditional birth attendant (TTBA) said,

> "*Most of the women in our area do not go for ANC unless they faced serious health Problems, because they do not like removing their closes and be examined by someone else"*.

4.5.3 Reasons for Choice of Health Institutions for Antenatal Care Attendance

Those women who attend antenatal care clinics were asked the reasons for choice of health institution for antenatal care attendance. The most frequent reason of choosing health institutions for ANC attendance was good quality of services (71.8%) (Figure 6).

Figure 6: Respondents reasons for Choice of Health Institutions for Antenatal Care Attendance in Gozamin woreda



Source: Owned from multi response field survey data, 2010

4.6 Health service factors

Regarding the health service factors of all the ANC attendees (15.5%) women paid for ANC services and the majority (83.5%) said fair with the average payment of 16.50 ± (20.00). Additionally, both user and non-user were asked about the perception of distance from home to health facility, (48.3 %) reported as an average distance and 23 % said too far with an average time spent1.2 ± (1.5) hours (Table 8).

Table 8: Health service factors with ANC attendance in Gozamin worwda

Variables	Frequency	Percent
Payment for ANC	**N=348**	
Yes	91	26.1
No	257	73.9
Perceptions of payment for ANC	**N=91**	
Unaffordable	8	8.8
Fair	76	83.5
Very small	7	7.7
Amount paid ANC	**N=91**	
<20 birr	13	14.3
20-50 birr	70	76.9
>50 birr	8	8.8
Mean ± st.devation		16.50 ± (20.00)
Perception of distance from health facility	**N=587**	
Short	168	28.7
Fair	284	48.3
Long	135	23.0
Average time spent from home to health facility	**N=587**	
Less than an hour	261	44.46
2-3 hours	269	45.83
Greater than 3 hours	57	9.71
Mean ± st.devation		1.20 ± (1.50)

Source: Own survey data, 2010

4.7 Bivariat Analysis of ANC

4.7.1 Association of Socio-demographic factors with ANC Attendance

The chi-square test is also applied to explore their relationship between some background (independent) categorical variables and the dependent variable, maternal health care utilization. By taking in to consideration the assumption of the methods is interested based on the values asymptote significance. If the relationship between the variables is significant, values of asymptote Significance needs to be 0.05 or similarly (Julie, 2004).

Table 9 shows percentage distribution of women with use/non-use of the service according to some socio-demographic and physical characteristic. Accordingly, percentage of women who used ANC in the five years period was increased with an increase in level of education. The table depicts that 46.9% of women with no education, and 86.6% of women with secondary and above had used antenatal care in the five years before the survey respectively. Similarly, ANC increases with an increase in the level of husband education. Thirty six percent of women whose husband did not at all attend formal education had used ANC. But also women occupation had an influence on the utilization of maternal health care service. 47.1% and 92.8% of women with occupation Housewife, and civil servant respectively had attended ANC service.

In this study, it was found that 75.8% and 45.4% of women in the age group 15-19 and 35 and above respectively had attended ANC service indicating a decline in ANC utilization as age increases. Similarly, 80.6% of women of urban residence had used ANC indicating that residence has a significant influence on the use of the service. Moreover, the use of ANC declines an increase in parity. The percentage of women who used ANC declines from 67.6% to 43.4% for one goes from women having given less or equal two births to five or more births (Table 9).

Table 9: Associations of Socio-demographic variables with ANC attendance

Variable	Attending antenatal care status		P- value	Chi-square χ^2
	Yes	No		
current age of respondent				
15-19	119(75.8%)	38(24.2%)		
20-34	135(60.5%)	103(36%)	P<0.01	34.385
35+	94(45.4%)	113(54.6%)		
Respondents residence				
Rural	157(44.9%)	193(55.1%)	P<0.01	74.75
Urban	191(80.6%)	46(19.4%)		
Respondents of education status				
No education	142(46.9%)	161(53.1%)		
primary school (1-8)	103(62.4%)	62(37.6%)	P<0.01	56.7
secondary and above	103(86.6%)	16(13.4%)		
Husband education status				
No education	73(36.1%)	129(63.9%)		
primary school (1-8)	153(64.6%)	84(35.4%)	P<0.01	80.42
secondary and above	122(82.4%)	26(17.6%)		
Occupation of respondents				
Housewife	176(47.1%)	198(52.9%)		
civil servant	90(92.8%)	7(7.2%)	P<0.01	74.62
merchant	55(69.6%)	24(30.4%)		
Others	27(73%)	10(27%)		
Age at first marriage				
<10 10-15 16-18 >18	128(58.4%) 146(54.7%) 15(68.2%) 59(74.7%)	91(41.6%) 121(45.3%) 73(1.8%) 20(25.3%)	P<0.05	10.889
Parity				
<=2	186(67.6%)	89(32.4%)	P<0.05	59.74
3-4	109(57.4%)	81(42.6%)		
>=5	53(43.4%)	69(56.6%)		

Source: Own survey data, 2010

4.7.2 Associations of quality of some selected health service with ANC attendance

As can be seen from table 10, the chi-square test result indicated that there is an association between ANC attendance and some selected health service barriers. Some of these health service barriers were measured based on respondents' view of present attendees and those of non-attendants but ever attended ANC care in the previous pregnancies.

Length of waiting time, lack of privacy, quality of ANC and confidence on the services provided is associated with women's antenatal care attendance. Length of waiting time at ANC clinics has a significance association with ANC attendance. The pattern of the relationship demonstrates that the proportions of non-attendants increase as length of waiting time increase. Quality of ANC given to pregnant women at ANC clinics has a significant association with ANC attendance. Among women who reported the quality was poor, 87.5% were non attendees. The proportion of respondents who were non-attainders and those who said the quality was good, satisfactory and poor were 14.3%, 54.4%, and 87.5% respectively. Lack of privacy of ANC given to pregnant women at ANC clinics has a significant association with ANC attendance. Among women who reported that lack of privacy on the service given, 34.2% were non attainders.

Similarly, confidence on the services given at ANC clinics was significantly associated with ANC attendance. Among respondents who said no confidence on the service given, 63% were non-attendants (table 10).

Table 10: Associations of quality of some selected health service factors with attendance of antenatal care by women in Gozamin worwda

Variables	Antenatal care status		P Value	Chi-square
	Yes	No		
Length of Waiting time				
Short	239(83.0%)	49(17.0%)		
Fair	87(49.4%)	89(50.6%)	**P<0.01**	161.436
Long	22(17.9%)	101(82.1%)		
Lack of privacy				
Yes	146(52.1%)	134(47.9%)	**P<0.05**	11.312
No	202(65.8%)	105(34.2%)		
Quality of ANC				
Good	251(85.7%)	42(14.3%)	**P<0.01**	200.15
Satisfactory	83(45.6%)	99(54.4%)		
Poor	14(12.5%)	98(87.5%)		
Confidence on service provided				
Yes	234(83.9%)	45(16.1%)	**P<0.01**	133.163
No	114(37.0%)	194(63.0%)		

Source: Owned survey data, 2010

4.10 Determinants of utilization of maternal health care

Antenatal care attendance was cross tabulated with age, ethnicity, religion, marital status, parity, educational status, occupation, distance, husband's attitude, illness experience, knowledge of unhealthy pregnancy, and planned current pregnancy. Chi-square statistic showed that antenatal care attendance is significantly associated with these variables ($P<0.05$) except ethnicity and religion of respondents.

However, this simple cross-tabulated chi-square result may not show the independent variables exact influence on the dependent variable, because the influences of other variables were not controlled. Thus, binary logistic regression analyses were applied to those variables that had

significant association in the bivariate analysis, to examine the net effect of each independent variable on ANC attendance of pregnant women by controlling for the effects of all other intervening variables.

As it has been mentioned earlier, the binary logistic regression model is appropriate to use when the response to a set of explanatory variables is in a binary form that in this case is ANC attendant and non-attendant. It is coded as a dummy variable (1= ANC attendant at least once during recent pregnancy and 0=ANC non-attendant at least once during recent pregnancy).

Logistic regression calculates changes in the log odds of the dependent (not changes in the dependent it self). For the dichotomies case, if the logit for a given independent variable is B, then a unit increase in the independent variable is associated with EXP (B) change in the log odds of the dependent variable.

A relative risk, EXP (B), estimates greater than one signifies an increased likelihood for the given outcome, while a value less than one indicates a decreased likelihood for the given outcome. In addition, the sign of B (logistic coefficient) indicate the direction of the change. Binary logistic regression was used to investigate the overall net effects of these variables on antenatal care attendance of pregnant women. Variables entered into the model include age, parity, occupation, educational status, marital status, illness experience, knowledge of unhealthy pregnancy and planned pregnancy.

4.8.1 Multicolinearity

Since an independent variable can affect another independent variable, which can again produce a deceiving result, multicolinearity is assessed in the variables which are suspected to have such characteristics. Accordingly, a value of less than zero indicated that the association between two variables is negative i.e., an increase in one variable results in a decline in the other variable. A positive value indicated that an increase in one variable results in an increase in the other variable. At zero value indicated no association between variables (Hubert and Blalock, 1998). In this particular study, husband education is highly correlated with women occupation and residence of the respondents with coefficient of correlation (0.621) and 0.717), respectively. And

also residence of the respondents has a strong correlation with respondents' education with correlation coefficient (0.605). For this study due to Multicolliniarity effect respondent's education was excluded in the model.

If the correlation is higher than 0.5, we can not apply both variables in the model at the same time. In this case residence, respondent education and husband occupation can not be applied at the same time.

Table 11: Matrix correlation among suspected correlated variables in Gozamin Woreda

	Residence	respondents education	Husband education	work status	Respondents occupation	Husband occupation	Knowledge of dangerous	Illness experience
Respondents residence	1	.605*	.358	-.226	.478	.717*	-.011	.047
Respondents of education status	.605*	1	.492*	-.456	.409	.621*	-.153	-.063
Husband eduction status	.358	.492*	1	-.201	.209	.306	-.155	-.164
work status	-.226	-.456	-.201	1	-.325	-.227	.062	.192
Occupation of respondents	.478	.409	.209	-.325	1	.373	-.018	.162
Husband occupation	.717*	.621*	.306	-.227	.373	1	-.018	.048
Knowledge of dangerous sign	-.011	-.153	-.155	.062	-.018	-.018	1	.205
Illness experience	.047	-.063	-.164	.192	.162	.048	.205	1

* = There is strong correlation

Source: Own survey result, 201**0**

In this and all other models to be discussed, ethnicity and religion are not included in the model because the largest (more than 95%) is concentrated to one category and does not allow for any comparison as indicated in table 3.

Tolerance or variance inflation factor (VIF) also used for check multicollinearity effect in addition to matrix correlation. Tolerance is 1- R^2 for the regression of that independent variable on the other independents, ignoring the dependent. The higher the inter correlation of the independents, the more the tolerance will approach zero. As a rule of thumb, if tolerance is less than 0.20, a problem with multicollinearity is indicated. As presented in annex B, for all models tolerance is highly greater than 0.20 (Schwarz, 2007). Thus, multicollinearity effects do not influence the models.

Likewise, the VIF, which is simply the reciprocal of tolerance shows whether or not the explanatory variables are related with each other. When VIF is high there is high, multicollinearity and instability of the beta coefficients. VIF >=4 is an arbitrary but common cut-off criterion for deciding when a given independent variable displays "too much" multicollinearity: a value above four suggests a multicollinearity problem (Schwarz, 2007).

As presented in annex 3, the values of VIF in all models were highly less than four. Therefore, the multicollinearity problems in the models were already detected.

4.8.2 Model of good fit

This study checked whether the model was well fitted to the data or not. The technique used was classification table that indicates the number and percentage of observed cases that are correctly classified or incorrectly classified. With regard to this study, utilization of antenatal care services were correctly classified compared to not attending antenatal care service, as can be seen the classification table, 329 and 181 respectively. But 77 respondents were misclassified: 58 as wiling to use and 19 as not willing to use the ANC care service. To sum up, 75.7 % and 94.5% of

not willing to use and willing to use were classified correctly respectively. As a whole, about 86.9% of respondents are classified correctly.

Table 12: Classification table of ANC

Observed		**Predicted**		
		Attending antenatal care status		**Percentage Correct**
		No	Yes	No
Attending antenatal care status	No	181	58	75.7
	Yes	19	329	94.5
Overall Percentage				86.9

The second technique used was Hosmer and Lemeshow goodness-of-fit test, which help to diagnose the significant level either to accept or reject the alternative hypothesis. According to this technique, if the significance level of the test is less than 0.05, it indicates that the alternative hypothesis is to be rejected and the null hypothesis which states the inadequacy of the model to describe the data is to be accepted. Concerning this study, the significance level of the test was found to be 0.17, which is statistically insignificant. Therefore, the alternative hypothesis which states that the model is adequate to describe the data is accepted.

Table 13: Multivariate analysis of ANC attendance in Gozamin worwda

Variables	B	S.E.	Sig.	Exp(B)	95.0% C.I. EXP(B)	
					Lower	Upper
Current Age						
15-19	.883	.354	.120	2.42	1.21	4.838
20-34 RC				1.00		
35+	-1.135	.296	.000	.321	.18	.574
Residence						
Rural RC				1.00		
Urban	1.731	.357	.000	5.65	2.80	11.371
Parity						
<=2 RC				1.00		
3-4	-0.88	.490	.072	.414	.159	1.083
>=5	-1.387	.546	.009	.239	.082	.695
Illness experience						
Yes RC				1.00		
No	-1.944	.273	.000	.143	.084	.245
Knowledge of dangerous sign						
Yes RC				1.00		
No	-1.470	.264	.000	.230	.137	.385
Marital status						
Married				1.00		
Others	-1.316	.311	.000	.268	.146	.493
Wife Occupation						
Housewife RC				1.00		
Civil servant	2.007	.544	.000	7.439	2.559	21.622
Marchant	1.585	.428	.000	4.880	2.109	11.292
Others	2.043	.515	.000	7.713	2.811	21.164
Husband educational						
No education	-1.734	293	.000	.177	.099	.314
Primary (1-8) RC				1.00		
Secondary and above	-.339	.433	.433	.712	.305	1.663
Pregnancy intended?						
Yes RC				1.00		
No	-1.148	.273	.000	.317	.186	.542
Constant	.638	.275	.021	1.892		

S.E= standard error — Sig. = significance value (P<0.05)

-2LL = -2 Log Likelihood — HLT = Hosmer and Lemeshow Test

R^2 = 66% — RC = Reference Category

B = Beta coefficient — EXP (B) = Odds ratio

The multivariate analysis result revealed from table 11, 68% of the women with age 35 years and above were less likely to attend ANC as compared with those whose ages 20-34 (OR=.321, 95% CI: 0.18, 0.574). This indicates that the likelihood utilization of ANC decrease as age increase. Residence of the respondent also had a significant influence on the utilization of ANC. Respondents with place of residence urban were 5 times more likely to utilize ANC as compared to those who live in the rural areas (OR=5.65, 95% CI: 2.80, 11.37).

Similarly, Parity of respondents also had a significant influence on ANC utilization. As the respondents' parity increased, the likelihood to attend ANC was reduced. Accordingly, attending of ANC for those respondents with parity 5 and above were less likelihood as compared to with parity less or equal to two (OR=0.239, 95% CI=0.08, 0.69).

Illness experience, knowledge of unhealthy pregnancy, respondents' occupation, husband educational level, planned/unplanned pregnancy and marital status also had significantly associated with pregnant women antenatal care utilization. As husband educational level progressed, the likelihood of attending antenatal care increased.

Regarding occupation variation of respondents, civil servants, merchants were seven, times more likely to utilize ANC service as compared with those who were housewives. The result analysis also revealed that the likelihood of being attend ANC was higher for those who were married (OR=0.268, 95% CI: 0.146, 0.493).

The odds ratio reveled that 86% less likely for utilizing ANC for those respondents who had not illness experience (unhealthy pregnancy) as compared with those had the illness experience. The odds of the table 11, respondents who had not knowledge of unhealthy pregnancy were less likely to utilizing ANC for those as compared with those had the knowledge (OR=0.23, 95% CI: 0.137, 0.385). The probability of non-use was higher if the pregnancy was unplanned as compared with those who had planned pregnancy.

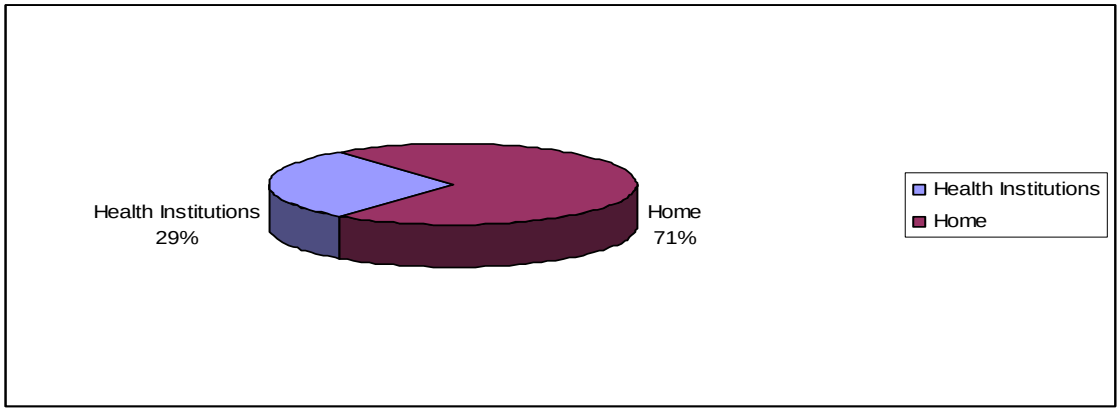
CHAPTER FIVE

5. RESULTS INTERPRETATION OF PLACE OF DELIVERY

5.1 Utilization of place of safe delivery Pattern

Concerning place of last delivery, 416 (70.9 %) of the deliveries took place at home, and 171(29.1 %) at health institution (Table 4).

Figure 7: Respondents place of delivery at in Gozamin worwda



Source: Owned from field survey, 2010

Concerning home delivery, about 48.3% of home deliveries were assisted by close relatives/friends and 11.3% deliveries takes place without any assistance.

Table 14: Respondents assistance during delivery in Gozamin worwda

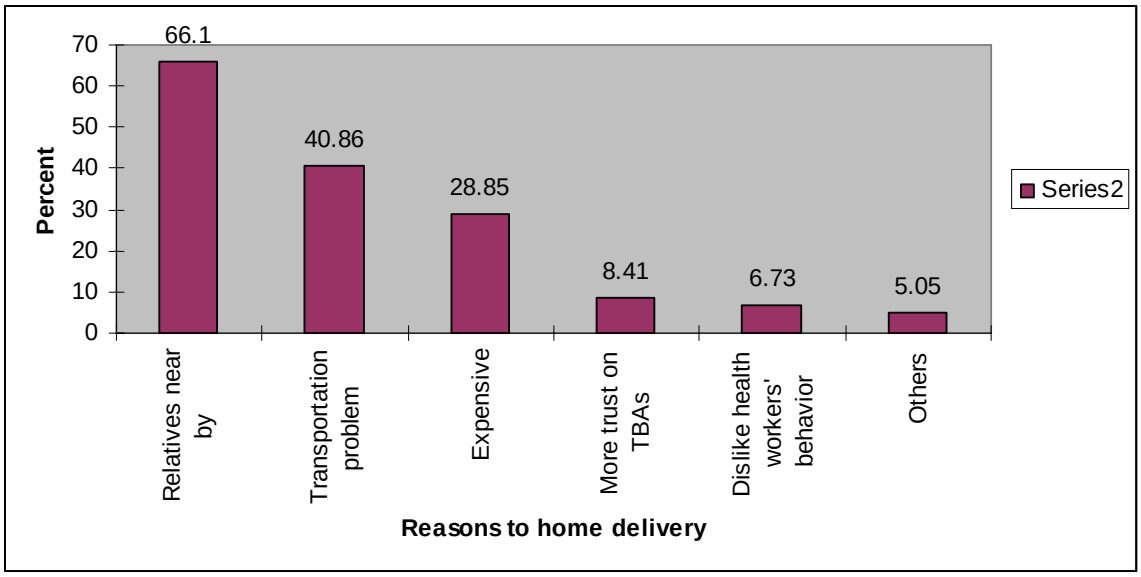
Variable	Frequency	Percent
Assistance during home delivery N=391		
Health workers	9	2.3
TBA	23	5.9
Close relatives/friends	189	48.3
Neighbors	126	32.2
No one	44	11.3

Source: Own survey data, 2010

5.2 Reasons for home delivery

Most of the respondents raised as main reason for home delivery were close relatives nearby (66.1%) and transportation problems (40.9%) (Figure 8).

Figure 8: Respondents reasons for delivery at home in Gozamin woreda



Source: Owned from multi response field survey data, 2010

The group were also interviewed the choice of delivery site. The majority of the discussants reflected mixing of opinions with no clear choice of place of delivery. Some of the discussants agreed that the best place to deliver a child is a health institution. The majority of the discussants preferred home delivery. According to participants, home delivery has adequate privacy and assisted by relatives and TBAs with no payment.

However, one of the discussant stated that, *"if they go to the health institution they will be seen by male delivery assistances with no adequate privacy, and unfriendly of some of the staffs who are not committed to their work." So, that they feel shy and therefore unless there are life threatening conditions they do not prefer to deliver at health institutions*. FGD participants also said: "*we feel free to apply pressure during labour in front of our friends and relatives than health professionals moreover we do not have satisfaction on the service given in the health centers. As a result, we do not deliver there."*

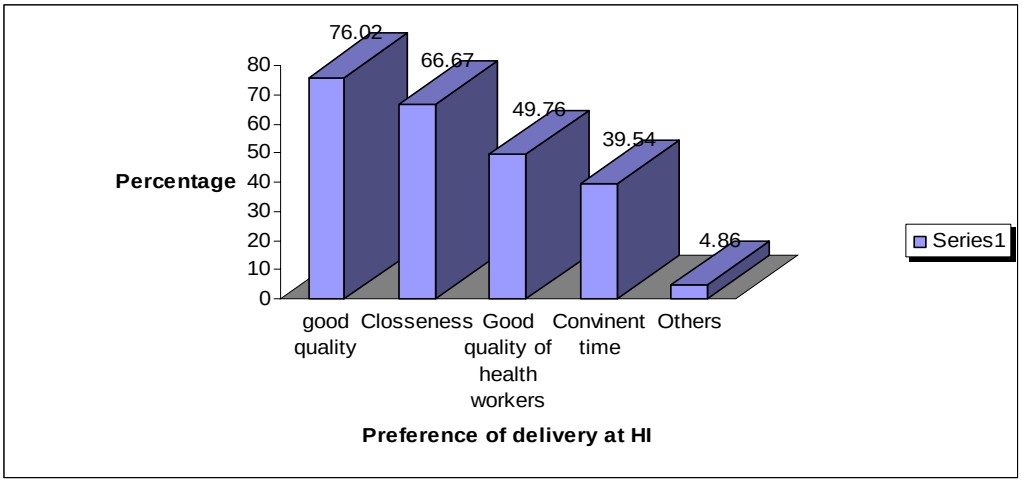
On the other hand, one of the married man discussants said, "*most women attend antenatal care throughout the whole pregnancy period but usually they deliver at home because labour is unpredictable and usually arises suddenly without warning.*"

These were also cultural and service related factors. The FGD participants confirm the presence of a harmful traditional belief in their areas. They state it by saying: "*the fetus is not expected to be delivered unless the pregnant woman is sit in a hole made on the ground to deliver by putting her legs apart on the cow dung and leaves of 'Gullo' positioned around the hole*". Because of the above stated reasons, people around this area did not want to deliver in the health centers.

5.3 Reasons for Choice of Health Institutions for Delivery Care Attendance

Those women asked the reasons for choice of place of delivery at health institution. The most frequent reason was good quality of services (76%), closeness of health institution to which the respondent lives (66.7%), and so on (figure 9).

Figure 9: Reasons for Choice of Health Institutions for Delivery Care Attendance in Gozamin worwda



Source: Owned from multi response field survey data, 2010

But from religion point of view, all the discussants agreed that from religion point of view attending modern health care services is not prohibited. One of a religious leader said, *"according to Orthodox religion, it is not proscribed to attend antenatal or delivery at health institutions rather than cultural behaviors or misinterpreting the bible"*.

5.4 Association of some socio-demographic variables with place of delivery

Crude analysis was done by applying chi-square tests to assess any association between socio demographic variables and women's place of delivery.

As can be seen from table 14, the chi-square test result indicated that there is an association of delivery at health institution and some selected health service barriers. It showed respondents distribution that delivered at health institution/home according to some socio demographic and physical characteristic.

Accordingly, women who delivered at health institution were increased with an increase in the level of education. The table depicts that 15.2% of women with no education and 72.3% of women with secondary and above had delivered at health institutions respectively. Similarly, delivery at health institutions increases with an increase in the level of husband education. But also women occupation had an influence on the utilization of maternal health care service. 88.9% of women with occupation were civil servant respectively had delivered at health institution.

In this study, it was found that 36.9% and 18.8% of women in the age group 15-19 and 35 and above respectively had delivered at health institutions indicating a decline in utilization of delivery as age increases. Similarly, 10.6% and 56.5% of women in rural and urban residence had delivered at health institutions indicating that residence influence on the use of the service. Moreover, the use of health institution delivery services declines as an increase in parity and number of living children. The percentage of women who delivered at health institutions was 46.9% and 8.2% for women who had less than two birth and five or more births, respectively. And also age at first marriage had an influence on the utilization of delivery at health institutions. This indicates that as age at first marriage increase utilization of maternal health care also increase (Table 14).

Table 15: **Association of some socio-demographic variables with preference of place of delivery in Gozamin worwda**

Variable	Place of delivery		P -Value	Chi-square (X^2)
	Health facility	Home		
Current age of respondent				
15-19	58(36.9%)	99(63.1%)		
20-34	74(33.2%)	149(66.8%)	P<0.01	17.032
35+	39(18.8%)	168(81.2%)		
Respondents residence				
Rural	37(10.6%)	313(89.4%)		
Urban	134(56.5%)	103(43.5%)	P<0.01	144.64
Respondents of education status				
No education	46(15.2%)	252(84.8%)		
primary school (1-8)	39(23.6%)	53(76.4%)		
secondary and above	86(72.3%)	33(27.7%)	P<0.01	138.622
Husband education status				
No education	18(8.9%)	184(91.1%)		
primary school (1-8)	61(25.7%)	176(74.3%)	P<0.01	119.642
secondary and above	92(62.2%)	56(37.8%)		
Occupation of respondents				
Housewife	65(16.6%)	326(83.4%)		
civil servant	80(88.9%)	10(11.1%)	P<0.01	182.482
merchant	20(25.3%)	59(74.7%)		
Others	6(22.2%)	21(77.8%)		
Age at first marriage				
<10	42(19.2%)	177(80.8%)		
10-15	55(20.6%)	212(79.4%)		
16-18	15(68.2%)	7(31.8%)	P<0.01	115.576
>18	59(74.7%)	20(25.3%)		
Parity				
<=2	129(46.9%)	146(53.1%)		
3-4	32(16.8%)	158(83.2%)	P<0.01	81.897
>=5	10(8.2%)	112(91.8%)		
Number of Living children				
<=2	115(41.5%)	162(58.5%)		
3-4	44(20.9%)	167(79.1%)	P<0.001	41.459
>=5	12(12.1%)	87(87.9%)		

Source: Own survey data, 2010

5.5 Association of some selected variables with preference of delivery

As we observed from table 14, illness history/complications during pregnancy and delivery had a significant association with the utilization of delivery at health institutions. 40% of women who had history of complications during pregnancy and 21% of women who had no history of complication had delivered at health institutions respectively. Similarly, knowledge of dangerous sign during pregnancy and delivery had a significance association with place of delivery. 33% of women who had knowledge about danger sign during pregnancy and delivery were delivered at health institutions.

More over, education during antenatal care had a significant association with place of delivery. 60.9% of women who had education during ANC had delivered at health institutions. Attending ANC had a strong association with place of delivery. 94.1% of women who had not attended ANC had delivered at home (Table 15).

Table 16: Association of some selected variables with place of delivery in Gozamin worwda

Variables	**Place of delivery**		**P Value**	**Chi-square**
	Institutions	**Home**		
Illness experienced for the recent pregnancy				
Yes No	159(69.4%) 189(52.8%)	70(30.6%) 169(47.2%)	**P<0.01**	16.019
Knowledge of dangerous health problems related to pregnancy & delivery				
Yes No	283(61.5%) 59(48.8%)	177(38.5%) 62(51.2%)	**P<0.05**	6.443
Health education during ANC				
Yes No	117(60.9%) 40(25.6%)	75(39.1%) 116(74.4%)	**P<0.05**	43.305
Antenatal care attendance				
Yes No	157(45.1%) 14(5.9%)	191(54.1%) 225(94.1%)	**P<0.001**	105.77

Source: *Own survey data, 2010*

5.6 Determinants of safe delivery service utilization

This study checked whether the model was well fitted to the data or not. The technique used was classification table that indicates the number and percentage of observed cases that are correctly classified or incorrectly classified. With regard to this study, home delivery were correctly classified compared to utilization of delivery care services, as can be seen the classification table, 125 and 392 respectively. But 70 respondents were misclassified: 24 as wiling to use and 46 as not willing to use the delivery care service. To sum up, 94.2% and 73.1% of not willing to use and willing to use were classified correctly respectively. As a whole, about 88.1% of respondents are classified correctly.

Table 17: Classification table for place of delivery care

Observed		**Predicted**		
		place of delivery care		**Percentage Correct**
		Home	**Health institutions**	**Home**
Place of delivery care	Home	392	24	94.2
	Health institutions	46	125	73.1
Overall Percentage				88.1

Table 18: Multivariate analysis of respondents' place of delivery in Gozamin worwda

Variable	B	S.E.	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
					Lower	Upper
Age of Respondent						
15-19	1.432	.404	.222	4.189	1.898	9.244
20-34 RC				1.00		
35+	-.605	.496	0.000	.546	.207	1.442
Residence						
Rural RC				1.00		
Urban	1.767	423	.000	5.850	2.553	13.404
Respondent Education			.			
No education RC				1.00		
Primary	-.423	.371	255	.655	.316	1.356
Secondary	1.956	.479	.000	7.073	2.763	18.101
Antenatal Care Status						
No RC				1.00		
Yes	2.269	.427	.000	9.672	4.188	22.337
Parity						
<=2 RC				1.00		
3-4	-.890	.398	.025	.411	.188	.896
>=5	-1.387	.480	.004	.250	.097	.640
Illness experience						
Yes RC				1.00		
No	-1.944	.273	.040	.143	.084	.245
Knowledge of health problem						
Yes RC				1.00		
No	-1.392	.263	.000	.249	.149	.416
Marital Status						
Married RC				1.00		
Others	-1.372	.316	.000	.254	.136	.471
Pregnancyintended/unintended						
Yes RC						
No	-1.148	.273	.000	.317	.186	.542
Constant	-3.786	.749	.000	.023		

S.E= standard error

Sig. = significance value (P<0.05)

-2LL = 351.91

-2LL = -2 Log Likelihood

HLT = 0.02

HLT = Hosmer and Lemeshow Test

R^2 = 65%

RC = Reference Category

B = Beta coefficient

EXP (B) = Odds ratio

Maternal education was a strong predictor for place of delivery at health Institutions. Mothers whose educational status was secondary high school and above were about 7 times more likely to give birth at health institutions than women with no education (OR= 7.073, 95% CI: 2.763, 18.101).

There was a statistically significant association between place of residence and use of safe delivery services. Women who resided in urban areas were 6 times more likely to use the services than their rural counterparts (OR=5.85, 95% CI: 2.553, 13.404). Obviously, prenatal visit was found to be strong predictor of safe delivery services utilization. Women who had any registered antenatal visit were10 times more likely to give birth at health facilities as compared to those who did not attend ANC service (OR=9.672, 95% CI: 4.188, 22.337).

Women's age and parity had significant impact on delivery care use. Both women's age and parity affects delivery care use negatively. As a result, younger women whose age 35 and above were less likely to use delivery care than women whose age 20-34 (OR=0.546, 95%CI: 207, 1.442). Regarding parity, higher parity women were less likely to use delivery care than lower parity women. Moreover, mothers who have hadn't past history of intra partum complication were 86% less likely to seek safe delivery care than those with who had history of complications(OR=.143, 95% CI: 0.084, .245) (Table 16).

As shown under table 11, those respondents who hadn't knowledge of unhealthy pregnancy as were less likely to deliver at health institutions as compared with those had the knowledge (OR=0.249; CI=0.149-0.416). The probability of home delivery was higher if the pregnancy was unplanned as compared with those who had planned pregnancy (OR=0.377, 95% CI: 0.186, .642). The result also revealed that the likely hood of being delivered at health institutions for those marital status unmarried, divorced, separated, and widowed were less likely as compared with married women(OR=0.254, 95% CI: 0.146.. 0.493).

CHAPTER SIX

6. DISCUSSION ON MAJOR FINDING

Pregnant women are generally recommended a minimum of four ANC visit for reasons like screening, identification and referral with risk factors (WHO, 1996). In this study, coverage of ANC care is low considering minimal physical inaccessibility, in terms of over all levels of service use; most women did not receive maternity care. Only 59.3% all (44.9% rural and 80.3% urban) and 29.1% all (10.5% rural and 56.5% urban) of the women received antenatal and delivery care services, respectively.

This study finding is not consistent with the DHS (2005) in Ethiopia in the Amhara region, which showed that women receive professional assisted antenatal care only about 26.5% and 3.5% of delivery at health facility which is lower than the country average 28% and 6% respectively. This study difference could come from the difference in access to the service while EDHS is not as well as the time gap might have contributed. The study conducted in Gondar (Nigussie M., Hailemariam D. and Mitike G, 2004) and Deri Dawa town (Berhane Y., 2000) showed larger value, which was 79.1% and 78.0% were attended ANC service respectively. This difference might be due to both studies conducted in urban towns and literacy higher in these areas that leads women may have a good accessibility.

Similarly, home delivery is still a norm in many developing countries; maternal mortality tends to be highest where this is the case. In this study, 70.9% of births took place at home. This finding is not in agreement with the previous studies from Butajira (88%), Adamitulu (83%), and Gondar (86.5%), report of Safe motherhood Need Assessment of Ethiopia (1996), and DHS (2005) (MOH, 1996; CSA, 2005; Berhane Y., 2000). All of these studies reported that large numbers of women are delivering at home being assisted by untrained traditional birth attendants. This difference might be due to time gap and the other possible reason could be at this time the government gives priority for the health sector that may help respondents to have more information on antenatal and delivery care services. More than 80% of the respondents reported that their source of information was health institutions.

The higher the coverage for antenatal care when compared to delivery care is consistence with other studies done elsewhere (Melkamu et al, 2005; Yared M, 2002). The lower coverage for delivery care has often been attributable to the unpredictability of labor onset, and the difficulty of travel, particularly long distance, during labor and delivery. Moreover, the relative high cost of delivery care is often blaimed for the low delivery service utilization rate. Utilization rate for both antenatal and delivery care services in the study area are considered to be low even by Sub-Saharan African standard. Results of the demographic found that coverage of ANC ranged from 35% in Niger to 90% in Kenya. Delivery care utilization rates also ranged from a low of 15% in Niger to 69.45 in Zimbabwe (Macro International INC, 1997).

ANC is more effective in preventing adverse pregnancy outcomes when it is sought early in pregnancy and is continued throughout pregnancy (Mwaniki P, and Kambru E., 2002). Only 45.7% of the pregnant women in this study made their first prenatal visits before the fourth month of pregnancy. This indicates that, women in the study area start ANC at relatively late stage of pregnancy. About 30.8% of the mothers who attended ANC did not receive only once tetanus toxoid injection during five year preceding the survey. The difference with that of ANC service coverage may be attributed to miss opportunity at the health facility. Use of at least one requested antenatal care visit positively predicts use of institutional delivery services (Fantahun M., 1992, and UNICEF/WHO, 2002). The results of multivariate analysis revealed that women who have not had antenatal visits were less likely to seek institutional delivery than women who had the visits.

Maternal age is strongly correlated with maternal health care utilization (Yusuf C., and David R., 2000). Since older women differ in their experience and influence of the health seeking behaviour. In general, younger women are more likely to accept modern health care as they are likely to have greater experience to modern medicine and have greater amount of schooling than older women. Another possible explanation for this is that women pregnant with their first child were more cautious about their pregnancies and therefore sought out trained professionals. Older women on the other hand, tend to believe that modern health care is not as necessary due to experiences and accumulated knowledge from previous pregnancies and births. Therefore,

mothers of alder age groups might be less inclined to attend ANC clinics especially if previous deliveries were smooth (Fantahun M., 1992; and Navaneetham K., Dharmalingam A., 2002).

Occupation of the mother is an important predictor for the utilization of ANC and delivery care services in this study. In general, women with formal job (civil servants) were more likely to use ANC and delivery services as compared to housewives. This result is consistent with previous studies in Ethiopia and South Indian States (WHO/UNICEF, 2002; CSA, 2006). Not working women were expected to have lower control over resources in the household. They are less likely to have knowledge about pregnancy and childbirth due to lesser freedom of movement outside the household and less likely to seek information on services available for pregnancy care.

This study also assessed women's reasons for ANC non-attendance. The most frequent reasons given by the individual and through FGD regarding for non- attending of ANC and delivery care services were lack of awareness about ANC, apparently healthy, work overload, male health workers attendant, lack of privacy and unfriendly of health workers who were not committed to their work at health facilities etc. Health workers were also invited to discuss the main reasons for low utilization of ANC and delivery care services in the study area. One of the male nurse said, *"There is a problem of giving services due to lack of equipments for delivery care, specifically vacuumed tube in remote areas but the main reasons for under utilization of maternal health care services were due to cultural influence from generation to generation, and existence of male dominance that led women to feel shy and to decreased utilization of maternal health care services"*.

Therefore, the most frequent reason for not attending antenatal clinics was being a state of good health, i.e.; absence of illness during pregnancy. This indicates that poor awareness of the respondents about the advantage of prenatal and delivery care. Studies in Bangladesh (Rahman, 1989) and in Arsi zone Ethiopia ((Mengiste and Farrow, 1996) reported similar reasons for not attending antenatal care services.

In the study, being married shows a relatively independent effect on mothers timing prenatal services utilization compared to others. While widowed\divorced women were found to be less

likely to be attendances as compared to with married women. Several studies on ANC in relation to psychosocial factors indicated that women who were single were less likely to use ANC than who were married (Mesfin M. and Farrow J., 1996). Thus one would expect greater delay due to less income than women in the households with two potential workers. Moreover, women with unwanted or unanticipated pregnancies may initially attempt to deny their pregnancies to themselves and to conceal them from others. As the result women become less motivated to seek ANC compared with their married counter parts.

Respondents' knowledge of potential on danger signs of pregnancy is an important predictor of ANC services (Mesfin M. and Farrow J., 1996, and, Nigussie M., Hailemariam D. and Mitike G., 2004). Women who experienced concern about any health problems were more likely to be ANC use.

Another finding in the present study is that utilization of ANC was less likely as compared to those mothers who experienced illness and perceived susceptibility to dangerous sign of health problems during pregnancy. This study finding is consistent with a study conducted in Ethiopia (Nigussie M. and Hailemariam D., 2004).

About 55.3% of mothers preferred to give birth in the presence of relatives, trust TBAs, cultural reasons and lack of money as reasons for non-use of the services reasons for not seeking out healthcare that accounted for half of maternal deaths (CSA and ORC Macro, 2006). This implies significant proportion of women seek for help from skilled birth attendants after developing obstetric complications and other traditional interventions failed. Studies in India and Iraq showed lack of recognition of perceived serious of health problems as a significant.

Results of this study revealed that utilization of delivery care at health institutions were significantly associated with the level of education. There is strong evidence from the analysis of the data to validate the prevailing association that many with some higher level of education (secondary and above) were seven times more likely to use safe delivery services than those with lower education levels. Most maternal and child health studies conducted in developing countries strongly agree with this findings (Mesfin M. and Farrow J., 1996; Addai L., 1986). This may be

the fact that, education is likely to enhance female autonomy so that women developed greater confidence and capacity to make decisions about their own health and more educated mothers are less influenced by traditional practices that are contrary to modern health care.

The number of previous pregnancies is an important determinant for utilization of ANC services in this study and it is consistent with study done in India (Lwango S.and Lemeshow S., 1992). Higher parity less likelihood of using the ANC services and delivery care service in the study areas because higher parity women could be due to time and resource constraints faced by those with large families, and greater experience. And this also could be anticipated in our society where marriage is universal first pregnancy attracts much more family attention than subsequent one.

Moreover, women with more than two living children and those residing in rural areas were less likely to be consistent in their use of maternity care services for subsequent pregnancies. One possible reason for inconsistent use of the service among women with more than two living children is that these women might develop confidence and become less motivated to use maternity care if they had no problem in their previous pregnancies. It is also possible that the accessibility and quality of maternity care service might limit women's ability to seek care for subsequent pregnancies. In addition such finding might also suggest that competing time demands, particularly for those women with many children, may effectively limit women seeking attention for them, particularly for preventive reason such as antenatal care.

In particular, for rural women access to maternity care services is relatively very low, women had to travel long distance to get the nearest health facility, which has a negative impact to maintain behavioral consistency. Therefore, health planners has to be aware of the existing behavioral inconsistency in the utilization of maternity care services from one birth to the next and advice the necessary measure to minimize such problems.

CHAPTER SEVEN

7. CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

In conclusion, this study demonstrated that utilization of maternal health service is inadequate in general, as clearly depicted by the major maternal health indicators (antenatal and delivery services) during the period of five year preceding the survey. The most important factors influencing utilization of antenatal and delivery care services were demographic and socio-cultural in nature.

Quality of ANC and delivery care received (adequate or some) were significantly associated with maternal age and maternal and paternal education, place of residence, parity and number living children. These findings indicate that there are differentials in the use of maternal health care services.

The significance of the results of this study is that education of both partners, urban residence, Illness experience on previous pregnancies and knowledge on dangerous sign of pregnancy, all increase probability of use of maternal health care services. The implication for these observations is that more effort should be exerted in ensuring education of couples, increasing accessibility in rural areas and formulation of policies and programmes to improve utilization of MHC.

Apart from serving as a measure of socio-economic conditions, type of place of residence can be a proxy for accessibility, such that urban residents usually have more access to services than their rural counterparts. Place of residence had an effect only on the use of delivery services. The results reveal that rural residents had less probability of seeking a hospital delivery and professional assistance during delivery. At this point, it is worth remembering that in rural areas, most health institutions that offer antenatal services do not have facilities for delivery.

The present study revealed that the majority of women sought at least one prenatal visit from modern health care providers during their recent pregnancy. However, more than half of the women who attended antenatal care were delivered at home and almost all of these deliveries were attended by TBAs and Close relatives\neighbors.

The main reasons given by the individual women for not attending ANC were apparently healthy, work overload, distant health facility, and lack of awareness. The main reasons given by the individual and through FGD resorting to home delivery by women were presence of relatives nearby, more trust on TBAs, apparently healthy and male health workers assistance.

Among the different reasons mentioned by women that activate them from the utilization of ANC and delivery service was quality of services.

From the results obtained, the conclusion drawn is that women in Gozamin woreda receive some maternal health care, but a large percentage is not adequately covered.

7.2 Recommendations

The findings of this study have important implications for improving utilization of maternal health care services and further research. Based on the above finding of the study the following recommendations were made: -

- The study found that ANC and delivery care service had a great gap. Then the study recommend Gozamin Woreda Health Office that the scope of coverage of delivery services should be increased.
- Another challenge is to overcome barriers of access to maternal health care services was place of residence. Therefore, maternal health care services should be made more accessible to rural women.

- Female education was low and also associated with patterns of maternal health care service use. Therefore, Education Office has to increase the level of education in the Woreda.
- Age at first marriage of women has negative effect on utilization of maternal health care services. Despite the legal provision of marriage, early marriage is more common in the country .So program should focus on creating awareness about marriage law and marriage law should be strictly implemented.
- More IEC are required for all age levels to the communities in Gozamin woreda about the existence and importance of seeking maternal health care services by health workers.
- Since pregnancy related complications are the main reasons for utilization of health facilities. Therefore, community awareness program must focus on the danger signs related to pregnancy and childbirth by health providers.
- Improving training and/or refreshment of TBAs, with the new role they should play in handling pregnancy and childbirth and integrate with in the formal health care system by giving Priority training for female skilled delivery attendants
- The relationship between use of maternity care services and maternal mortality is another area that needs research in Gozamin Woreda.

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ANNEX 1: Questionnaire in English Version

Addis Ababa University

College of Development Studies
Institute of Population Study

Questionnaire for community based survey on **factors influencing utilization of maternal healthcare services** in Gozamin woreda of East Gojjam Zone of Amhara Region

Greetings
Hello! My name is _____ from **Gozamin woreda** of **East Gojjam zone of Amhara Regional Health Bureau**. I am working in research team of Addis Ababa University college of Development Studies, Department of Population Studies. We are conducting a study of mothers Antenatal care attendances during pregnancy and place of delivery. You are kindly requested to be included in the study, which will have importance in improving maternal and child health services. The interview will take about 50 minutes. No information concerning you, as individual will be passed to another individual or institution without your agreement. Your participation is voluntary and you have the right to not participate fully or partially. If you agree to be included in the study I will start my questions by asking general identification points. Only honest answers would contribute to improvement of health planning.

The study has approval from Addis Ababa University. “My I continue?”
If yes, continue interviewing
If No, thank and stop interviewing

Name of the interviewer_____Sign. _____ Date of interview_____
Name of the supervisor. _____. Sign. _____ Date_____

1. Household identification_____
01. Questionnaire code_____
02. Residence: Kebele_____
03. Gott_____
04. House number_____

N.B Please fills on each answer sheet as follows:
- Time of start of interview_____
- Time of end of interviewed_____

Part I. Socio Demographic characteristics

No	Questions	Coding categories	
101	How old are you?	_____age in complete years 98. Don't know	
102	Place of residence?	1. Rural 2. Urban	
103	What is your religion?	1. Orthodox 2. Muslim 3. Catholic 4. Protestant 99. Other (specify)	
104	To which ethnic group do you belong?	1. Amhara 99. Other specify	
105	What is the highest level of education you completed?	You	Your husband
		1. Never attended 2. Read and write only 3. Primary school 1 to 6 4. Junior school 7 to 8 5. Secondary school & Above 99.Others specify----------	1. Illiterate 2. Read and write only 3. Primary school (1-6) 4. Junior school (7-8) 5. Secondary school & above 99. Others specify------
106	Have you done any work in the last 12 months?	1. Yes 2. No	
107	Occupation?	You	Your husband
		1. Housewife 2. Maid servant 3. Civil servant 4. Merchant 99. Other (specify)	1. Farmer 2. Daily laborer 3.Civil servant 4. Merchant 99. Others specify--------
108	What is the average family income per month?	_____birr/day 98. Don't know	
109	What is your current marital status?	1. Currently married 2. Divorced 3. Widowed 4. separated 5. Others specify------	
110	How old were you at your first marriage?	----------complete years 98. Don't know	
111	How old were you when you had your last child?	Age in complete years---------- 98. Don't know	
112	Do you have any sons or daughters to whom you	1.Yes 2. No ——————→skip to 114	

	have given birth who are now living be with you?	
113	How many sons and daughters live with you?	1. Sons ---------- 2. Daughters----------
114	Do you have any son or daughter to whom you have given birth who are alive but do not live with you?	1. Yes 2. No ----------skip to 116
115	How many sons and daughters alive but not living with you?	Sons……. Daughters……
116	Have you given birth to a boy or girl who was alive but later died?	1. Yes 2. No ----------skip to 218
117	How many sons and daughters have been died?	Sons……. Daughters…….
118	Children ever born (add 214+216+218)	Total children ever born_____
119	How many is your household family size?	…….. Person

Part 2: Pregnancy related characteristics

N0	Questions	Coding category
201	Was the pregnancy intended?	1. Yes 2. No
202	From where do you think a pregnant woman could get ANC?	1. health institution 2. TBA 3. Relatives/friends 4. CHA 99. Others specify
203	If the answer is yes, from where did you get this information?	1. health institution 2. Radio/TV 3. TBA 4. Health provider 5. Relatives/friends 6. Female association 99. Others specify
204	What for do you think would be the benefits of ANC?	1. Maternal health 2. Child health 3. Both 98. Don't know 99. Others specify
205	Did you see any one of the antenatal cheek ups for the recent child birth?	1. Yes 2. No ⟶ skip to 218
206	If yes, at what gestational age did you go?	1. 1-3 months 2. 4-6 months 3. 7-9 months 98. Don't know
207	If yes, what was the total number	1. Once

	of visits?	2. Two 3. Three 4. Four and more
208	If you went for ANC check-ups to which health institution did you go?	1. Hospital 2. Health center 3. Clinics 99. Others specify
209	Why did you go to that particular health institution? (Multiple response is possible)	yes No 1. Close to where I live--------1 2 2. Little or no expense---------1 2 3. B/r of health workers is best- 1 2 4. Convenient time of services---1 2 5. High quality of services--------1 2 99. Other specify----------1 2
210	If you went for ANC check ups have you ever an injection on the arm to prevent against T	1. Yes 2. No
211	If yes, how many times have you received such injections?	1. Once 2. Two or more
212	What is the main reason you initiated for ANC follow up?	1. Health problem 3. To start regular check up 99. Other specify
213	If you attended ANC, was health education given during each visit?	1. Yes 2. No 99. Don't know
214	If health education was given, on what topic?	Yes No 1. ANC- ----------1 2 2. F/P----------1 2 3. Baby care----------1 2

		4. Breastfeeding……..1 2 98. Don't remember-…1 2 99. Other specify--------1 2
215	Did you pay fee during your antenatal care?	1. Yes 2. No
216	If yes, how do you feel about the payment for ANC?	1, Unaffordable 2. Fair 3. Very small
217	How much on average did you pay for ANC service per visit?	----------birr
218	Do you think that waiting time was a problem for attending ANC?	1. Yes 2. No
219	How much time on average did it take from home to the health facility?	----------hours
220	If you did not attend ANC? Why?	Yes No 1. No or little knowledge about ANC clinics----------1 2 Being in a state of good health…....1 2 Too busy to attend ANC clinics…..1 2 Expenses for ANC clinics are Unaffordable ----------1 2 ANC clinic too far from my home--1 2 Waiting time is too long at ANC ---1 2 Husband disapproval ----------1 2 8. Poor quality of the services-------1 2 9. Because of religion----------1 2 10 .ANC attendance is useless ------1 2 99.Others specify_____ 1 2

Part III. Preference utilization of Maternal Health care Service

No	Questions	Coding Category
301	Should a healthy pregnant women attend ANC clinics	1. Yes 2. No
302	If yes at what month/gestational age should a pregnant woman attend ANC?	1. 1-3 months 2. 4-6 months 3. 7-9 months
303	Do you know dangerous health problems related to pregnancy?	1. Yes 2. No
304	If yes, can you mention some of them? (More than one answer is possible)	Yes No 1.persistant vomiting------1 2 2.Anemia----------1 2 3.Leg swelling----------1 2 4.Headache----------1 2 5.Vaginal bleeding---------1 2 6.Hypertension----------1 2 7.Seizurer----------1 2 8.Abnormal fetal position- 1 2 9.Obstraced /pronged labour----------1 2 10.Retained placenta------1 2 99.Others specify----------1 2
305	Did you experience a health problem during the last year pregnancy?	1. Yes 2. No 98. Don't remember
306	Did you think of developing dangerous health problems during pregnancy?	1.Yes 2.No 98.Don't know
307	If the answer is yes, please choose the	Yes No

	answer? (Choose more than once)	1.persistant vomiting------1 2 2.Anemia----------1 2 3.Leg swelling----------1 2 4.Headache----------1 2 5.Vaginal bleeding---------1 2 6.Hypertension----------1 2 7.Seizurer----------1 2 8.Abnormal fetal position- 1 2 9.Obstraced /pronged labour----------1 2 10.Retained placenta------1 2 99.Others specify----------1 2

Part IV. Factors Influencing on the choice and assistances delivery and during delivery

NO	Questions	Coding category
401	Where did you deliver your last baby?	1. Hospital 2. Health center 3. Health station/clinic 4. Home, 99. Others specify--------
402	Why did you want to deliver your baby in that particular place? (If in a health institution)	1. Close to where I live High 2. quality services 3. Good approach of health workers 4. Little expenses to deliver in this 5. particular institution

		99. Other specify___
403	If you delivered at home. Why? (More than one answer is possible)	Yes No 1. Expences for delivery at health institution is unaffordable-----1 2 2. Dilike behaviors of health workers at health institution---1 2 3. Wishes to deliver at home where relatives are nearby------1 2 4. More trust on TBAs/relatives than health workers a t health institution----------1 2 99.Others specify----------1 2
404	If you delivered at home who assisted you during delivery?	1. Health workers 2. TBA 3. Close relatives/friends 4. Neighbors 5. No one 99. Others specify_____
405	What were your husbands or partner's attitude towards ANC attendance?	1. Positive 2. Negative 98.Don't know
406	If you want to deliver in the health facility, who will make the final decision?	1. Just me 2. My husband 3. Our relatives 99. Others specify_____

Part Five: Quality of antenatal care

No	Questions	Category
501	How long was the time you spent in waiting to get ANC services?	1. Short 2. Fair 3. Long
502	Did you think that lack of privacy was problem at ANC?	1. Yes 2. No 98. Don't know
503	What is your feeling about the quality of ANC given?	1. Good 2. Satisfactory 3. Poor
504	Do you have confidence on the service provided at that health institution	1. Yes 2. No 98. Don't know
505	How do you rank the behavior of health workers providing ANC service?	1. Very good 2. Good 3. Fair 4. Bad
506	How do you feel about the distance from your home to the nearest health institution? (Health center, Clinic)	1. Very close 2. Average 3. Too far
507	How long does it take to travel from your home to the nearest health institution?	_____Hours

Annex 2: English FGD Guide

Introduction

Good morning! Well come to our group discussion.

My name is----------. My collogues near to me is----------. We came from the Regional Health Bureau.

Read the following as it is:

"After we conduct some brief introduction, we will be talking about several different issues. We will be asking you questions about your overall experience with the maternal healthcare services in your locality and questions pertaining to pregnancy related health problems, preferences to place of delivery and factors influencing utilization of the available health services. Then, we will conclude the session by asking you for your recommendations on how such program might be implemented in your community in any way in the future.

Would you be willing to participate in the discussion? If yes, proceed, if no, thank and stop the discussion.

Name of the moderator. ---------- ------- Sign----------.

(Signature of the moderator certifies that consent has been obtained verbally).

Date----------Time----------.

Preparation

Topic; Community perception of Antenatal care utilization and preferences to place of delivery

Target audience: pregnant women, husbands, religious & community leaders and health workers.

Objective of the discussion

- To explore the community's understand and perceptions of Antenatal care utilization and preference to place of delivery in Gozamine woreda

- To assess factors affecting utilization of maternal health care services particularly Antenatal and delivery care, including TT vaccination.

Description of the participants

A total of four focus groups, each comprising a minimum of eight and a maximum of ten participants will be involved.

1. Next we would like to hear a little about your experience or knowledge about antenatal care, childbearing and postnatal care service.

1.1. Who can tell us about antennal, delivery and postnatal care services?

1.2 Is there any health education given about ANC, DC and how much is its importance?

1.3 Who would like to tell us dangerous health problems related to pregnancy and childbirth and its cause, consequences and prevention methods?

Pregnancy related risks and antenatal care

2. Now we would like to ask you specific questions about health problems related pregnancy and childbirth.

2.1. Do you think that a healthy pregnant woman should attend ANC? why?

2.2. Where do you think is the best place for ANC? Why?

3. What are the primary reasons for pregnant women not attend ANC clinics?

4. What are the primary reasons pregnant women should attend ANC clinics?

5. Where do you think the best place for delivering a child? Why?

6. Who do think the best person to assist during delivery? Why?

7. What is your opinion about ANC, and preferences to place of delivery from local cultural and religion point of view?

8. Which groups of the population do you expect not to utilize the services and what are their reasons?

Annex 3: Tolerance and VIF values to check multicollinearity effects in the models

Variables	Collinearity Statistics			
	ANC model		DC model	
	T	VIF	T	VIF
current age of respondent	.915	1.093	.917	1.090
respondents residence	.373	2.680	.352	2.840
respondents of education status	.372	2.687	.360	2.776
Husband eduction status	.653	1.531	.621	1.610
work status	.679	1.473	.649	1.541
occupation of respondents	.607	1.647	.610	1.639
Husband occupation	.326	3.066	.381	2.626
current marriatal status	.898	1.114	.857	1.167
Number of living children	.386	2.592	.385	2.599
family size	.865	1.156	.889	1.124
Average parity of last child	.354	2.826	.365	2.742
Illness experienced for the recent pregnancy	.770	1.298	.688	1.453
knowledge of dangerous health problems related to ANC	.887	1.127	.854	1.171
Was pregnancy planned?	.859	1.164	.848	1.179
place of delivery care	.496	2.018	-	-
ANC care status	-	-	.614	1.629

Source: Own survey data, 2010

T= Tolerance

VIF=Variance-inflation factor

Annex 4: Goodness of model fit

Model Summary for delivery

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	351.909(a)	.455	.649

Hosmer and Lemeshow Test of delivery

Step	Chi-square	df	Sig.
1	17.986	8	.021

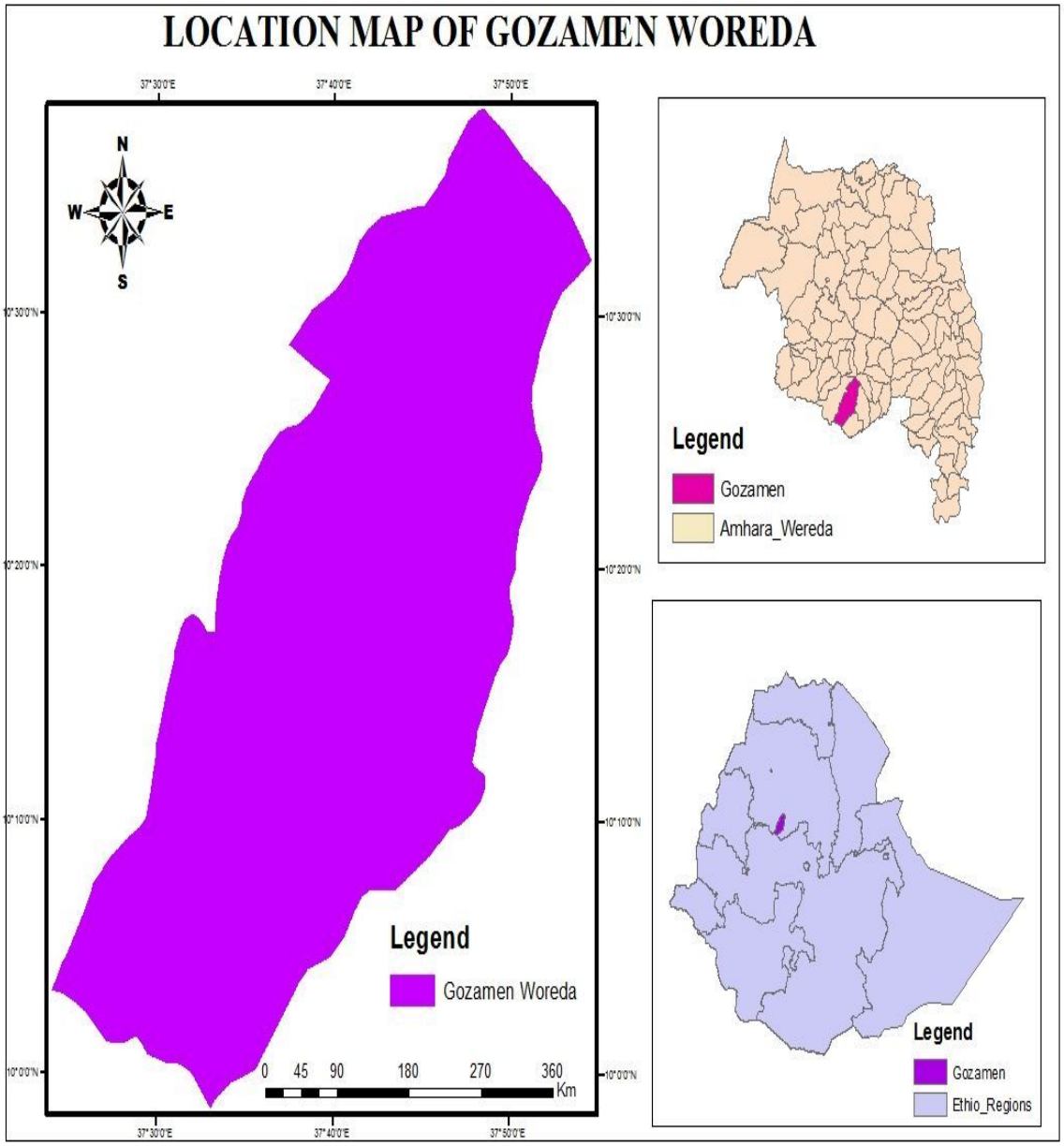
Model Summary ANC

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	396.969(a)	.491	.662

Hosmer and Lemeshow Test of ANC

Step	Chi-square	Df	Sig.
1	18.618	8	.017

Appendix 5: Map location of Gozamin Woreda



DECLARATION

I, the undersigned, declare that this thesis is my original work, has not submitted for a degree a degree in any other university, and that all sources of materials used for the thesis have been duly acknowledged.

Name: Niguss Berihan

Signature: _____

Place: Addis Ababa University

Date of submission: 30/6/2010

Advisor: Name: Dr. Hirut Terefe

Signature: _____

Date: _____