

**ANTENATAL HEALTHCARE UTILIZATION IN MATERNAL
HEALTH FACILITIES IN LUSHOTO DISTRICT, TANGA**

**ANTENATAL HEALTH CARE UTILIZATION IN MATERNAL HEALTH
FACILITIES IN LUSHOTO DISTRICT, TANGA**

By

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**A Dissertation to be submitted in Partial Fulfilment for the requirement for the
Award of the Degree of Masters of Science in Economics of MzumbeUniversity**

2019

CERTIFICATION

We, the undersigned, certify that we have read and hereby propose for reputation through the Mzumbe University, a dissertation entitled “**Antenatal Healthcare Utilization in Maternal Health Facilities in Lushoto District,Tanga**” in partial fulfillment of the requirements for the award of Master of Science in Economics of Mzumbe University.

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DEDICATION

I commit this work to my loving parent Mrs. Setonga, My young brother and best friend Antonia Castro for their daily prayers, tolerance, and unconditional love, financial, moral and material help. Special thanks to my mother Mwantum Robert. This achievement is equally yours.

ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
ANOVA	Analysis of Variance
DHS	Demographic and Health Survey
ELCT-NED	Northen Eastern Diocese Evangelical Lutheran Church
HIV	Human Immune Virus
KM	Kilometers
LDC's	Less Developing Countries
MDG's	Millenium Development Goals
MHA	Muea Health Area
MICS	Multiple Indicator Cluster Survey
MMR	Maternal Mortality Rate/Ratio
NGO's	Non- Governmental Organizations
OLS	Ordinally Least Square
PNC	Postnatal Care
SDG's	Sustainable Development Goals
SPSS	Statistical Package for Social Science
UHC	Universal Health Coverage
UN	United Nations
UNICEF	United Nations Children's Funds
USA	United State of America
WHO	World Health Organization

ABSTRACT

In most developing countries maternal mortality remains large public trouble. One number of strategies to improve maternal health in both public and personal health facilities is the implementation and appropriate use of proper ANC services in which at least 4 visits is suggested. ANC utilization is influenced by various factors which differ in various regions and countries. The study aim was to establish the determinants of ANC services utilization in maternal health facilities in Lushoto district, Tanga. The study design was a case study which was conducted among recently delivered mothers seeking ANC in public and private maternal health facilities in Lushoto district. Antenatal mothers included were those who were aged 15-49 years. A sample of 396 antenatal mothers for the study was obtained. Purposive sampling technique was used in the study whereby submissive respondents who met the criteria of being selected were enrolled cumulatively until the required sample size was obtained. Structured questionnaires were used to obtain data from study participants and the structured interview was used for mothers who were unable to fill the questionnaires. After data collection, data was then analyzed using descriptive statistics which involved frequency distribution tables and percentage and employed logit and ordered probit regression analysis in analyzing utilization of ANC and factors upon frequency of visits of mother in health facility respectively. The results of the study showed that utilization of ANC services is influenced by marital status of expectant mother, expectant mother's education level, facility type, frequency of visit and waiting time for care whilst transport costs, income, use of public facility and insured mother influences frequency of visits of recent delivered mothers public and private health facilities in Lushoto district. The study recommends on the promotion and provision of education based on the ANC services package and be aware about the number of visits recommended by WHO which provides the need to educate pregnant mothers especially of younger ages on the need to utilize maternal health services including ANC so as to achieve WHO minimum requirement of number of visits on ANC and reducing maternal mortality under SDG 3 and 5.

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CHAPTER ONE

INTRODUCTION

1.1 Background information

Women's health status is a great constituent within the socio and financial improvement of the societies. The worth of women's fitness is important to societies due to the fruitful and useful roles they adopt relying on their fitness and schooling to beautify their exceptional health lifestyles. Consequently "the healthcare that a mom receives throughout being pregnant, at the time of delivery and shortly after delivery is vital for the survival and well-being of every mother and kids" (Akouwah et al., 2018).

Globally the coverage of antenatal care is an achievement story. At the least as soon as, approximately 86% of pregnant women have got right of entry to ANC below the supervision of skilled and trained fitness employees, but approximately sixty-two percent accounted to receive at the least four ANC visits (UNICEF, 2016). WHO recommends a minimum of 4 antenatal care visits. But, international estimates imply that only about half of all pregnant women get hold of this recommended amount of care (WHO, 2016).

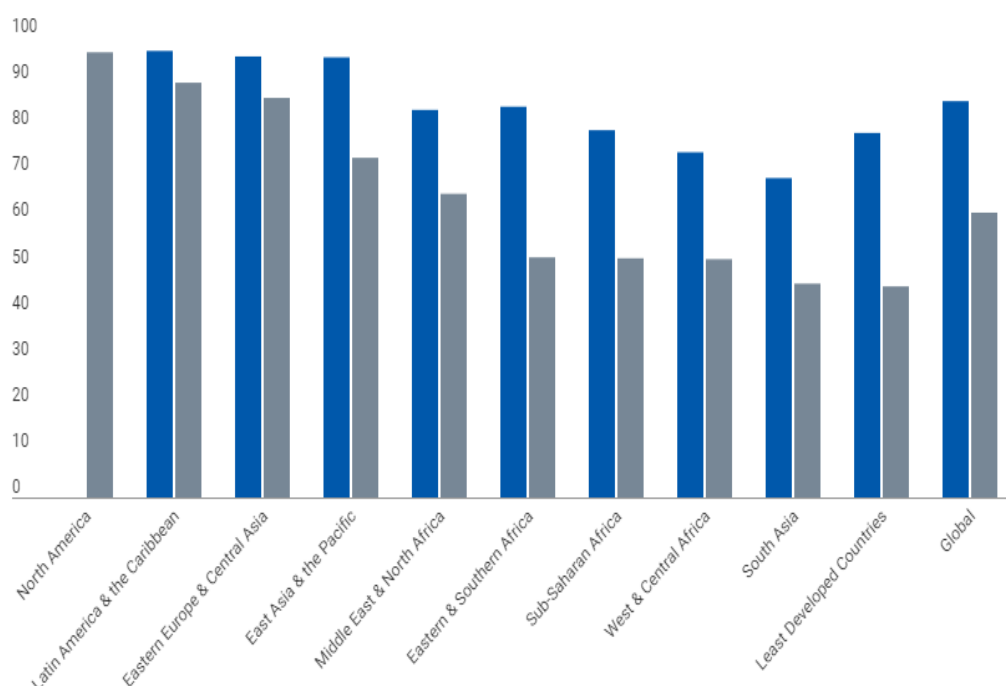
In developing countries, the efforts towards the progress of the coverage of ANC focused on some issues such as frequency and timing of visits also the characteristics of users and non-users of the ANC. Most of ANC was established along with the line of those in developed countries but with a little adjustment for local conditions. It has emerged that some components of standard antenatal care have been subjected to precise scientific evaluation with the aim of determining their effectiveness. In 2001, WHO published a randomized controlled trial of a new model of ANC and gives a systematic review of other trials which looked at how the effectiveness of different models of antenatal care is. This led to the growing awareness of around the key elements of ANC that are likely to improve maternal health or health outcomes. The new WHO model of ANC separate women into two groups are those who only need a regular routine of ANC including 75% some of the total population of the pregnant women and those with specific health conditions or factors that require special care

as 25% of the pregnant women. With the regards of WHO guidelines the timing and content of ANC are specific according to gestational age. The guidelines insist that “only examination and tests that serve an immediate purpose and they have been proved to be beneficial should be performed” (WHO, 2016). These examinations are the measurement of blood pressure, testing of urine for bacteria and blood test to detect syphilis and serve anemia are also considered to be elements of ANC although the routine for weight and height measurement is considered optional (WHO, 2016).

In Sub-Saharan Africa, it's far anticipated that about 52% of pregnant women have at least one ANC visit as greater than in South Asia that is 46% visits. The insurance of 4 or extra ANC visits as which include the number of visits given over a trimester is vital to assess. Honestly, the effectiveness of a given antenatal intervention together with tetanus vaccination, malaria vaccination and prevention of mom to baby transmission of HIV depends upon the repeated wide variety of visits and the trimester which they definitely occur. In Africa, the proportional percentages of pregnant women attending the endorsed 4 extra visits are 6% accelerated over 10 years. Further, over 10 years the percentage of women obtained ANC in the first six months of being pregnant extended by way of 10 % quicker than the general growth of the ANC insurance (Lincetto *et al.*, 2015).

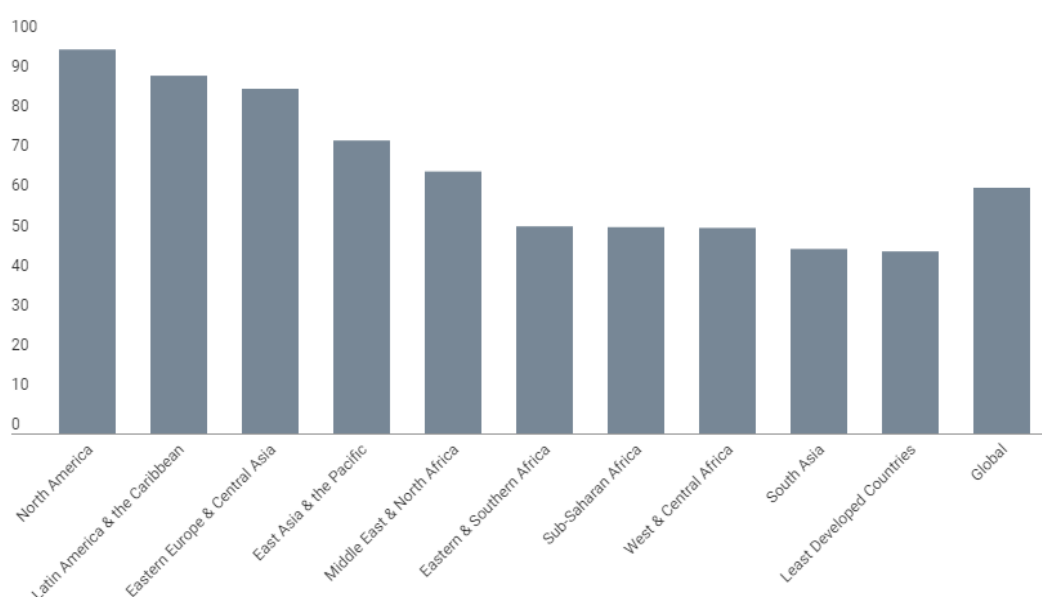
Regional coverage of at the least one antenatal care go to with professional health personnel ranges from 69% in South Asia to over 95% in Eastern Europe and central Asia, East Asia and Pacific. Most pregnant girls get admission to skilled antenatal care at least once, but only 60percent obtain the advocated minimum of four antenatal care visit (UNICEF, 2015).

Figure 1.1 indicating the proportions of women aged 15–49 attended at least as soon as in the course of being pregnant by way of professional fitness personnel (ANC1) and percentage of women attended with the aid of any provider at least 4 times (ANC4), via UNICEF area, LDCs and global, 2011–2016.



Source: UNICEF international databases, 2016, based totally on Multiple Indicator Cluster Surveys (MICS), Demographic and Health Surveys (DHS) and other nationally representative sources.

Figure 1.2 Percent of women aged 15–49 attended through an issuer at the least four instances (ANC4), by way of UNICEF locality, LDCs and global, 2011–2016 international distribution of women attended at the least 4 times through any issuer, and the percentage of women aged 15–49 attended at the least as soon as all through being pregnant by means of skilled health personnel (ANC1).



Source: UNICEF international databases, 2016, primarily based on Multiple Indicator Cluster Surveys (MICS), Demographic and Health Surveys (DHS) and other national consultant resources.

Utilization of health care is a totally critical key inside the improvement of health outcomes in middle and low-profits nations. The information of get admission to and usage of health services is large in making plans for allocation of health resource into special ranges of health system and monitoring the achievement of well-known as UHC of which the WHO advise as a means to make certain equity within the utilization of health services (Ngugiet *al.*, 2012). Most of ANC interventions are known to be effective may be supplied with the aid of midwife or nurse or lower-degree health care employees inclusive of auxiliary nurse, number one health care employees and network healthcare employees provided that they have the essential training equipment, and supplies and properly supervised (Ngugiet *al.*, 2012).

In 2002 WHO followed 4 visit model (focused antenatal care) and it's been used for the reason that then with the intention of providing goal orientated and centered care which increases the detection and management of complications at some stage in pregnancy. In 2016 WHO launched new guidelines on getting right of entry to ANC for the pregnant women. The modification of these guidelines became encouraged by way of the consistently excessive maternal death particularly in developing nations where death continues to be 14 more instances higher than in developed countries. WHO advocated growing antenatal care visits from the modern four to 8 fundamental visits with the intention of making sure a selection of care at some point of pregnancy, delivery and the postnatal period (WHO, 2016).

However, some evidence suggests that a higher frequency of antenatal care contacts by women and adolescent girls with the health system is connected with the discount of the likelihood of stillbirths. In an evaluation of 4 minimum number of visitors, it's far revealed that at the very least 8 visits can decrease death by up to eight per a thousand births. The new guidelines recommended the primary visits to be 12 weeks of gestation with next visits at 20, 24, 28, 32, 36, 38 and 40 weeks of gestation period. It also furnished all through each of the eight visits. beneath the first model, the first visits have been encouraged at 16weeks, the second at 24 to 28 weeks of gestation and 1/3 and forth as at 32 weeks and at 36weeks of gestation. The release of a new version of antenatal care is astep toward the implementation of Sustainable Development Goals (SDG's). In keeping with Sustainable Development Goal number three which enures healthy lives and promote well being for all at all ages by intending to reduce global maternal mortality ratio to be less than 70 per a 100,000 live birth and decreasing neonatal mortality to at least 12 per 1,000 live births by 2030 (WHO, 2016).

Furthermore, growing antenatal care must be a priority in Tanzania where maternal and neonatal death remains under expectation. Frequency of visits gives an opportunity for health care providers to deliver care, provide support and statistics to pregnant women and to prevent unfavorable pregnant outcomes. Tanzania is a way far from achieving the Sustainable Development Goal of ensuring health lives and promote well-being for all at all ages by decreasing Maternal Mortality (UN,2017). Every year women die from pregnancy complications for every 100,000 live births as compared to 2009/10 DHS findings of about 578 maternal deaths occur for every 100,000 births. Nearly all 98% of women aged 15-49 get antenatal care from a skilled health provider, the timing and qualities of ANC are also critical. In spite of excessive insurance of ANC coverage, only one in four women had their first ANC visits in the first trimester and 1/2 of the women (51%) made four+ ANC visits. Almost two-thirds of births (63%) occurs in public area health centers. But, 36% of births arise at public sector health facilities. This is the fact that women with no training and education are most likely to deliver at home. Almost 1/2 of births in 2004/05 were added at the health center as compared to 63% in 2015/16 (TDHS 2015/16).

Developing countries still face the obstacles on poor implemented ANC programs with irregular visits and long waiting time including poor feedback to women. Studies have clearly indicated that countries with high maternal, prenatal and neonatal mortality have inadequate use of health services. As such, increased emphasis is being placed on the need for standards of care as well as mechanisms which deal with the barriers to provision and use of health care (WHO, 2006). A study in Hadiya zone Ethiopia found that the majority of mothers who attended ANC did not receive an adequate number of visits and initiated the visit later than recommended by WHO. The ANC service utilization was significantly influenced by maternal age, where mothers aged between 25-29 years were less likely to utilize the service than women aged 35 years and older and positive attitude of the husband was also a significant factor related to ANC service utilization (AbosseWoldie&Ololo, 2010). Level of education of mother influences the use of ANC, for the mothers with primary education level were more likely to attend ANC than women those who are

unable to read and write. The study reveals further that women's availability of time is also important as women spend more of their time on their responsibilities for children caring, fetching water, collecting oil, cooking, cleaning, and trade more than their health (AbosseWoldie&Ololo, 2010).

1.2 Statement of the problem

Antenatal care is the care given to pregnant women so that will have health pregnant with the aim to diagnose disease or complicating obstetric conditions and to provide information about pregnancy and delivery. Antenatal care is a vital determinant of high maternal mortality rate and one of the simple additives of maternal care on which the lifestyles of mothers and infants depend. As a consequence, Antenatal care is a key strategy to improve maternal and health of a child. Number of studies have discovered that inappropriate antenatal care has been associated with mother pregnant outcomes. Lately, the technical operating organization of global health organization (WHO) has advocated a minimum level of care to be 8 visits at some stage of being pregnant to reduce the maternal morbidity and mortality (Ali *et al.*, 2018).

In an effort to improve ANC services and enlarge the extent to attain the services and make the appropriate use of existing health service, the authorities of Tanzania have prioritized health care mainly maternal healthcare back 1970s through its guidelines and countrywide programs along with Expanded Program of Immunization, safe Motherhood Initiatives and Integrated Management of Child Health and greater recently improving maternal health services is the first-rate preference inside National Road Map Strategic Plan to improve Reproductive, Maternal, new child, infant and Adolescent health in Tanzania (One Plan II, 2016/2020). Tanzania's Demographic and Health Survey (TDHS) indicated few improvements in maternal health service usage during the last ten years, with use of facility-based delivery which improved by 34% from 2005 to 2016 and use of postnatal care increases by 165% for the equal period (TDHS, 2005-2016).

However, several initiatives aim to increase admission to ANC services which include the provision of ANC that is freed from rate. Presently, the focal point is

especially on the adoption and implementation of ANC practices within maternal and child health services program.

In spite of the efforts made through by the authorities closer to enhancing maternal health services, of all of the estimated maternal demise occur throughout all developing nations approximately 450 as per 100,000 live births die for the duration of being pregnant, childbirth and the postpartum period. In step with UNICEF, (2012) anticipated that approximately 3 million newborns die within the first month of existence wherein among 2.1 to 3.8 million infants are stillborn. ANC is one among the endorsed intervention in decreasing maternal and child mortalities. ANC visit prevalence varies in different regions wherein the prevalence is globally 97 % and is low in Sub-Saharan Africa specifically in Congo (Gross and Ebu, 2015). It indicated that the superiority of ANC goes to in Tanzania has extended from 90% in 2011 to 98% in 2016 (TDHS, 2016). Notwithstanding the increase of ANC visit is effective and about 24% of pregnant women were said to begin their visits during the primary trimester as encouraged by WHO (TDHS, 2016). About 94% of the women in Lushoto attended ANC but only 16% adhered with the recommended schedule as most of the women in Tanzania postpone to make the maximum of encouraging visits (TDHS, 2016). The failure to make the advocated visits is probably because of different factors which include women's' education level, income, occupation, and distance to the facility, type of facility, transport costs, health insurance cover and waiting time for care. Hence the study aims to analyze the determinants of ANC services utilization in public and private maternal health facilities in Tanzania.

1.3 Research objectives

1.3.1 General objective

The general objective of the study was to analyze the major determinants of antenatal healthcare utilization in health facilities in Lushoto district.

1.3.2 Specific objectives

The specific objectives of the study will be:

- i. To determine the proportions of women's knowledge of the ANC services in maternal health facilities in Lushoto district.

- ii. To analyze the factors affecting ANC healthcare utilization in health facilities in Lushoto district.
- iii. To analyze the factors influencing expectant mothers' frequency of visits to ANC services in maternal health facilities in Lushoto district.

1.4 Research Questions

The research questions of the study will be as follows:

- i. What are the proportions of women's knowledge of the ANC services in maternal health facilities in Lushoto district?
- ii. What are the factors affecting ANC healthcare utilization in maternal health facilities in Lushoto district?
- iii. What are the factors influencing expectant mothers' frequency of visits to ANC services in maternal health in Lushoto district?

1.5 Significance of the study

Antenatal care is the only of a totally crucial indicator for maternal health in any facility, especially within the sub-Saharan African countries. With consideration of the elements that determine the ANC utilization, antenatal care services may be advanced with the aid of taking into consideration the elements that customers are approximately extra sensitive. This can help in greater effective allocation of scarce health resources.

This study shed light on the role of the authorities should play in boosting delivery and enhancing high-quality antenatal care. That is viable because the pregnant women demand antenatal care usage and this gives the demand model that can be utilized by those health planners or policymakers in predicting possible outcomes of different policy actions specifically on approaches of enhancing the utilization of ANC and maximizing utilization level by influencing those attributes.

1.6 Organization of the study

The study was organized into six chapters. Chapter one provides a background of the study, problem statement, and research objectives, and research questions, significance of the study as well as the organization of the study. Chapter two centered on the literature including theoretical review of relevant materials and works related to the research along with the empirical review and conceptual framework. Chapter three contained research methodology which included research design, study area, study population, sample size and sampling techniques, data collection methods, data analysis and unit of analysis, variable measurements and descriptions, validity and reliability as well as the model estimation and ethical considerations. Chapter four described the presentation of findings. Chapter five covered the discussion of findings. Lastly, chapter six provided the summary, conclusion, policy implications, recommendations, limitation of the study and areas for further studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Definitions of important key concepts

2.1.1 Antenatal Care

Alkema et al. (2015) defined antenatal care as regular care of pregnant women provided between the period of conceiving and onset labor. It's far one of the intervention possibilities to offer pregnant women with prevention and control of current capacity complications and reasons for maternal mortality and morbidity. In step with this intervention WHO recommends the brand new antenatal care visits to take location within the first trimester (gestational age < 12 weeks) and in addition, seven visits is suggested.

Antenatal Care is the care that the expectant mom gets from health care experts from the time conception to delivery. It is crucial that it allows making sure that newborns survive and recognized as among the 4 pillars of safe motherhood, along with smooth and make safe delivery, critical obstetric care, and family plans. The intention is to keep a watch on mother health and baby's fitness and guide them to make plans that are proper for their health, (Harrington, 2012).

2.1.2 Healthcare Utilization

Healthcare utilization refers to the usage of health care services by someone for the purpose of preventing and curing health complications, promoting fitness maintenance as well as well being or in any other case to obtain data about one's health status and the forecast of the health situation of a person (Carrasquillo, 2013). Variety of different methods reported utilization as the variety of services which might be used over a time period divided by a given population. For example, in 2008 there have been 320.1 Ambulatory Care Visits to Physicians' workplaces per 100 persons residing inside America. Additionally suggested health care utilization as the percentage of humans who use services that are eligible in a given term. For instance, the USA pronounced about seventy-five % of all girls elderly 18 years attended for health care (Carrasquillo, 2013).

2.1.3 Maternal Health

Maternal health can be defined as the health of women at some stage in a duration of being pregnant, childbirth and the postpartum duration. Throughout pregnancy, a mom can come across specific health troubles which may additionally have resulted not handiest for her but for the child, the circle of relatives and her community as well (WHO, 2011).

Maternal health is a crucial determinant of mother and baby survival health effects .therefore enhancements in maternal health are critical worldwide public health goals (UN, 2008).

2.1.4 Maternal Mortality

Maternal Mortality is described as a loss of life of a woman while pregnant or within 42 days of the cease of being pregnant, regardless of the duration and site of the pregnancy, from any cause related to or annoyed via the pregnancy or its management however no longer from accidental or incidental reasons (WHO, 2014). According to various publications on behalf of Maternal Mortality Working Group, some areas have decreased maternal mortality to a degree since 1990, however, MMR (maternal death according to 100,000 live births) in Sub-Saharan African have remained excessive with little proof of improvement (Hill *et al.*, 2007).

2.2 Theoretical Framework

Appropriate theories and model to explain antenatal care services utilization in public maternal health will base on the:

2.2.1 Theory of Consumer Behavior.

As postulated in the theory that, a rational consumer allocated his/her income among different needs so as to maximize his utility. Under this study, an expectant mother is assumed to maximize the merits of utilizing antenatal health care services given her health production function and budget constraints. This study employed a theoretical model which was given by Machio in 2008. She assumed that a mother will maximize utility given as:

$$U = f(V, H, Y) \dots\dots\dots (2.1)$$

U is the utility derived by an expectant mother, V is the consumption goods, H is the health-related good and Y are other factors eg. Distance, time

In utility maximization an expectant mother given her health production and budget constraints which can be expressed as follows:

$$h_i = h(H, N, Z, \dots) \dots\dots\dots (2.2)$$

$$I = P_v \cdot V + P_h \cdot H + P_a \cdot A \dots\dots\dots (2.3)$$

hi= health production, H is the health-related factors, Z are socio-demographic factors age, income, education, and occupation, N is other health inputs. Under the above budget constraints, I is the income of the expectant mother, A is antenatal care and Pv, Ph and Pa are the prices (costs) for consumption good (V), health-related goods (H) and Antenatal care utilization (A) including the cost of seeking care respectively.

Using the above equations we may express the Lagrangian equation as follows:

$$L = f(V, H, Y) + \lambda_1 [h - f(H, N, Z)] + \lambda_2 [I - P_h \cdot H - P_a \cdot A] \dots\dots\dots (2.4)$$

By solving equation v gives a reduced form of the demand function for antenatal care utilization

$$D_a = f(P_v, P_h, P_a, I, Z) \dots\dots\dots (2.5)$$

Whereby Da is the demand for antenatal care utilization which implies that it depends upon a number of determinants such as prices (costs) for consumption good (V), health-related goods (H) and Antenatal care utilization, income (I) Pv, Ph, Pa, I and Z.

2.2.2 Andersen and Newman's Health care Utilization Model

According to the model, the individual use and access to health care depend on three (attributes) factors such as predisposing factors, enabling factors and the need factors.

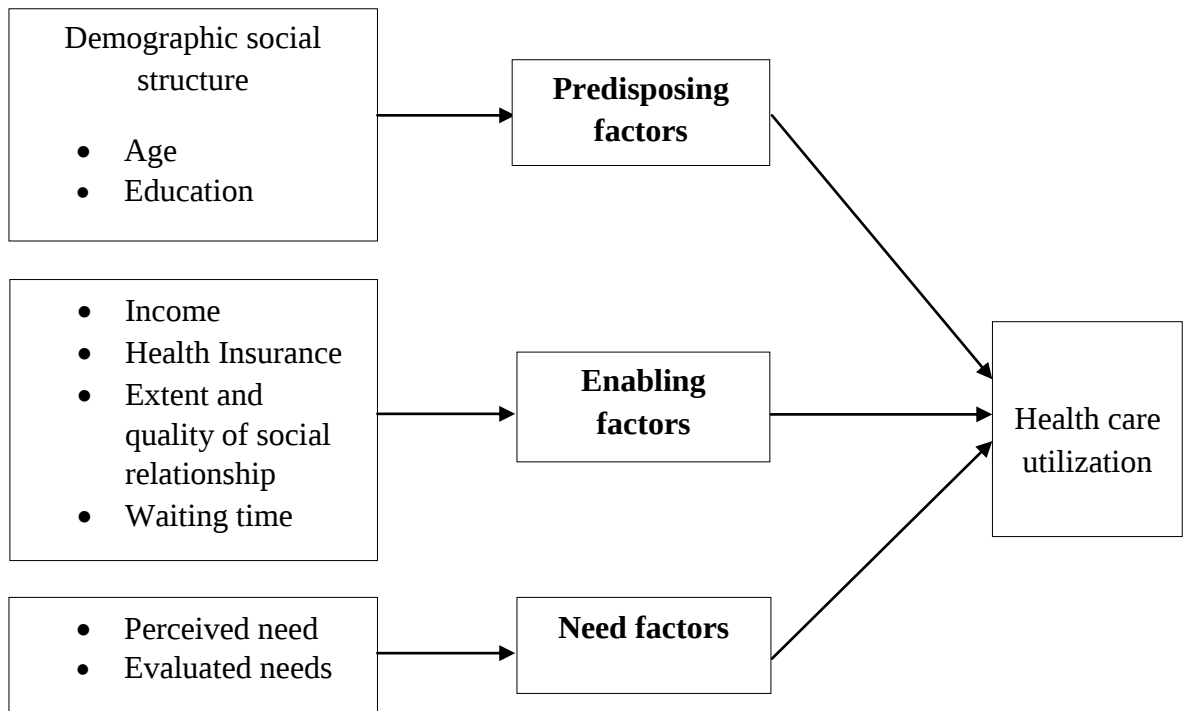
The predisposing factors: These are elements associated with demographic factors and social structure inclusive of age, gender, house, lifestyle, profession, schooling, ethnicity, attitudes, knowledge, and values that character have in the direction of health.

Enabling factors: According to Andersen, these are aspects that are used to obtain health. They are categorized into three aspects such as firstly, family (personal) which are means and help to know how to access health service and they include income, health insurance, travel, extent, and quality of the social relationship. Secondly, include a community aspect which involves available health personnel and health facilities including waiting time and lastly involves the possible addition including genetic factors and psychological characteristics.

The Need factors: These are maximum instant motives for health services usage from purposeful and health problems that cause the need for health services. Andersen categorized the need factors into a perceived need and evaluated need. “A perceived need includes how human beings view their personal general health and efficient state in addition to how they experience the symptoms of ache, infection, and issues about their health and whether or no longer they choose their problem to be enough significance and significance to seek for professional help”.(Andersen,1995)

Evaluated needs “these represent the professional judgment about people’s health status and their need for care” (Andersen, 1995)

Figure 2.1 Represent Andersen and Newman’s healthcare utilization Model



Source: **Andersen, 1995**

On this study Andersen health care utilization model could be used to foretell the factors that influence or hinder usage of antenatal care services.

As defined by Andersen (1995), an expectant mother use of antenatal care is dependent on their socio-demographic attributes including age, training, profession, ethnicity and marital popularity. These elements might also have an impact on a pregnant female both in a positive or negative manner with the regards to the use of antenatal care services. Additionally, awareness, health perception, values and attitudes that pregnant woman have on health care scheme can also have an effect on the utilization of maternal healthcare (antenatal care). That is an expectant mother with a fantastic health notion will use the service in comparison to the one with the wrong notion at the carrier (Andersen, 1995).

Moreover, Andersen becomes at the view that the functionality of a pregnant to use healthcare depend upon some factors of obtaining care such as her income, her medical health insurance reputation, health employees, availability of health centers

and waiting time. The provision of these factors can have an effect on a female to search for health care ie. Antenatal care (Andersen, 1995).

On the need of the version relates to the factional capability of a mother or present health problem as a way to reason a pregnant woman to use maternal health care services. The model explained that the need aspect as categorized into perceived and evaluated want. A pregnant woman perceived need for health are primarily based on how she perspectives her standard health reputé and the practical state. It's far properly proved that any disorder health state that it will have an effect on a woman to use antenatal health services. On evaluated need health contain the judgment that health professionals make approximately expectant mother popularity and the need for medical care (Andersen, 1995).

The aspect of fitness behavior is categorized into elements. first off, is the health practices that an expectant mother indulge in. Those practices are considered to have a poor or high-quality impact on the final results of the being pregnant. The second component is the usage of the health services of which in this study entails the utilization of antenatal care services.

2.3 Empirical Literature Reviews

This part covers the overview of the studies carried out based on the determinants of antenatal care services utilization through other researchers and their findings within the country and different locations around the world.

Tekelab et al. (2019) conducted a study on factors affecting the utilization of antenatal care in Ethiopia. The study takes a look at hired pooled records of their analysis and the effects were consisting of the pooled odds ratio showed a tremendous association between usage of antenatal care and urban domicile, mother's education, husband's education and in addition they determined a strong association among exposure to mass media, family income and accessibility of the service. The outcomes of this reveal that a good way to increase usage of antenatal care, there need to be women's empowerment via training and promoting their family making plans to save unplanned pregnant and increasing awareness to women regarding ANC through mass media and making the service extra reachable.

In keeping with Kibusi et al. (2018) examined the role of health insurance coverage in maternal health care utilization in Tanzania using the evaluation of 2011/12 HIV/AIDS and malaria indicator survey. The study used both descriptive and regression analysis to examine the connection between health insurance and maternal health services. The results of the study determined that a higher proportion of women had the right timing of first ANC visits per recommendation as compared to those without medical insurance. The results conclude that women protected by using medical health insurance were more likely to have the right attendance to the hospital consistent with advice.

Acharya (2018) studied on demographic and socioeconomic factors affecting utilization of antenatal care services in Nepal by means of examining the chance of the utilization of ANC services 4 or more visits in terms of women's socioeconomic and demographic popularity. Kumar utilized NDHS of 2011 by applying bivariate logistic regression evaluation and analyses the consequences of these variables in 4 or more ANC services use. He concluded that these variables demographic (women's age, abortion), socio elements (religion, ethnicity, women's training, husband's education, effect of mass media, residence); financial factors (household wealth, women's employment popularity, women's profession) concerning the women and her circle of relatives in well-known. These variables have been located to persuade relaxed mother-hood behavior and practices.

Akowuah, Agyei-Baffour, and Awunyo-Vitor (2018) conducted a study aiming at exploring the socio-economic determinants of antenatal healthcare utilization by pregnant women in Third Trimester in Ghana. The study employed a two-stage sampling technique to sample 200 pregnant women who were in the third trimester. The study used binary logit analysis to show the determinants on the utilization of ANC. The authors found variation in ANC utilization level among pregnant women and found that the important factors which influence utilization were distance factor, education of the mother, age of the mother, employment status, quality of services and services satisfaction.

According to Deepak and Dhungana (2018) studied on the utilization of maternal health services both (ANC and PNC) and factors influencing the utilization in Urban Slums of Lucknow. Using a random sampling technique the study employed 968 participants, the study employed descriptive statistics using the chi-square test to show how the factors influence utilization of maternal health services. The results found that some socio-demographic factors such as education of women, religion, and parity were found to be statistically significantly associated with maternal healthcare utilization in Lucknow. The authors then recommended various policies and programs which will focus on education of women especially girls and incorporate the opinions of religion in relation to the utilization of maternal healthcare.

Islam and Masudi (2018) conducted a study on the determinants of frequency of visits and contents of antenatal care visits in Bangladesh aiming at assessing the extent of compliance with the WHO recommendations. The study employed a cross sectional design and analyzed the data using univariate, bivariate and multivariate statistical methods and tests the statistically significant variables using chi-square and analysis of variance (ANOVA). The study found that there were positive association between the ANC frequency of visits, high socio-economic status, low parity, exposure to mass media planned pregnancies and visits to public or NGO's health facilities.

Akashi et al. (2017) studied on the determinants of poor utilization of ANC services amongst recently delivered women in Rwanda, a population-based study. The study used logistic regression and odds ratios were presented with their 95% confidence interval. The examiner exhibits that the danger of women with older age, people who are unmarried and people with poor social support had been associated with bad utilization of ANC. They argued that general maternal or ANC awareness ought should be raised on the significance of the timing of visits and cost must be minimized.

Kimani, Mugo and Kioko (2016) performed an econometric analysis of health care utilization in Kenya the using of Kenyan Households Expenditure and Utilization Survey of 2007 with the aid of estimating a count data negative binomial model which offers a perception that about 17% of those needed healthcare services couldn't have right of entry to to the services due to economic constraints. The analysis screen that out-of-pocket expenditure, distance, waiting time, families size, profits and operating reputation of the family head are widespread factors affecting utilization of the healthcare while distance and income are significant factors affecting public healthcare usage but they're not significant in explaining the utilization of healthcare in private health facilities. Additionally, the working status, insurance cover and schooling popularity are good sized in explaining that of private facilities and not public facilities.

Another study was done by Umar and Bawa (2015) at the assessment of whether women's biological, socio-cultural and economic attributes are associated with ANC usage as the look at measured ANC in terms of ANC visits in Yobe, Nigeria. The study used records from NDHS of 2008 with 33,385 women where through bivariate individual's chi-square take a look at and two-degree multivariate evaluation were used. The findings reveal that education level, own family wealth and availability of skilled health workers were related to the wide variety of ANC visits.

Rutaremwa et al. (2015) investigated the predictors of maternal health service usage in Uganda; the study takes a look at using a sample of 1728 women of reproductive age. A multinomial logit regression model was employed to research the relative contribution of different factors of maternal health provider package utilization. The findings deliver that women with secondary and better training had been more likely to use maternal health care package, also women with the highest income were more likely to utilize the services and women lived close to the area have been more likely to make use of the service. They argued that there is a desire to formulate strong rules and offers a layout of maternal health services applications and programs on the way to target the women of the reproductive age.

Inside the study to investigate factors influencing the utilization of maternal healthcare services amongst pregnant women in Kenya (Chepkorir, 2014) used binary Probit regression analysis and employed KDHS of 2008 and the findings gives that size of the family individuals, age of the women and birth order are the sizeable predictors which impact utilization of hospital delivery, also gender of the household head affects the utilization of each antenatal and postnatal care undoubtedly and are tremendous. In the opposite aspect, Chepkorir reveals that residence appreciably reduces the utilization of both health center transport and postnatal care and gives that women with higher wealth index found to have low usage of each antenatal and postnatal care. He additionally argues that there is powerful relationship between birth order and utilization of healthcare services and that is due to the risks that are related to the primary being pregnant as a maximum of the women are more likely to search for maternal health offerings for the primary delivery due to the danger associated with it, and additionally offers that women with many children increase utilization of healthcare services due to increases call for of healthcare as children associated with extra health resources utilization.

Gupta et al. (2014) studied approximately the factors associated with the four or more ANC visits and its decline amongst pregnant women in Tanzania among 1999 and 2010. The have a look at used information from TDHS of 1999, 2014/2005 and 2010, of which it hired multivariate logistic regression analysis to find the association among all predictors and utilization of ANC. The findings screen that the predictors which had been definitely associated with ANC usage service; checking out and HIV counseling all through ANC, receiving malaria doses in the course of ANC and some factors were determined to be considerably related to decreasing in ANC utilization such as the age of the woman and geographic factor. They argued that to bost ANC utilization some techniques have to be installed vicinities like improvement in the quality of care, geographic accessibility, and early ANC initiation.

Halle- Ekane et al. (2014) performed a cross-sectional survey that involved pregnant women and women with children much less than 2 years ago on the determination of the percentage of women attending ANC and the elements influencing ANC attendance within the Muea Fitness Area (MHA) in Cameroon with 220 women. The effects give that participant's schooling degree was significant to ANC utilization and a few did no longer show any association related to the number of visits, the timing of visits and missing visits (age, parity, marital popularity, income, partner education degree). They argued that 74% of women attending ANC in government health facilities had been much more likely to benefit from ANC bundle than 29% of ladies attending private health service institutions.

Berhe et al. (2014) on the assessment of ANC utilization and its associated factors amongst 15 to 49 years age of women's in AyderKebelle, Mekelle city 2012/2013 of which information became accumulated via a cross-sectional survey with the sample of 252 of which bivariate regression was used to interpret and perceive factors associated with ANC utilization were analyzed. The study shows that being good in health and terrible pleasant of services become a motive for non- attendance at ANC health center and socio-demographic factors were determined to be barriers to utilization of ANC.

2.4 Research Gap

A wide variety of global and national efforts to enhance and increase ANC utilization through expectant mother as well as introducing and promoting various policies along with knowledge about ANC has been completed for the purpose of lowering the charge of maternal mortality and child death in Tanzania. But, ANC utilization remains trouble to the health status of women in developing countries. Numerous studies have been carried out inside the international and outdoor Tanzania on ANC usage inclusive of that of Akashi et al. (2017) on the determinants of terrible utilization of ANC services among recently delivered women, they found that girls with older age, unmarried and without social support were associated with poor utilization of ANC.

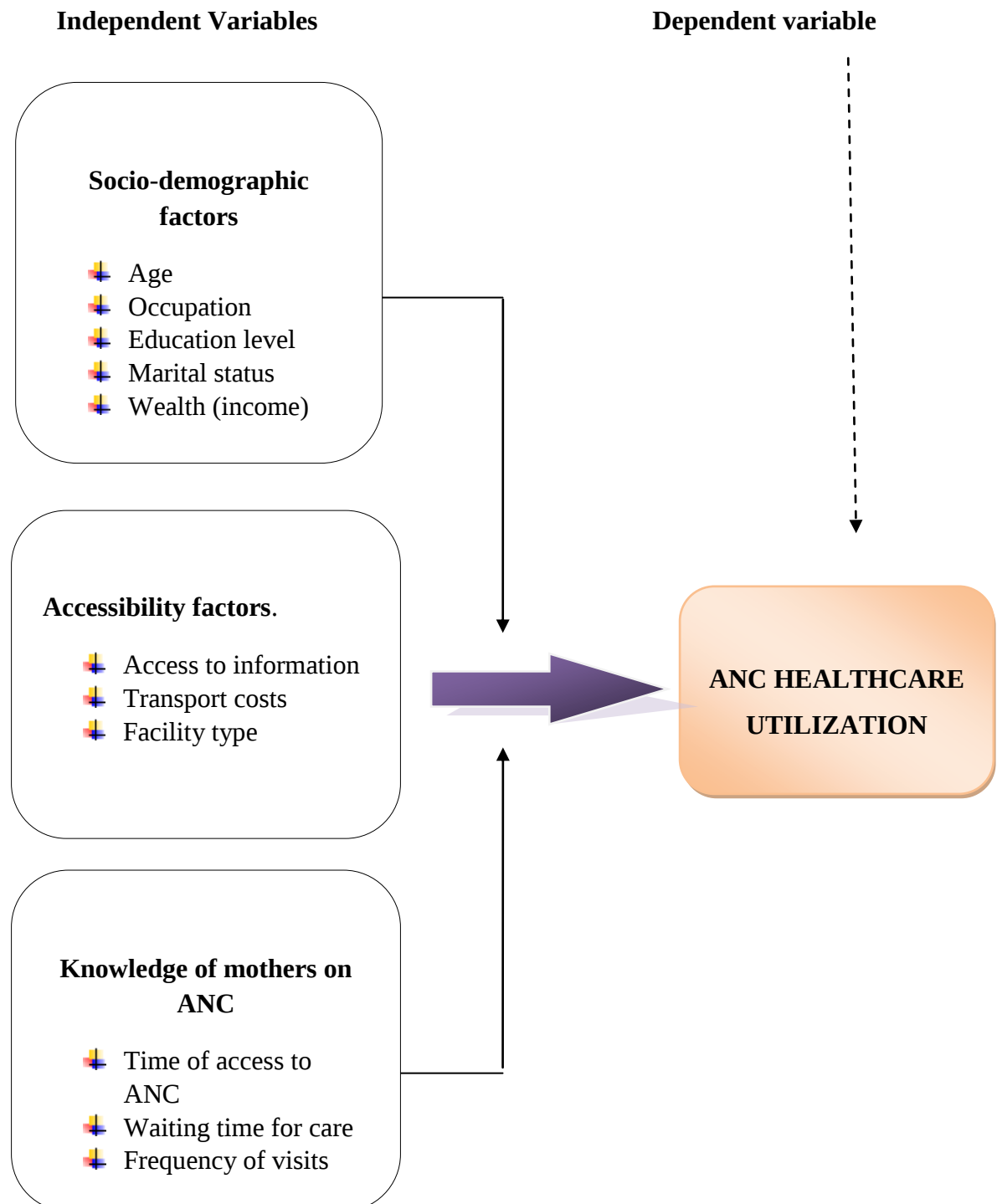
Notwithstanding the efforts to promote maternal and neonatal care to gain millennium development goal number five, the use of delivery care stays underneath expectancies that are reducing maternal death by 2/3. Tanzania Demographic health Survey record of 2015/16 shows that MMR has extended from 432 to 556. This reality invites extra efforts to store mother's lives in the course of pregnancy and childbirth. therefore, there is a need for studies that provide an in-intensity understanding of the utilization of antenatal care services from each non-public and public maternal health centers and raises the questions about the usage of care offered in maternity centers.

2.5 Conceptual Framework

According to Shields and Rangarajan (2013), a conceptual framework is a diagrammatic presentation of the relationship between dependent and independent variables. In this study, the relationship is between antenatal care utilization and the factors affecting it.

And the relationship can be both negative and positive depending on the level of utilization of ANC.

Figure 2.2 Indicate the Conceptual Framework



Source: Researchers Own Design 2019

2.5.1 Explanations on the Characteristics of variables as per figure 2.2

Age and Antenatal Care Utilization

Age is the most determinant aspect of the use of ANC that is related to the utilization of ANC. Women's whose are 35 years older are much more likely to attend the ANC certainly because this group of women has other children and that they perceive themselves to be skilled in antenatal care and consequently this is not the same for the women aged less than 35 years whose are reluctant to make time looking for care.

H₀: Age has a positive relationship with the utilization of antenatal healthcare services.

Occupation and Antenatal Care Utilization

Occupation explains if households are doing a certain employed, unemployed or performing any other activities. It is also a factor affecting ANC service utilization. Olayinka reveals that there is no association between occupation and the ANC usage, meaning that occupation isn't a factor in the utilization of ANC services. Simkhada (2008) found a significant association of which occupation is statistically significant and positively related to the utilization of ANC.

H₀: Occupation is more likely to influence ANC utilization of expectant mothers.

Education level and Antenatal Care Utilization

Education is one of the key elements that have an effect on the utilization of antenatal care services definitely. As women with a better stage of education are more likely to wait for more antenatal visits and in comparison to people with lower training on the grounds that education is related to more appreciation of the importance of antenatal care. In a study by Taraka education found to influence the place of delivery in which women with higher education were more likely to deliver in a health facility than those with lower education.

H₀: Expectant mothers with education attend more to ANC services as compared to those with no formal education at all.

Marital status and Antenatal Care Utilization

Is the status of being (being unmarried, divorced and widowed) and married. Marital status is one of the determinants of use of antenatal care. Married women are much more likely to wait for the recommended centered visits compared to unmarried women. That is married women seem to attend antenatal visits earlier than the unmarried women. With the study conducted by Simkhada and his colleagues observed that married women have been much more likely to attend clinics than unmarried women. This suggests that there's a positive link between marital status and antenatal care usage.

H₀: Expectant mothers' who are married are more likely to attend for ANC services as compared to those who unmarried.

Wealth (income) and Antenatal Care Utilization

Refers to the amount of cash derived from paid employment and comprising especially of wages and salary. The economic reputation of the expectant mother and households is a great determinant of using antenatal services. The excessive price of the service is much more likely to be a prohibiting aspect of the use of antenatal services. Women's with high economic reputé are possibly to attend antenatal visits early and more often in comparison to a decrease in wealth. A survey completed by Nzioki in Kenya located that women earnings extra than a dollar per day were more likely to attend as a minimum of 4 antenatal visits than those with incomes less than a dollar per day.

H₀: Expectant mothers' with higher wealth status more likely to attend for ANC services as compared to those with lower wealth status.

Distance to health facilities and Antenatal Care Utilization

Distance to health the facility is also undoubtedly associated with the antenatal care usage that is women who stay a long way to the facility are likely to make use of the service as compared to individuals who are near the facility. Magadi et al (2000) observed that long distance to ANC facility is a dilemma to the ANC., in addition, they suggested that a few elements that may obstruct women in developing countries

from accessing ANC are consisting of costs such as direct price, in addition to the costs of transportation, drugs, and supplies.

H₀: The closer the health facility the more the expectant mothers had to attend and vice versa.

Access to information and Antenatal Care Utilization

Access to information influences utilization of ANC services as an expectant mother have access to information regarding the utilization of ANC will honestly attend to the service compared to the one who has no access to information about the service.

H₀: information access through media use (tv and Radio) among expectant mothers' has a positive effect at the utilization of ANC services compared to people with no get admission to facts (through another manner).

Time of accessing ANC and Antenatal Care Utilization

Time of access of ANC is likewise an important or important element to ward off pregnancy complications, counseling for maternal and preparedness for health facility delivery. It has positive on impact at the utilization of the ANC relying on the knowledge of the mother concerning the service, early visits influence usage of the services closer to the delivery as compared to those who are late for the go to.

H₀: Time of accessing ANC among expectant mothers has a positive influence on the utilization depending on the knowledge of the mother regarding the service as compared to those with little knowledge about ANC.

Waiting time for care and Antenatal Care Utilization

The expectant women generally tend to get exhausted when seated in one position waiting for care. Therefore, there is a negative association with the usage of care. If the waiting time is an excessive amount they' failed to attend for ANC in comparison to while the ready time is not too much.

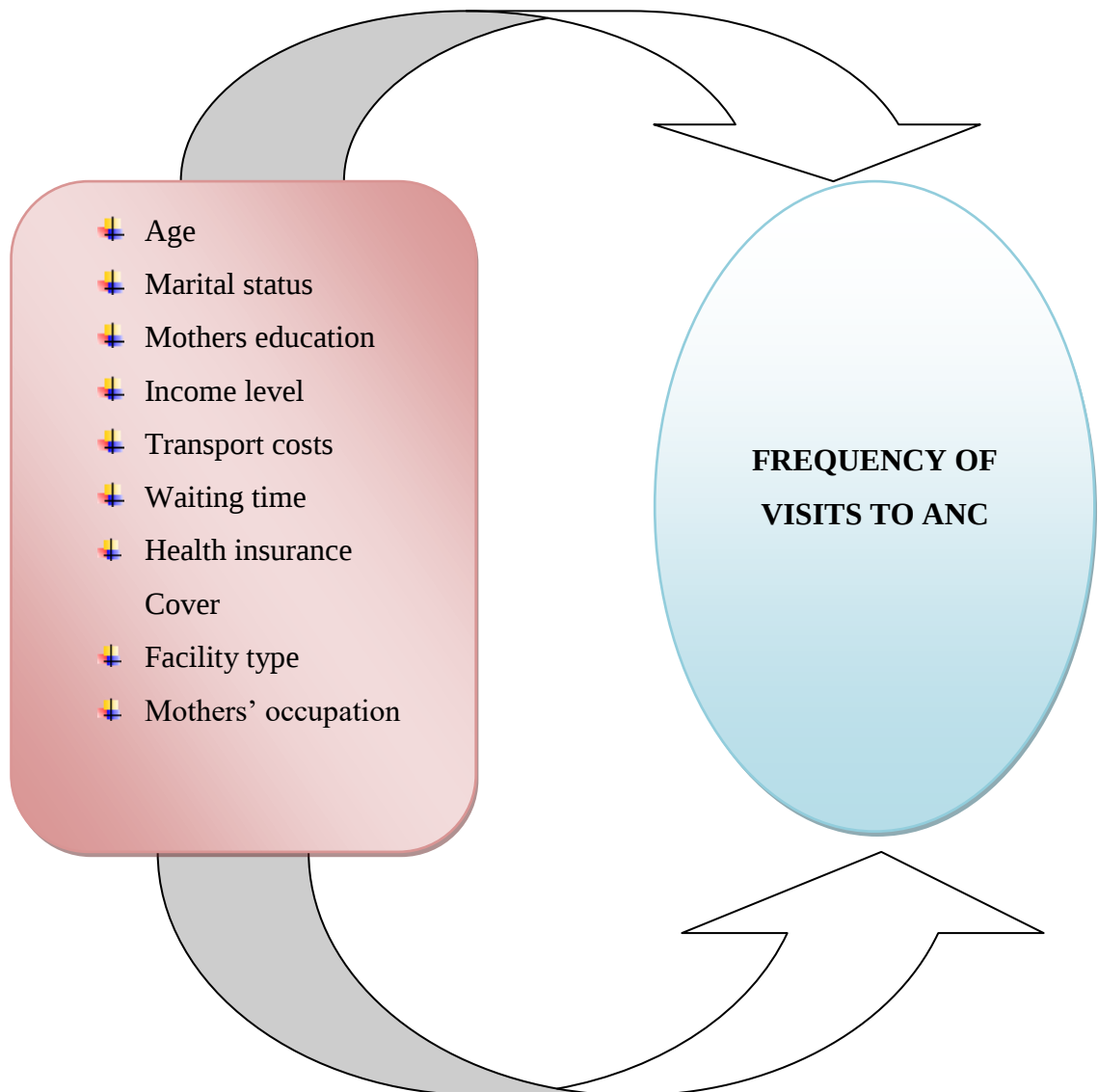
H₀: The higher the waiting time the less the utilization of the ANC and vice versa.

Frequency of visits and Antenatal Care Utilization

The tendency of an expectant mother to visit the services several times increases the number of utilization of the services as compared to those who do not visit at all.

H₀: If expectant mother visited the for ANC increases ANC utilization and vice versa.

Figure 2.3 Represent Conceptual framework derived from Andersen and Newman's Healthcare Utilization Model



Source: Researchers Own design: 2019

2.5.2 Relationship between dependent and independent variables as per figure

2.3 Income level and frequency of Visits

Income refers to the amount of cash derived from paid employment and comprising particularly of wages and salary. The financial status of the expectant mother and families is good determinants to the frequency of visits. Women with high financial reputation are probably able to wait for antenatal visits early and more frequently in comparison to a decrease in wealth.

H₀: Expectant mothers' with higher wealth status more likely to visit for ANC services early as compared to those with lower wealth status.

Transport costs and frequency of Visits

Transport costs those are expenses that an expectant mom incur to and from health facility as per any visits she makes to get health care service. There's a negative relationship among the frequency of visits and transport costs surely because an increase in transport costs will reason a lower in range of frequency as compared to when the transport costs are lower influence the frequency of visits.

H₀: The higher the shipping costs the lesser the attendance for ANC offerings and vice versa.

Waiting time for ANC and frequency of Visits

The expectant women tend to get tired while seated in one position looking forward to accessing ANC. This shows that waiting time is negatively related to the frequency of visits. If the waiting time is too much expectant mothers will fail to wait for ANC visits as compared to whilst waiting time isn't an excessive amount of.

H₀: The higher the waiting time the less the frequency of visit to ANC among expectant mothers and vice versa.

Health insurance and frequency of Visits

An expectant mother with medical insurance is much more likely to visit the ANC service as compared to the only without medical health insurance. On the carried out by Amponsah, Senadza and Arthur on the determinants of antenatal care utilization

in developing nations, the outcomes suggests that ownership of medical health insurance increases variety of ANC visits on the utilization of ANC services among rural women and proved that the depth of utilization of ANC care tends to increase the attendance of women who own medical insurance.

H₀: An expectant mother is likely to attend for the ANC if they are insured.

Facility type and frequency of visits

The facility type has had an impact on the frequency of visits. The facility type emerges as labeled as public health centers and private health facilities. There is a strong relationship between the type of facility and frequency of visits. Whereby, expectant mothers tend to increase the number of visits in a public health facility as compared to those in private health facilities.

H₀: With public facilities, expectant moms are much more likely to visit for a clinic for service and vice versa.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This part describes on how the study was carried out by the researcher showing the studies design used by the researcher along with the study, study area, sample size and sampling techniques, dataanalysis, unity of analysis, variables and measurements, validity and reliability as well as estimation model.

3.2 Study Area

Lushoto District is situated in the Northen part of Tanga region between 4025'-4055' Latitude south of the equator and 300 10'- 380 35' Longitude East of the Greenwich. According to the 2012 National Population and Household Census, the district has 418,652 people, According to the 2002 National Population and Household Census, the district had 492,441 People, of whom 230,236 were male and 262,205 were female. The under-five is estimated to be 91,785 and women with bearing age is estimated to be 90,364. Concerning health coverage Lushoto has 2 hospitals, 1 governmentmedical institution and the other hospital owned by ELCT-NED (Northen Eastern Diocese- Evangelical Lutheran Church), 7 health centers 6 owned by the government and 1 health center is privately owned. There are 43 dispensaries of which 32 owned by the government and 11 are privately owned. The aggregate of these government and privately owned health facilities provide good public and private health services in the district. All health facilities provide both preventive and curative services to the community.

3.3 Research Design

In line with Kothari (2004), defined research design as an outline and arrangement of what the researcher will do from writing the speculation to the final analysis of statistics. The cross-sectional survey technique entails the gathering of information from a large number of cases at a given time. Therefore the respondents selected should constitute the full population in an effort to produce a miniature cross-sectional (Kothari, 2004). The study used a cross-sectional survey with the aim of inspecting the determinants of antenatal care services usage in Lushoto districts. This

layout might be appropriate as it will enable a researcher to collect statistics from specific districts of Lushoto at a time.

3.4 Sample Population and sampling technique

3.4.1 Study population

The study population is defined as the entire number of people or items which are of interest in drawing a conclusion. In this study, the study population involved all reproductive women aged 15-49 years in Lushoto district, Tanga.

3.4.2 Sample Population

Sample population involves the proportions of the study population that is actually selected to represent the entire population for generalization and analysis of the study topic. In the context of this study, the sample population was a proportion of recently delivered women in Lushoto district, Tanga to represent the whole population. The study inclusive criteria were all recently delivered women with the reproductive age of 15-49. These women aged 15-49 are considered as the most concerned people who get pregnancy and delivering group that plays a role in the utilization of antenatal care services.

3.4.3 Sample size

A sample was selected from five wards namely Lushoto (urban ward), Lukozi, Mlola, Mlalo, and Mtae all these being rural wards. Given the population data from the National Population Census of 2012 showing all reproductive women's aged 15-49 years old, In another stage sample of respondents (reproductive women) over a given selected wards was obtained.

Table 3.1 Representing women's population from given wards and their status

Name of Ward	Status	Women's Population
Lushoto	Urban Ward	14,932
Lukozi	Rural Ward	6,338
Mlalo	Mixed Ward	4,416
Mtae	Rural Ward	7,237
Mlola	Rural Ward	5,330
Total Sum		38,253

Source: National Bureau of Statistics (2012, Population Census)

Orodho and Kombo, (2002), reports that sampling is a process of selecting a number of individuals or objects from a population such that the selected group contains elements representative of the characteristics found in the entire group. Thus in the preparation of the sample regarding the related study the researcher calculated the sample using Yamen, (1967), the formula for calculating sample size from the population targeted.

$$n = N / [1 + N(e)^2]$$

Details

n = this represents the sample size selected

N = this represents the targeted population in which the researcher has identified as **38,253** in the Lushoto district.

e = this involves the sampling error percentage which the researcher has chosen as 5%

$$n = \frac{38,253}{1 + 95.6325}$$

$$n = \frac{38,253}{96.6325}$$

$$n = 395.8606 \approx 396$$

Thus the sample size to be selected is 396 respondents.

3.4.4 Sampling Procedure and Sampling technique

To obtain more detailed information from the study population the study employed a stratified random sampling and purposive sampling techniques to select the representative sample. The wards were randomly selected from 32 wards in Lushoto district. Then, 396 recently delivered women from each ward were each 79 were purposely selected make up a total of 396 respondents given that at least women to be 15 years and above and not exceeding 49 years old. Generally, sampling process will depend on the availability of sampling frame that is a list of complete units that comprising the study population and this sampling frame will govern whether the method should be based on probability or non-probability sampling.

Non-Probability sampling

The method has been selected because a group of people, places or things are purposely selected that is each unit in the population has no equal chance of being selected in the sample unless they meet inclusion criteria. Purposive sampling will be used in the field to select a sample of recently delivered women in Lushoto district private and public maternal health facilities in which a total of 396 women were selected from five wards.

3.5 Type of data and Data collection methods

The study employed both primary and secondary data. For primary data, the collection was done through structured questionnaires and face to face interview for a survey. Secondary data was based on the second-hand information from an internet source, national publications, journals and data from demographic health survey.

3.5.1 Structured Questionnaires

The questionnaires made and distributed were according to the sample chosen by the researcher which is 396 respondents, the questionnaire instrument was chosen due to that it saves time, confidentiality is upheld, information of large sample is collected and over diverse areas. The questions contained in the questionnaire included both open-ended as well as closed-ended questions for respondents to provide their opinions and thoughts and those where they needed to choose pre-determined

answers respectively. The information obtained aimed to explain the specific objectives determine the factors associated with utilization of antenatal care services, analyzing the factors influencing the expectant mothers' visits to ANC health facilities and lastly to determine the proportions of women's knowledge on the ANC services in public and private maternal health facilities.

Given the number of respondents that a researcher used, the questionnaire was equally distributed as 79 per ward that is selecting the number of women equal to the number of questionnaires.

3.5.2 Interview

The researcher used interview to some expectant mothers who were thought not to be able to answer the questions on the provided questionnaires, perhaps this was because of the state they had, however this is because some of them were at the initial stage of pregnant while others were found to be at the last trimester which made it difficult for them to write.

3.6 Unit of analysis

The unit of analysis in this study was the recently delivered mothers found in public and private maternal health facilities in Lushoto district, Tanga among the selected wards.

3.7 Variables measurements and descriptions

The study included variables associated with individual's household's characteristics, access to care, knowledge on the ANC and frequency of visits to identify and estimate determinants of ANC utilization. The following table shows the dependent variables associated with explanatory variables are defined.

Table 3.1 indicating variable measurements their description and expected signs

Variables (Dependent)	Measurements	Categories	Expected outcome
Antenatal care utilization	1 if expectant mother visited a qualified health provider 0 otherwise	Binary	
Independent variables			
Age	The length of time that a household head has lived/ Number of age per women	Scale	Positive
Women's Educational level	Number of years of schooling 1 for primary level 0 otherwise 1 for secondary level 0 otherwise 1 for university level 0 otherwise	Binary	Positive
Marital status	The status that if an expectant mother lives with a spouse or not 1:Married 0: otherwise	Binary	Positive
Income status	The amount of money that households get monthly/ Continuous variable measured in terms of amount spent	Ordinal	Positive
Mother's Occupation	The activities that an expectant mother indulge in or not 0 if unemployed 1 if employed	Binary	Positive

	2 if farmer		
Time of accessing care	Number of trimesters that an expectant mother reached the health facility 0 for don't know 1 for the first trimester 2 for the second trimester 3 for the third trimester 4 for the fourth trimester	Binary	Positive
Access to information	The ways of which a woman can get information on ANC 1= If a mother exposed to media such as radio Tv and others 0 otherwise (friends, institutions)	Binary	Positive
Waiting time for care	Number of hours an expectant mother waiting to receive care measured in terms of minutes and hours	Ordinal	Negative
Facility type	Type of facility attended 1 for public facility 0 otherwise	Binary	Positive

Source: **(Researcher's Own Design, 2019)**

Table 3.2 Indicating Measurements of variables derived from Andersen and Newman's Health care utilization model

Variables (Dependent)	Description of variables	Measurement	Expected outcome
Frequency of Visits	0 for no visits 1 for the first visit 2 for the second visits 3 for the third visits 4 for the forth visits	Binary	
Independent variables			
Age	The length of time that a household head has lived/ Number of age per women	Scale	Positive
Women's Educational level	Number of years of schooling 1 for primary level 0 otherwise 1 for secondary level 0 otherwise 1 for university level 0 otherwise	Binary	Positive
Mother's Occupation	The activities that an expectant mother indulge in or not 0 if unemployed 1 if employed 2 if farmer	Binary	Positive
Marital status	The status that if an expectant mother lives with a spouse or not	Binary	Positive

	1:Married 0: Unmarried		
Access information to	The ways of which a woman can get information on ANC 1= If a mother exposed to media such as radio Tv and others 0 otherwise (friends, institutions	Binary	Positive
Waiting time	Number of hours an expectant mother waiting to receive care	Ordinal	Negative
Health Insurance	1 for an insured person 0 otherwise	Binary	Positive
Facility type	Facility attended 1 for public facility 0 otherwise	Binary	Positive

Source: **(Researcher's Own Design, 2019)**

3.8 Data Processing and Data Analysis

For the quantitative data, the analysis was done using econometric analysis through STATA software and descriptive data will be analyzed using descriptive analysis. Data on household socio-demographic characteristics and accessibility factors was analyzed using SPSS.

3.8.1 Descriptive and Econometric Analysis

Descriptive analysis was analyzed to represent the proportions of expectant women attending the ANC using various statistical presentations such as tables, charts, and graphs, percentages, means and standard deviation which was done using SPSS. Logit regression model was used to describe and show the factors influencing utilization of ANC in public and private maternal health facilities and ordered probit regression was used to describe the factors influencing frequency of visit in maternal health

facilities in Lushoto district where the frequency of visits was ordered as the first visit, second visit, third visit and fourth visit.

3.9 Econometric Analysis

3.9.1 Econometric Analysis for Factors associated with ANC utilization

Based on the theoretical framework factors associated with ANC utilization in Lushoto are were explored using binary logistic regression model since dependent variable is binary in nature (1 utilized the service and 0 not utilized the service). Let Y_{nx1} be binary outcome variable with categories 1 utilized the service and 0 Not utilized the service. Let $Y_{n \times (p+1)}$ denote the collection of predictor variables of Y and then the conditional probability that an expectant mother utilized the services is given as the X_i predictor variables is denoted by $P(Y_i=1/X_i)=Y$ and the model will be expressed in the form of :

Probability of observing the value of one is

$$P_r = \left(y_i = \frac{1}{x_i \beta_i} \right) = 1 - F(x_i \beta_i) \dots \dots \dots (2.6)$$

Where $F(.)$ is a cumulative distribution function, it is continuous, strictly increasing functions that takes a real value and return a value which ranges from 0 to 1. Consequently, the probability of observing zero is

$$P_r = \left(y_i = \frac{0}{x_i \beta_i} \right) = F(-x_i \beta_i) \dots \dots \dots (2.7)$$

From the given specification, the maximum likelihood estimation approach can be used to estimate the model.

The dependent variable y_i is an unobserved latent variable that is linearly related to the equation: $y_i = \beta_i x_i + \mu_i$

Where μ_i a random disturbance is term and x_i is an independent variable which influences the utilization of ANC. The dependent variable y_i can be observed if $y > 0$ which signifies utilization of ANC and $y=0$ which signifies no utilization of ANC.

$$y = \begin{cases} 1, & \text{If an expectant mother utilized (attended to health facility)} \\ 0, & \text{if an expectant mother not utilized (not attended to health facility)} \end{cases}$$

Then, the study adopted the logit model to analyze the data and the empirical model is specified as

$$y = \frac{e^{\beta_0 + \beta_1 X_1 + \dots + \beta_P X_{iP}}}{1 + e^{\beta_0 + \beta_1 X_1 + \dots + \beta_P X_{iP}}} = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \dots + \beta_P X_{iP})}} \dots \dots \dots (2.8)$$

In the logistic regression model, the logarithmic transformation of the equation gives a linear relationship between independent and dependent variables. Then the logit transformation is given as follows:

$$\text{logit}(y) = \log \frac{P(y)}{1-P(y)} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots \dots \dots + \beta_P X_{iP} \dots \dots \dots (2.9)$$

3.9.2 Model Specification

Therefore, the estimated model was specified as

$$\log \frac{P(y)}{1-P(y)} = \beta_0 + \beta_1 Ag + \beta_2 Mstat + \beta_3 Inc + \beta_4 Occ + \beta_5 TimAc + \beta_6 FreqVis + \beta_7 AccInf + \beta_8 Waitm + \beta_9 Transcost + \beta_{10} Ed \varepsilon_i \dots \dots (2.10)$$

Whereby:

Ag is the age of the expectant mother, **Ed** is the educational level which is categorized as expectant mothers education and husband's education, **Mstat** is the marital status of the expectant mother, **Inc** is the income level of expectant mother, **Occ** is occupation of the expectant mother and husband, **FreqVis** is the frequency of visits to care, **Accefornt** is access to information, **Wait** is the waiting time and **NumbVis** is the number of visits to ANC and **Trancos** is the transport cost to and from the facility.

3.9.3 Econometric Analysis for Ordered Probit Model

On the second conceptual framework design which was derived from Andersen and Newman's Model of healthcare utilization, propose that the use of health care service is the function of three sets of individual factors as predisposing, enabling and need

factors. Then the formulation of our mathematical model based on the spirit of Andersen and Newman's (Andersen and Newman, 1973) can be illustrated as follows:

$$y = X_i\beta + E_i\delta + N_i\lambda + \varepsilon_i \dots \dots \dots (2.11)$$

The ordered Probit model assumes that the factors influencing expectant mother visits to ANC in public and private maternal health are based on the latent variable y which is a number of visits which is specified as a linear function of explanatory variables. Where X_i is the vector of predisposing factors, E_i is the vector of enabling factors and N_i is the vector of the needy factors. And β , δ and λ are the parameters to be estimated and ε is the error term measuring unobserved heterogeneity in the model. For this case let consider the enabling factors as the factors influencing the number of visits. As y crosses a series of increasing unknown thresholds we then move up by ordering alternatives.

For instance, the value of y increases from 0 to 4, it depicts an increase in health care utilization. Then the analysis will base on the categorized factors presented in figure 1.5 as [Income level, education level, age, Transport costs, facility type, marital status, occupation, information access on ANC, waiting time and Health insurance]. Then the probability of choosing alternative 'j' (visits 0->4) is given as

$$Pr(y_i = j) = Pr(k_{j-1} < y_i < k_j); -a = k_0 < k_1 < k_2 < \dots \dots < k_j = a, j \in (1, 2, 3, \dots, j) \dots \dots \dots (2.12)$$

Whereby k_j 's are the threshold parameters to be estimated, then the probability of choosing a visit type ($y=j$) is equal to

$$P_r(y = j) = \lambda(k_j - \beta x) - \lambda(k_{j-1} - \beta x) \dots \dots \dots (2.13)$$

Where λ is the cumulative standard normal distribution function

Then the effect of regressors on the probability of the j th visits is given by:

$$\frac{\delta P_r(y=j)}{\delta X_i} = [\lambda(k_j - \beta x) - \lambda(k_{j-1} - \beta x)]\beta \dots\dots\dots(2.14)$$

And this effect is called marginal effects of the ordered Probit model. The ordered Probit shall then estimate using the maximum likelihood method (Greene, 2002). The ordered Probit model shall further used to generate the actual probabilities of pregnant women choosing a particular visit i (Greene, 2002). Then the actual probabilities will then involve the estimation of the probabilities of each expectant mother for each possible visit. Hence, the dependent variable (frequency of visits) is measured on a 1- 4 scale, whereby 1 indicates one visit, 2 indicates two visits, 3 indicates three visits and 4 indicates four visits.

3.9.3 Econometric Tests

Data collected were subjected to different econometric and statistical tests in order to ensure that they are suitable for use and provide best and valid results. This study used different econometrics tests for ensuring precision, efficient and best results.

3.9.3.1 Test for Model Specification

Gujarati (2004) argued that model specification is an important aspect in the econometric analysis must be suitably specified. Notably, if it is not suitably specified the analysis results may encounter a problem of model specification error or model specification bias. The study used Linked test command in STATA version 14. Before winding up, H_0 : Model is well specified and H_a : Model is not well specified.

3.10 Validity and Reliability

Validity is the quality that an instrument used in research is accurate, correct, and meaningful and right while reliability is the measure of degree or extent to which researcher instruments yield consistency results of the data after several trials (Msabila and Nalaila, 2013). To data validity and reliability of the study, similar conditions of the data collection were ensured to all the participants of the study. Any sort of biases was avoided to ensure the information obtained was not biased on subjectivity which harms the validity of the final results and the study as a whole. Before data collection, the elements of the research proposal were pre-tested, these

elements include variables, availability of the respondents and their acceptance, time factor and the adequacy resources used. The two components are important in any research if the research objectives and conclusion regarding the findings are right or wrong.

3.11 Ethical Consideration

Wassenaar and Mamotte(2001) explained that professional codes are essential to protect participants in social research from harm while ensuring the right of privacy adhering to the action of informed consent and avoiding deception. Ethical dilemmas are likely to emerge during data collection and publication of research findings. This study adhered codes of research ethics during data collection.

In addition, a researcher sought to have permission from the responsible local authorities before undertaking the research. Participants were assured that the information they provided was confidential and used solely for the stated purpose of the study.

CHAPTER FOUR

PRESENTATIONS OF RESEARCH FINDINGS AND RESULTS

4.1 Introduction

This chapter described and offered all the findings which had been analyzed through STATA 14 and SPSS version 20, the sample made from 396 recently delivered mothers who have been considered as a significant group upon ANC utilization. The primary component describes the proportions of women utilizing ANC in public and private maternal health facilities with their socio-demographic characteristics, accompanied by factors influencing ANC utilization in public and private maternal health facilities, and consequences on the analysis of factors influencing the frequency of visits in private and public maternal fitness centers.

4.2 To describe specific characteristics of recently delivered mothers received ANC in both public and Private Maternal health facilities.

The part introduces the descriptive information of specific characteristics of demographic information among recently delivered women in Lushoto district Tanga whereas the information was indicated in terms of the summary of the statistics presenting mean, standard deviation, minimum and maximum values.

Table 4.1 Descriptive Analysis of Demographic characteristics among recently delivered mothers in Lushoto district, Tanga.

variable	obs	Mean	Std.Dev.	Min	Max
Age	396	28.31818	5.981387	17	45
Married	396	0.722222	0.4484698	0	1
Unmarried	396	0.277778	0.4484698	0	1
Income	396	230522.7	129955.3	24000	750000

Mothers Education

None	396	0.166667	0.3731494	0	1
University Education	396	0.232323	0.4228483	0	1
Seconadry Education	396	0.441919	0.4972434	0	1
Primary Education	396	0.159091	0.3662235	0	1

Mothers Occupation

Unemployed	396	0.489899	0.5005303	0	1
Employed	396	0.401515	0.4908249	0	1
Farmer	396	0.111111	0.3146672	0	1

Source: (Field Data, STATA Output, 2019)

Age of a Mother

From the interviewed mothers, it was observed that the average age of the mothers were 28 years while the standard deviation was 5.98. This implies the age composition of the population of mothers around the selected Lushoto wards. This presents that most of the women residing in Lushoto were pregnant at age averaging 28 years. The minimum number was 17 and the maximum number was 45.

Marital status of Mothers

For the interviewed mothers 72% were married while 28% were not married meaning that was single, widowed or separated. Marital status is an important factor in assessing mothers' utilization of ANC package and it is expected that married

women to utilize ANC as compared to unmarried one. The standard deviation of the married women was 0.4484 and the standard deviation of unmarried women was 0.4484.

The income of Mothers

The income of the respondent is also an important factor towards the utilization of ANC package. It was observed that expectant women's income averaged 230522.7Tshs with a standard deviation of 129955.3. This implies that composition of the expectant mother's income residing Lushoto districts and had attended for ANC averaged 230,522.7 Tshs. The minimum number income was 24,000 Tshs and the maximum income was 750,000 Tshs.

Mother's education

Upon receiving ANC service mother's education matters. That is those with high education are better to receive the package. Education of a mother was categorized as none (not received any formal education), primary education, secondary education, and university education. For the interviewed women about 17% had no education at all with standard deviation 0.3731494, 23% had higher education with a standard deviation of 0.4228283 and this percentage of women might have been caused by the presence of Sebastian Kolowa Memorial Univeristy which was a private university which might have indicated that some percent of the student attended university in SEKOMU had their lives in Lushoto, about 44% had secondary education with a standard deviation of 0.4972434 and the rest 16% had primary education with a standard deviation of 0.3662235. This implies that large percent of expectant mothers are more likely to attend for ANC as compared to those who are uneducated.

Mothers Occupation

From the interviewed mothers their occupation was categorized as a farmer, unemployed and employed. Mothers whose was unemployed was about 49% with their standard deviation of 0.5005303, employed being 40% of the expectant mothers with a standard deviation of 0.4908249 and those whose was a farmer was 11% with

a standard deviation of 0.3146672. This observation implies that large percent expectant mothers of selected wards in Lushoto district was unemployed of which upon interviewing the mothers their response based on the fact that they are just mothers at home not working depending on their husband and most of them lamented that their husbands don't want them to work and may have less influence in the utilization of ANC as compared to the employed and farmer women.

4.3 Distribution of the respondents depending on their visits to facility type

Table 4.2 Distribution of the respondents depending on their visits to facility type

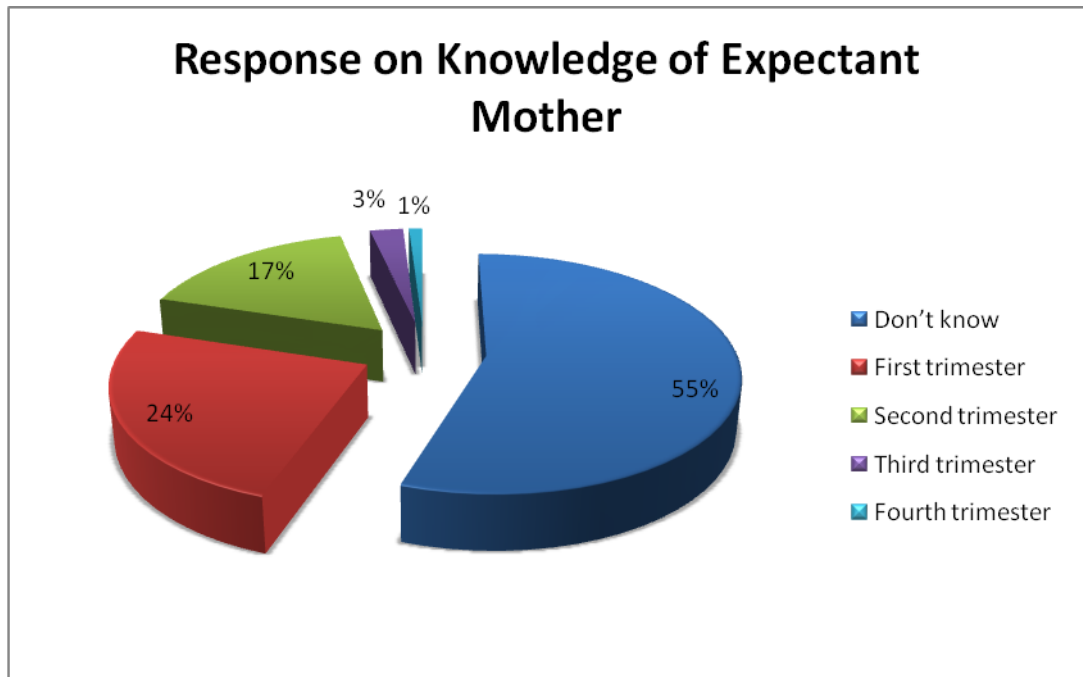
Facility type	Frequency	Percent
Private	116	29.3
Public	280	70.7
Total	396	100.0

Source: (Field information, STATA Output, 2019)

Given table 4.2 above the expectant mothers was distributed depending on the facility type they attended. That attended private facility was 116 women which is equivalent to 29.3% of the total selected population and those attended Public health facilities was 280 women which are equivalent to 70.7% of the total sample selected. This implies that a large group of women in Lushoto district among the selected wards visited the public facility of which may be associated with many factors for them to visits.

4.4 Objective One: To determine the proportions of women’s knowledge of the ANC services in maternal health facilities attended.

Figure 4.1 Response on the Knowledge among the recently delivered mother on Time of accessing ANC services.



Source: (Researchers Own Design, 2019)

Given figure 4.1 above the respondents were asked if they are aware about the trimester to attend when they are pregnant whereby about 55.3% of the expectant mother they don't know at which trimester they are required to attend, 24.5% of the respondents responded to first trimester as suitable for them to attend, about 16.7% of the expectant mothers believed that attending the second trimester is better for them, the rest 2.5% and 1% for those having knowledge that the best trimester to attend is third and fourth trimester respectively.

4.5 Response on the frequency of visits of the recently delivered mothers in selected wards in Lushoto district in facilities attended

Table 4.3 Response on the frequency of visits of the recently delivered mothers in selected wards in Lushoto district

Frequency of Visits	Frequency	Percent
No visits	26	6.6
First visit	131	33.1
Second visit	67	16.9
Third visit	104	26.3
Fourth visit	68	17.2
Total	396	100.0

Source: (Field Data, SPSS Output, 2019)

From table 4.3 above the number of visits made by the women was categorized as a minimum recommendation and guidelines by WHO. But the response on the frequency of visit in Lushoto district mothers was large percent for those whose attended only once which was 33.1% of the sample population and 26.3% for those whose made a total of the third visit to the respective health facilities, those attended for only second visit were 16.9% of the sample population and the last sample population attended fourth times were 17.2% and 6.6% for those who had not attended for any care at the respective health facilities.

4.6 Indicate the waiting time on receiving ANC among the recently delivered mothers in Lushoto district in the facility attended.

Table 4.4 Indicate the waiting time on receiving ANC among the recently delivered in Lushoto district

Waiting time	Frequency	Percent
1 -20 minutes	129	32.5
20 -40 minutes	63	15.9
40- 60 minutes	204	51.5
Total	396	100.0

Source: (Field data, SPSS Output, 2019)

From table 4.4 above indicate that the majority of the sampled population of the expectant mothers responds on the waiting time to be as within 40 – 60 minutes which is approximate 51.5% of the population followed by 32.5% of the expectant mothers whose categorized the waiting time as within 1- 20 minutes group and the remaining expectant mothers about 15.95% of the population responds as the waiting time for receiving care was between 20 – 40 minutes. The implication behind this is that the majority of expectant mothers faced a problem of waiting for care and this might be due to insufficient care providers such as midwives whose took a long time to treat one woman.

4.7 Represent the rating of waiting time for recently delivered women

Table 4.5 Rating of waiting time for women

How can you rate waiting time to receive the ANC Service?	Frequency.	Percent	Cum.
Enough/Convenient	121	30.56	30.56
Long	143	36.11	66.67
Too long	132	33.33	100
Total	396	100	

Source: (Field data, SPSS Output, 2019)

As indicated in table 4.5 above, the rating of the service rendered depending on waiting time when one is not satisfied or satisfied with the services received at respective healthcare. Then we can assume that they will probably not go back to the same facility if and only if they were not satisfied. The researcher then sought to find out the satisfaction of the respondents.

4.8 Level of satisfaction of recently delivered women for ANC services facility attended

Table 4.6 Ratings according to the Satisfaction level of Women for ANC service facility attended

Were you satisfied with the service provided by the respective health facility?	Frequency.	Percent	Cum.
Not all satisfied	271	68.43	68.43
Extremely satisfied	68	17.17	85.61
Very satisfied	57	14.49	100.00
Total	396	100	

Source: (Field data, SPSS Output, 2019)

Table 4.6 presents that, about 68.43% of women were not satisfied with the ANC service provided at the respective health facility they attended this percent might be caused by long waiting time to get the services and treated for any pregnancy complications, whereby about 17.17% and 14.49% were extremely satisfied and very satisfied respectively with the facility they attended. These results imply that the services provided over the respective health facility where the majority attended needs to be improved for women in Lushoto to rate them as extremely and very satisfied.

4.9 Objective 2: To analyze the factors affecting ANC utilization in public and private maternal health facilities

The second objective under the study was meant to analyze the factors affecting ANC utilization in Public and Private Maternal health facilities.

4.9.1 Logistic Regression on factors associated with ANC utilization in public and private maternal health facilities

To obtain the estimates logistic regression was run and the marginal effects were calculated. Logistic regression was used given the nature of the dependent variable which is a dummy in nature as it took two values 0 and 1, like 0 for not utilized the

Table 4.7 Logit Regression Model Fitness and Results indicating Coefficients on factors associated with ANC utilization in public and private maternal health facilities

Logistic regression		Number of obs	396
		Wald chi2(12)	104.38
		Prob > chi2	0.000
Log pseudolikelihood= -5.267824		Pseudo R2	0.693

ANC Utilization	Coefficients	Robust Std. Err.	z	P>z	[95% Conf. Interval]	
Age	-0.0305064	0.0452633	-0.67	0.500	-1.192209	0.058208
Marital status	2.362856	0.5366428	4.4	0.000	1.311055	3.414657
Farmer	0.8032984	0.8282417	0.97	0.332	-0.8200255	2.426622
Unemployed	0.8083096	0.5843706	1.38	0.167	-0.3370357	1.953655
InIncome	2.288272	0.6011051	3.81	0.000	1.110127	3.466416
Time of access to care	-0.2553228	0.2100079	-1.22	0.224	-0.6669307	0.1562851
Information access	1.447643	0.5692344	2.54	0.011	0.3319642	2.563322
Public Facility	2.284091	0.4896022	4.67	0.000	1.324488	3.243694
Waiting time	-0.1113971	0.0258604	-4.31	0.000	-1.620826	-0.0607117
Uninsured mother	0.4469409	0.4691165	0.95	0.341	-0.4725106	1.366392
Secondary education	1.939822	0.7310321	2.65	0.008	0.5070255	3.372619
University education	1.820335	0.7411891	2.46	0.014	0.3676309	3.273039
_Constant	-26.69497	6.986322	-3.82	0.000	-40.38791	13.00203

Source: (STATA Output, 2019)

Given the results of the logistic regression model in table 4.7 above indicating regression by default (coefficient) and odds ratio to analyze the factors affecting ANC utilization in public and private maternal health facilities. The fitness of the data was statistically significant given that the P-value 0.0000 is at ($P < 1\%$). And the Pseudo R^2 was 0.693 which indeed tells us how well the maximum likelihood estimates were obtained through iteration fitting the model, while the Wald $\chi^2(12) = 104.38$ which is the log of the likelihood chi-square test with 12 degrees of freedom. The implication of the log-likelihood -55.267824 is that all the parameters of the

independent variables are zero meaning that the logistic response can be rejected at a given significant levels.

The logistic regression above indicates that ANC utilization increases with an increase in the marital status of the expectant mother, mothers education level, type of facility, information access, income level and waiting time. The mentioned variables were statistically significant in influencing ANC utilization among expectant mothers in Lushoto district.

While some variables such as age, mothers occupation, time of accessing care and health insurance were statistically insignificant in influencing ANC utilization among expectant mothers in Lushoto district.

4.9.2 Marginal Effect Analysis Results for factors associated with ANC utilization in public and private maternal health facilities

The use of Marginal effect is to measure the expected change independent variables as results of the change in explanatory variables, keeping other covariates constant. Since the coefficients of the logistic regression can only give the direction of the effect but not the magnitude of the effect. Therefore, Marginal effect is computed to interpret the coefficient given both the magnitude and direction.

Table 4.8 Marginal Effects after logistic regression

variable	dy/dx	Std. Err.	z	P>z	[95% C.I.]	X
Age	-0.0006498	0.00102	-0.64	0.524	-0.00265 0.00135	28.3182
Mstatus2*	0.0978321	0.05195	1.88	0.060	-0.00399 0.199657	0.722222
Farmer*	0.0129777	0.01107	1.17	0.241	-0.00871 0.034669	0.111111
Unempl~d*	0.0174917	0.01384	1.26	0.206	-0.00963 0.044618	0.489899
lnincome	0.0487431	0.01766	2.76	0.006	0.01412 0.083366	12.2004
Timeof~e	-0.0054387	0.00444	-1.23	0.220	-0.01414 0.003258	1.46717
Infoacc2*	0.0336757	0.01774	1.9	0.058	-0.0011 0.068447	0.510101
public*	0.0893846	0.03841	2.33	0.020	0.0141 0.16467	0.707071
Wtime	-0.0023729	0.0009	-2.65	0.008	-0.00413 -0.00062	20.5303
uninsu~d*	0.0101419	0.01108	0.92	0.36	-0.01157 0.031854	0.631313
second~c*	0.0423612	0.01881	2.25	0.024	0.00549 0.079232	0.441919
univer~c*	0.0273879	0.01253	2.19	0.029	0.002831 0.051945	0.232323

(*) dy/dx is for discrete change of dummy variable from 0 to 1

4.10 Post Estimation Test to justify the use of the Logit Model on factors associated with ANC utilization in public and private maternal health facilities

This section indicates all the econometric tests conducted after the estimation of the logit model to see whether or not the estimates will be meaningful given the results obtained. In order to analyze the factors affecting ANC services utilization among expectant mothers in Public and Private maternal health facilities, numerous test were used to justify the use of the model. The test involved the fitness of the model, several statistical measures can also be used among them are Hosmer- Lemeshow goodness of fit test, Pseudo Rsquare, Specification error (model specification).

4.10.1 Fitness of the Model

Pseudo R-squared

From the regression model above the Pseudo, R² is 0.6930, the Pseudo R² can be interpreted as the measure of how well model fits the data on some occasions but not obvious. In binary regression, the interpretation of the Pseudo R² and coefficient are different because we are regressing 0 and 1 value and not the real values of dependent variables. Therefore we cannot set a range for Pseudo R² like OLS. Therefore the lower the Pseudo R-square, the model is fit and welcomed.

Hosmer-Lemeshow

Moreover, the fitness of the model was examined using the Hosmer-Lemeshow test for logistic regression. For the reason, that chance of Hosmer- Lemeshow (1.0000) is more than 5% level of significance which means that we reject the null hypothesis (H0) and we accept (H1). Whereby H0 shows that there's no relationship among the elements influencing ANC utilization of expectant mothers in public and private maternal health facilities and H1 suggest that there is a relationship among the elements influencing ANC utilization of expectant mothers in public and private maternal health facilities.

Table 4.9: Hosmer-Lemeshow Test

Logistic model for ANCutilization, a goodness-of-fit test		
Number Of Observations	=	396
Number Of Covariate Patterns	=	396
Pearson Chi2(383)	=	190.42
Prob> Chi2	=	1.00000

Source: (STATA Output, 2019)

4.10.2 Model Specification test

Moreover, another test performed was a specification error test by commanding Linktest, aiming to check whether the model was correctly specified or not. The results indicate that **_hatsq** which is the predicted value from the model is insignificant showing that the model is very well specified compared to **_haq**.

Table 4.10 Linktest for specification error

Logistic regression	Number of obs	=	396
	LR chi2(2)	=	249.67
	Prob > chi2	=	0.000
Log likelihood = -55.188943	Pseudo R2	=	0.6934

ANCUtil2	Coefficients	Std. Err.	z	P>z	[95% Conf. Interval]
_hat	0.9774823	0.1331605	7.34	0.000	.7164925 1.238472
_hatsq	0.0169131	0.042827	0.39	0.693	-.0670262 0.100853
_cons	-0.0609071	0.3142709	-0.19	0.846	-.6768667 0.555053

Source: (STATA Output, 2019)

4.10.3 Classification table

This is another way of evaluating the predictions generated with the aid of the model and fit of a given logistic regression model. This is, but, to expose how the model can produce accurate expected categories based on the values of the predictor variables.

Table 4.11 Classification table

Sensitivity	Pr(+ D)	98.18%
Specificity	Pr(~D)	79.10%
Positive predictive value	Pr(D +)	95.85%
Negative predictive value	Pr(~D -)	89.83%
False + rate for true ~D	Pr(+~D)	20.90%
False - rate for true D	Pr(- D)	1.82%
False + rate for classified +	Pr(~D +)	4.15%
False - rate for classified -	Pr(D -)	10.17%
Correctly classified		94.95%

Source: (STATA Output, 2019)

4.11 Objective 3: To analyze the factors influencing mothers' frequency of visits to ANC services in public and private maternal health facilities.

The third objective under the study meant to analyze the factors influencing expectant mothers' frequency of visits to ANC services in Public and Private maternal health facilities. Under this objective, the Ordered Probit regression analysis was employed and the results were computed.

4.11.1 Ordered Probit regression output results for the factors associated with mothers' frequency of visits to ANC services in public and private maternal health facilities

To obtain the estimates ordered probit regression was run and the marginal effects were calculated. An ordered Probit regression model was used given the nature of the dependent variable which is dummy which is ranked as 0 for no visits, 1 for the first visit, 2 for the second visits, 3 for the third visits and 4. Then to get the precise effects of the independent variables to the dependent variables marginal effects were computed.

Table 4.12 Ordered Probit Model Fitness and Results

Ordered probit regression

Number of obs = 394

Wald chi2(13) = 58.24

Prob > chi2 = 0.000

Pseudo R2 = 0.0556

Log pseudolikelihood = -557.21893

Frequency of visits	Coefficients	Robust Std. Err.	z	P>Z	[95% Conf. Interval]
Age	-0.0064259	0.0092591	-0.69	0.488	-0.0245734 0.0117217
Marital status	0.0609122	0.1564889	0.39	0.697	-0.2458003 0.3676248
Information access	0.0173002	0.1352237	0.13	0.898	-0.2477334 0.2823338
Primary education	0.471597	0.2655116	1.78	0.076	-0.0487962 0.9919903
University education	0.4417605	0.2187184	2.02	0.043	0.0130804 0.8704406
Secondary education	0.4976881	0.2282333	2.18	0.029	0.0503591 0.9450172
Transport costs	-0.000028	0.0000149	-1.88	0.060	-0.0000571 0.0000116
Waiting time	-0.0045814	0.005809	-0.79	0.430	-0.0159669 0.0068042
Income	0.2528953	0.1369986	1.85	0.065	-0.015617 0.5214076
Farmer	-0.0868988	0.174514	-0.5	0.619	-0.42894 0.2551425
Unemployed	0.0329697	0.1243616	0.27	0.791	-0.2107745 0.276714
Public facility	0.096289	0.1486037	0.65	0.517	-0.1949689 0.3875469
Uninsured mother	0.4862753	0.1264402	3.85	0.000	0.2384572 0.7340935
/cut1	3.09125	1.691788			-0.2245927 6.407093
/cut2	3.571756	1.694683			0.2502387 6.893274
/cut3	4.35157	1.702153			1.015411 7.687729
/cut4	5.190482	1.710753			1.837467 8.543496

Source: (STATA Output, 2019)

The presented results of the ordered probit regression model in table 4.8 estimates factors determining the factors influencing frequency of visits of the expectant mothers to maternal health facilities. The fitness of the data was statistically significant with P-value 0.0000 at $P < 1\%$. With Pseudo $R^2 = 0.0556$ which explain how well the maximum likelihood estimates were obtained through iteration fits the model, while the Wald $\chi^2(13) = 58.24$ is the likelihood chi square test with 13 degree of freedom. The log of likelihood -557.21893 which implies that all the

parameters of the independent variables are zero meaning that the ordinal responses obtain the four thresholds can be rejected at a given significance level.

The above results of the ordered probit regression analysis signify that probability of visits increases with the decrease in transport costs, waiting time, and insurance cover. Also, the probability of visits increases with the increase of income of the expectant mother and type of facility being public facility. The above-mentioned variables were statistically significant in analyzing the factors influencing the frequency of visits among recently delivered mothers in public and private maternal health facilities. While distance to the health facility was statistically insignificant in influencing the frequency of visits.

4.11.2 Ordered Probit regression output results for the factors associated with mothers' frequency of visits to ANC services in maternal health facilities

Primary Education of a mother and Frequency of Visits

It was expected that the level of education of a mother would have an influence on and positively related to the frequency of visits to ANC services. It was found in table 4.12, that primary education of a mother was statistically significant at 10% significant level with a p-value of 0.076 with positive relation to the frequency of visits suggesting that with primary education expectant mothers are more likely to visit for ANC service.

Secondary Education of a mother and Frequency of visits

With an expected sign of the secondary education of a mother in relation to the frequency of attendance to ANC, a mother with secondary education was expected to have attended for ANC. With the secondary education, it was found to be statistically significant at 5% significant level with a p-value of 0.029 being positively related to ANC attendance indicating that with increase in education level to secondary education a mother is more likely to attend for ANC in health facility.

University Education of a mother and Frequency of Visits

The level of university education of mother is expected to have positive relation towards frequency of visits of a mother to ANC, with university education ANC

attendance was found to be influenced by 5% significant level with p-value of 0.043. the implication behind this is that as number of university educated mothers increase it will increase the frequency of attendance to ANC as compared to when a mother do not attended any formal education.

Transport costs and Frequency of Visits

It was expected that transport costs would have an influence on the frequency of visits to ANC services. It was found in table 4.12, that transport cost was statistically significant at 10% significant level with a p-value of 0.060 with negative relation to the frequency of visits suggesting that with higher transport costs expectant mothers are less likely to attend for ANC service in a particular health facility.

The income of a mother and Frequency of Visits

The income of a mother was also statistically significant in influencing ANC visits indicated in empirical studies. From table 4.12 presented that income of the expectant mother was statistically significant at 10% in influencing ANC visits among expectant mothers residing in Lushoto district and positively related to a number of visits with p-value of 0.065. An increase in income of a mother was more likely to increases the frequency of visits of the expectant mother in a health facility.

Insurance Cover and Frequency of Visits

For mothers with no insurance was found to be statistically significant in influencing ANC visits at 1% significant level with p-value 0.000 as presented in table 4.12 above, meanwhile, it is positively related to ANC attendance among expectant mothers in public and private maternal health facilities residing Lushoto district.

4.11.3 Marginal Effect Analysis Results for the order of frequency of visits

The marginal effects results are used to measure the expected change in the dependent variable as a result of a change of explanatory variable, other covariates remaining constant. Since the coefficients of the ordered probit can only tell the direction of the effect but not the magnitude of the effect. Therefore, the marginal effect is computed to interpret the coefficients given both magnitude and direction.

Table 4.13 Marginal Effects for the Factors influencing frequency of visits for recently delivered women in Lushoto district, Tanga

ANTENATAL HEALTH CARE UTILIZATION	First Visits			Second Visits			Third Visits			Fourth Visits		
	Marg. Eff.	Std. Error	P>Z	Marg. Eff.	Std. Error	P>Z	Marg. Eff.	Std. Error	P>Z	Marg. Eff.	Std. Error	P>Z
	dy/dx			dy/dx			dy/dx			dy/dx		
Age	0.0023039	0.00331	0.486	0.0002592	0.00039	0.508	-0.0006989	0.00101	0.487	-0.001193	0.00172	0.487
Mstatus	-0.0219722	0.0568	0.699	-0.0023121	0.00558	0.679	0.0068062	0.01801	0.705	0.0112544	0.02883	0.696
Info access	-0.0062033	0.4851	0.898	-0.0006972	0.00542	0.898	0.0018824	0.01473	0.898	0.0032116	0.02509	0.898
Primary educ	-0.1541217	0.07729	0.0046***	-0.0304529	0.02335	0.192	0.0319003	0.01039	0.002***	0.088755	0.04987	0.075**
University educ	-0.1480684	0.0676	0.028*	-0.0258798	0.01719	0.132	0.0346375	0.01321	0.009***	0.0830638	0.04174	0.047*
Seconadry educ	-0.174722	0.07755	0.024**	-0.021788	0.01224	0.075**	0.0495625	0.02178	0.023**	-0.00000651	0.04272	0.032*
Transport	0.00001	0.00001	0.060**	0.00000113	0.00000	0.098**	-0.00000304	0.0000	0.079**	-0.0008506	0.0000	0.064**
Waiting time	0.0016426	0.00208	0.429	0.0001848	0.00025	0.451	-0.0004983	0.00062	0.425	0.0469515	0.00108	0.432
Income	-0.0906721	0.04902	0.064**	-0.0102015	0.00641	0.111	0.0275052	0.0158	0.082**	-0.0159348	0.02595	0.070**
Farmer	0.0316199	0.0644	0.622	0.0029898	0.00505	0.553	-0.0100855	0.02151	0.639	0.0159348	0.03156	0.614
Unemployed	-0.0118181	0.04456	0.791	-0.0013322	0.00506	0.792	0.0035823	0.01352	0.791	0.0061214	0.02312	0.791
Public facility	-0.0348302	0.05426	0.521	-0.00354	0.00499	0.478	0.0108933	0.01757	0.535	0.017428	0.02722	0.515
Uninsured	-0.1778363	0.0466	0.000***	-0.0136051	0.00577	0.018*	0.0581673	0.01957	0.003***	0.0868908	0.02213	0.000***

Source: Stata Output (2019)

*** 5% significance level**

**** 10% significance level**

***** 1% significance level**

From table 4.13 above the Marginal Effects given the ordered probit regression model shows that primary education, secondary education, university education, income and insurance cover of a mother are positively related to the frequency of visits. Therefore, any increase in the four identified factors increases the probability of frequency of visits of the expectant mothers in maternal health facilities while transport costs were negatively related to the frequency of visits in maternal health facilities. The implication behind this is that any decrease in expectant mothers' transport costs increases the probability of the mothers to visit the health facilities upon the respective visits.

Primary Education level

The level of primary education level of a mother was found to be statistically significant at 1%, 5% in influencing ANC attendance and positively related to the probability of a mother to attend antenatal care by third and fourth times as compared to when mothers visit for the first and second times which was found to be negatively related. The probability of a mother to attend antenatal care by third and fourth visits was found to be positively related to insurance cover implying that the probability of a mother increases to attend for third and fourth visits increase within an increase in level of primary education of a mother as compared to when a mother visits less than three times to the health facilities.

Secondary Education

The level of secondary education level of a mother was found to be statistically significant at 5% in influencing ANC attendance and positively related to the probability of a mother to attend antenatal care by third and fourth times as compared to when mothers visit for the first and second times which was found to be negatively related. The probability of a mother to attend antenatal care by third and fourth visits was found to be positively related to secondary level education implying that the

probability of a mother increases to attend for third and fourth visits with an increase in level of secondary education of a mother as compared to when a mother visits less than three times to the health facilities.

University Education

The level of university education of a mother was found to be statistically significant at 5% in influencing ANC attendance and positively related to the probability of a mother to attend antenatal care by third and fourth times as compared to when mothers visit for the first and second times which was found to be negatively related. The probability of a mother to attend antenatal care by third and fourth visits was found to be positively related to level education implying that the probability of a mother increases to attend for third and fourth visits with an increase in level of university education as compared to when a mother visits less than three times to the health facilities.

Transport costs

Transport costs were significant in influencing antenatal care utilization at 5% significant and positively related to the probability of a mother to use ANC by the first visit which implies an increase in number of first and second visits to ANC utilization increases with an increases transport costs. Also in comparison to the first attendance, the probability of a mother to attend antenatal care by third visits and fourth visits increase with a decrease in transport costs as compared to when a mother had their first visits.

The income of a mother

The wealth of a mother was found to be statistically significance influencing antenatal care at 5% significant level and positively related to the probability of a mother to ANC attendance by first, third and fourth times which imply that an increase in income of a mother increases ANC attendance by first, third and fourth times as compared to when a mother visits first time. The probability of a mother to attend antenatal care by first, second visits and fourth was negatively related to ANC utilization implying that the probability of a mother to attend for first, second visits

and fourth times increases with a decrease in income of a mother as compared to when a mother visits more than three times to a health facility.

Insurance Cover

The insurance cover was found to be statistically significant at 1% in influencing ANC attendance and positively related to the probability of a mother to attend antenatal care by third and fourth visits as compared to when mothers visit for the first and second times. The probability of a mother to attend antenatal care by third and fourth visits was found to be positively related to insurance cover implying that the probability of a mother increases to attend for third and fourth visits increase within an increase in insurance coverage of a mother as compared to when a mother visits less than three times to the health facilities which had negative influence on the ANC attendance.

4.12 Post Estimation test to justify the use of Ordered Probit

Under this section all econometric tests which are conducted after estimation of the ordered probit model to see whether or not the estimates will be meaningful given the results obtained.

4.12.2 Model Specification test use of Ordered Probit

According to Gujarati (2014) argued that model specification is an important aspect in econometric analysis and the model must be suitably specified. He also expressed that if the model is not suitably specified the analysis may encounter the problem of model specification error or model specification bias. The study conducted this test for the specification using Link test command in Stata Version 14. The Link test looks for specific errors known as link-error where the dependent variable is linked to accurately relate with the independent variables.

Table 4.14 Link Test Results

Ordered probit regression		Number of obs	=	394
		LR chi2(2)	=	67.85
		Prob > chi2	=	0.000
Log likelihood = -556.11753		Pseudo R2	=	0.0575

ANCutil2	Coefficients	Std. Err.	z	P>z	[95% Conf. Interval]
_hat	3.486581	1.735767	2.01	0.045	0.084541 6.888621
_hatsq	-0.3620343	0.2510976	-1.44	0.149	-0.8541765 0.1301079
/cut1	7.282512	2.967812			1.465707 13.09932
/cut2	7.7654	2.97012			1.944071 13.58673
/cut3	8.542735	2.969781			2.722072 14.3634
/cut4	9.376276	2.967963			3.559177 15.19338

Source: (STATA Output, 2019)

It should be remembered that, H_0 : Model is well specified and H_a : is not well specified. Since the probability ($P > |t|$) of hatsq was 0.149 which was greater than 5% significance level, therefore the t test of the hatsq is insignificant. Then, this gives sufficient information to fail to reject H_0 and therefore the model is well specified. However this results is good and does not suffer model specification error.

CHAPTER FIVE

DISCUSSIONS OF THE FINDINGS

5.1 Introduction

This chapter discusses in details the findings obtained from the preceding chapter. The comprehensive discussion is more emphasized on descriptive and empirical findings. The discussion is organized in regard to specific objectives, results from the logistic regression and ordered probit was discussed.

5.2 Discussions on the Descriptive analysis of the characteristics of expectant mother utilized ANC

Age of the expectant mother

This is the length of time that an expectant mother has lived, the expectant mother is a woman who is pregnant or has given birth within the previous six months (having either delivered a live child or a stillborn baby after 24 weeks of pregnancy). According to the analysis, the average mean of the expectant mother was 28 years old. According to the Tanzania Population Census (2012) considered all reproductive women aged 15 - 49 years old, meaning that are the women who can conceive and give birth to a child. The average age of 28 years old implied that most of the women in Lushoto district were pregnant. Therefore women aged between 15 – 49 years old are more likely to get pregnant. The minimum age of the expectant mother was 17 years old and the maximum age was 47 years old.

Marital Status of the Expectant Mother

This is the extent to which a woman is either married or not married. From the descriptive analysis, of about 72% of the expectant mothers were married and 28% were not married to mean that they were single, widowed or separated. Marital status is an important factor in assessing expectant mothers' utilization of ANC package and it is expected that married mothers utilize ANC as compared to unmarried one. The standard deviation of the married expectant women was 0.4484 and the standard deviation of unmarried expectant mothers was 0.4484 with the minimum and maximum numbers of 0 and 1 respectively.

Mothers Education Level

This refers to the years of schooling of an expectant mother; it plays a considerable role in the utilization of antenatal care. From the descriptive analysis above the education of a mother was categorized as none (not received any formal education), primary education, secondary education, and university education. For the interviewed women about 17% had no education at all with standard deviation 0.3731494, 23% had university education with a standard deviation of 0.4228283, about 44% had secondary education with a standard deviation of 0.4972434 and the rest 16% had primary education with a standard deviation of 0.3662235. This implies that a large percent of expectant mothers had secondary education as compared to those attended primary education.

Mothers Occupation

From the interviewed mothers their occupation was categorized as a farmer, unemployed and employed. Expectant mothers whose was unemployed was 49% with their standard deviation of 0.5005303, those employed was 40% of the expectant mothers with a standard deviation of 0.4908249 and those whose was farmers were 11% with a standard deviation of 0.3146672. This observation implies that large percent expectant mothers of selected wards in Lushoto district were unemployed as compared to those worked as farmers and those employed in different areas.

5.3 Discussions on the proportions of women's knowledge on the ANC services maternal health facilities.

Frequency of Visits among recently delivered mothers

From table 4.3 above the number of visits made by the women was categorized as minimum recommendation and guidelines given by WHO. But the response on the frequency of visit in Lushoto district antenatal mothers was large percent for those who attended only once in comparison to those of the other visits. The results imply that the means for attending the facility such as type of facility, transport costs, distance and waiting time needs to be checked and improved for women to attend the

ANC for more than four times. These were consistent with that of Kushwaha et al. (2016), whereby their results show that the majority of women of about 97% availed at least one ANC to their last birth. Also, Berhe et al. 2014 found that 88.9% of the women had at least one antenatal visits during their recent pregnancy and almost half of the antenatal care attendants (44.2%) made their first visit at their second and third trimester of pregnancy.

Waiting Time to receive ANC service among recently delivered mothers

From table 4.4 majority of the sampled population of the expectant mothers responds on the waiting time to be as within 40 – 60 minutes which is approximate 51.5% of the population followed by 32.5% of the expectant mothers whose categorized the waiting time as within 1- 20 minutes group and the remaining expectant mothers about 15.95% of the population responds as the waiting time for receiving care was between 20 – 40 minutes. The implication behind this is that the majority of expectant mothers faced a problem of waiting for care and this might be due to insufficient care providers such as midwives whose took a long time to treat one woman. According to Joshi et al. (2016) indicated a significant association between waiting for time and utilization of maternal health services, they also found that majority of the respondents approximate of 73.5% suggested that long waiting time affects utilization of maternal health service among mothers in Hilly region.

Time of accessing ANC among recently delivered mothers

Given figure 4.1 the respondents were asked if they are aware of the trimester to attend when they are pregnant. The results found that a large percentage of the mothers recently delivered were not aware of the best time for accessing the ANC. The implication behind this is that women should be given maternal health education specifically on the utilization of the full ANC package of which they will be able to know the recommended visits with their respective trimester to attend. This study is contrary to the study conducted by Berhe et al. 2014 on antenatal care utilization and its associated factors whereby they found that trimester at which women attending their first contact with ANC was found to be different. Of 48% made their first visit

in their first trimesters, 42.4% were found to start their attendance in their second trimester of pregnancy but only 1.8% started their visit during their third visit. Also, Tewodros et al. (2009) found that 49.2% of the pregnant women had their first visit during their second trimester and 29.1% had four or more ANC during their last period of pregnancy.

5.4 To analyze the factors affecting ANC utilization in maternal health facilities

Table 4.7 summarizes the factors affecting ANC utilization in maternal health facilities. The results show that seven variables are statistically significant and four variables are not statistically significant in relation to the dependent variables. It can be observed that the contribution of ANC utilization in maternal health facilities was significantly related to marital status (being married), mothers education (primary education, secondary and university education), facility type, income, information access, and waiting time for care which imply that have significant influence on ANC utilization of mothers in maternal health facilities while age, mothers occupation, time of accessing ANC and uninsured mother was not significantly related to ANC utilization. Variables such number of the married mother, years of primary education, years of secondary education, years of university education, use of a public facility, information access and income had a positive relationship while the age of expectant mother, time of accessing ANC and waiting time had a negative relationship.

Marital Status of Mothers

The results from regression analysis indicate that the number of the married expectant mother is positively related to ANC utilization and statistically significant. The implication behind this outcome is that for being married women the probability of expectant mother utilizing ANC is higher as compared to unmarried women. Higher proportions of married women avail ANC because they may receive support from their husbands and family as compared to unmarried expectant mothers. The number of married women displays a significant effect on the utilization of ANC as compared to unmarried women. This study is consistent with the study by Rurangiriwa et al. (2017) which found that women who were single

divorced or widowed and who had no support from family, relative or friend were at high risk of poor utilization of ANC services. Also on the study conducted in public primary healthcare facilities in Edo state by Alenoghena, Isah, and Isara (2015) found that there is an association between marital status of pregnant women and ANC utilization.

Mothers' Education Level

The logistic regression controlling other factors indicate that the mothers who were of primary and secondary education were positively related to ANC utilization and significant. The implication of these outcomes is that secondary educated and university educated women are higher in the utilization of ANC compared to non-formal education. Women with secondary and university education were more likely to utilize ANC compared to women with no formal education. The level of education of a mother determines the utilization level of antenatal health care services. Kawungezi et al.(2015) found the results which were not comparable to the results of this study that, mothers level of education influenced the use of ANC, whereby mothers with primary education level were more likely to attend ANC than women who are unable to read or write. Also, this study supported the study conducted by Greenaway, Leon, and Baker (2012), on the association between maternal education and use of health services in Ghana where the authors demonstrate a strong link between mothers' formal education and a measure of women's' health education in accessing health care services.

Facility type (Use of Public facility)

The regression results reporting coefficients revealed a strong positive relationship between ANC utilization and the use of a public facility. The positive coefficient of the use of public facility indicates the probability of expectant mothers to utilize ANC services as compared to the private facility which might be so costly in accessing the ANC services. The results show that utilization of ANC increases with an increase in attendance of mothers in public health facilities compared to those of private health facilities. According to Islam and Masud (2018) found similar results

as the place of ANC influences the frequency of visits, they found that place of delivery such as the public facility to be significantly associated with frequency of visit as compared to a private facility. Gupta et al. (2014) reported similar results and proved that about more than 80% of the interviewed women utilized ANC services at the public sector health facilities with dispensaries providing ANC to more than 50% of which within the public sector health facilities ANC +4 rate at the hospital was higher.

Information Access (expose to media)

The results from the regression analysis reporting coefficients, media shows a positive relation to the use of ANC in maternal health centers. The results indicate that media access is statistically significant. The positive coefficient of the access to media shows the probability of expectant mother is more probable to utilize ANC in maternal health centers. In various studies carried out in the world, this look at is consistency to some research which proved that exposure to mass media (tv and radio) is appreciably associated with ANC usage. A study performed in Ethiopia by Tekelab et al 2019, indicates that publicity to mass media is strongly associated with antenatal care usage amongst pregnant women. similar study at by Mathe (2017) located that mothers exposed to mass media especially tv and radio are significantly using ANC service and proved that watching televisions programs on health and ANC every week extensively influence the chances of women looking for antenatal care services, that is due to the fact the information on reproductive health motivates pregnant mothers to wait for ANC services.

Waiting time for care

A mother tends to be uncomfortable when seated in one position. If the waiting time is too much they may fail to attend ANC services unlike when waiting time is not very long. From the regression analysis, the researcher found that long waiting time is negatively related to ANC and signs indicate the probability of mother not to utilize the ANC services given the long waiting time to receive the care as compared to when waiting time is short meaning that it decreases with an increase in waiting

time. This study supports the results by Nyuthi et al. (2017) which proved that waiting time for ANC services hinder the time for receiving care, some women complained that they have been often made to wait for long periods and from time to time they brushed off due to the fact nurses could declare that it was too late for them to receive ANC. The authors proved that women were greater worried about spending the entire day on the medical institution once they had to shop for meals whilst waiting for their turn to be served. This study is in keeping with another study carried out by Banda, Michelo and Hazemba (2012) where they found that lengthy ready time before to being attended to ANC facilities was a barrier to initiate ANC on the advocated term.

5.5 Factors influencing mothers' frequency of visits to ANC services in maternal health facilities.

Under this section, a researcher assesses empirically the second objective in which factors such as the income of the mother, insurance cover, transport costs, waiting time, primary, secondary and university education, age, marital status were analyzed with intention to capture their influence on ANC utilization in public and private maternal health facilities. This section used an ordered probit in which marginal effect was also computed to identify the effect of these factors on ANC attendance in maternal health facilities in Lushoto district.

5.5.1 Factors influencing expectant mothers' frequency of visits to ANC service

The analysis reveals that; income of expectant mother, uninsurance coverage for mothers, transport costs and primary education, secondary education and university education were statistically significant while other factors in this part were statistically insignificant influencing ANC utilization. Thus, only the significant factors are discussed.

Transport costs and Frequency of Visits

It was expected that transport costs would have an influence on the frequency of visits to ANC services. The probability of a mother to attend antenatal care by second visits, third visits and four visits increase with a decrease in transport costs as

compared to when a mother visits more than five times. It was found that transport cost was statistically significant at 10% and negatively related to the frequency of visits suggesting that the probability of a mother to attend antenatal care by four visits increases with a decrease in transport costs towards the health facilities compared to when mothers visit more than 5 times. With higher transport costs expectant mothers are less likely to visit for ANC service. This study is consistent with that of Nyuthi et al. (2017) of which they found that women were more concerned with high transport costs and because they were not working it was difficult for them to pay for transport costs while others needed to be accompanied by their family hence transport costs were a hindrance for regular visits.

The income of a mother and Frequency of Visits

The use ANC by 3 and 4 times imply that an increase in income of a mother increases ANC utilization as compared to when a mother visits less than three times. The probability of a mother to attend antenatal care by first and second visits was negatively related to ANC utilization implying that the probability of a mother to attend for first and second visits increases with a decrease in income of a mother as compared to when a mother visits more than five times to a health facility. The income of a mother was also statistically significant at 10% significant level in influencing ANC visits indicated in empirical studies and positively related to a number of visits. The implication behind is that the probability of a mother to attend for antenatal care by four visits increases with an increase in the income of a mother as compared to when mothers visit less than three times. As income increases expectant mothers were more likely to visit for ANC services more than the first time. Perhaps, this might be caused by mothers investing their income to improve their attendance for ANC services. As expectant mothers income may be used for ANC attendance rather than spending on other expenditures. The results are similar to the study by Islam and Masudi (2018) showed that women with higher quantile wealth index are more likely to visits for ANC early as compared to women with lower quantile (poor).

Insurance Cover and Frequency of Visits

For mothers with no insurance coverage were found to be statistically significant at 1% significant level in influencing ANC visits meanwhile, it is positively related to ANC attendance among mothers in maternal health facilities residing Lushoto district. The probability of a mother to attend antenatal care by first and second visits increases with an increase in the use of the public facility as compared to when a mother visits less than three times. This implies that the probability of a mother to attend antenatal care by four times increases with increase in a number of mothers having not covered by health insurance by 8.68% as compared when a mother visits less than. This might be due to the fact that antenatal care is freely provided thus, using insurance card is useless. This complies with the study conducted by Kibusi et al. (2018) as they found that health insurance has a significant relationship to maternal health service utilization. They reveal that higher proportion of women with health insurance had their proper timing of visits as compared to those with no health insurance and concluded that women covered with health insurance are more likely to have proper timing visit as compared to those without covered by insurance.

CHAPTER SIX

SUMMARY, CONCLUSION AND POLICY IMPLICATION

6.1 Chapter description

This chapter presents a summary of the findings obtained from the discussion in the previous chapter. The conclusion and policy implication also is presented whenever necessary for improving the situation by policy makers and planners. Furthermore, this chapter will present areas of further research and the limitations of the study.

6.2 Summarization of the Study

The aim of this cross-sectional study was to investigate the major determinants of antenatal healthcare utilization in public and private maternal health facilities in Lushoto district, Tanga region. The survey data was collected from 396 expectant mothers as respondents from Lushoto districts in Tanga region. Descriptive statistical analysis, Logistic regression and ordered probit analysis were used to answer the questions arising from three objectives. The objectives were (i) to determine the proportions of women's knowledge on the ANC services in maternal health facilities (ii) to analyse the factors affecting ANC healthcare utilization in maternal health facilities and (iii) to analyse the factors influencing expectant mothers' frequency of visits to ANC services in maternal health facilities.

Findings representing demographic characteristics of expectant mothers were presented using the descriptive statistics, the average number of expectant mothers attended for ANC was 396. It was observed that the average age of expectant mothers was 28 years old which represents the age composition of expectant mothers. The marital status of the interviewed mothers was found to be 72% for married women and 28% for those expectant mothers not married. The income of the expectant mothers was also analyzed and observed that the average income of the expectant mothers residing in Lushoto district.

With the category of expectant mothers' education upon receiving ANC services which were categorized as not received a formal education, primary educated, secondary educated and university level educated expectant mothers. About 17% of the expectant mothers not received any formal education, 23% had a university

education, 44% had secondary education and the rest 16% had primary education. This implies that among the total population of expectant mothers a large population of them had secondary education. Mother's occupation was also categorized as a farmer, employed and unemployed expectant mothers of which about 49% expectant mothers were unemployed, 40% were employed and 11% was a farmer. Upon ANC utilization the occupation of expectant mothers implies that large percent of expectant mothers residing in Lushoto district were unemployed. On the distribution of respondents based on the frequency of visits to the facility, the type was mainly categorized as if expectant mother attended public or private facility whereby about 116 expectant mothers which are equivalent to 29.3% attended private health facilities and about 280 which is equivalent to 70.7% attended public facilities in Lushoto district.

From the first objective on the determination of proportions of women knowledge on utilization of ANC in public and private maternal health facilities. The response on the knowledge was based on the trimester attended and if they understand at which trimester an expectant mother is supposed to start a visit, where about 55.3% said they don't know, about 24.5% said the first trimester, 16.7% said the second trimester, 2.5% said third trimester and about 1% said the fourth trimester. On the frequency of visits the expectant mother was asked if they are aware of the number of visits that are supposed to make according to the WHO recommendation schedule, the response was and waiting time.

Of 396 recently delivered mothers number about 33.1% which is equivalent to 131 expectant mothers attended for the first visit, 16.9% which is equivalent to 67 expectant mothers attended for only second visit, 26.3% attended the third visit, 17.2% attended the fourth visit and 6.6% of the expectant mothers attended for more than four visit.

The findings on the second objective showed that eight variables from thirteen influence ANC utilization of expectant mothers. The findings on socio-demographic characteristics influencing ANC were marital status whereby for an expectant mother who is married had the possibility of utilizing the package for ANC. Also with a

secondary educated and university educated mother had more possibility of ANC utilization simply because they are considered to have knowledge concerns ANC clinic and attendance. Also with expectant mothers occupation increased the possibility of them to attend for ANC if they are employed.

The findings on the accessibility of ANC services were based on the type of facility an expectant mother had attended which had also a strong influence on the ANC utilization, thus public facility had a strong influence on the utilization of ANC in maternal health facilities. On the access to information concerns ANC services, an expectant mother had a greater possibility of attending for ANC if has access to information or she reads the news, listens to the radio and watches Television as compared to those whose had no access to information. On accessing ANC services income and waiting time also matter whereby higher income women were more likely to utilize ANC and long waiting time to ANC facilities had a lower influence on ANC services utilization.

The findings on knowledge concerning ANC, the results were such as frequency of visit had greater influence on the utilization of ANC that is, the higher the number of visits of an expectant mother the higher the possibility of her to receive full ANC package and waiting time was also significant in influencing ANC utilization whereby with the less waiting time there is possibility of an expectant mother to attend for ANC services as compared to long waiting time.

The findings on the third objective indicate that among eleven independent variables seven variables were significantly related to the frequency of visits of the expectant mothers in maternal health facilities. The findings on the transport costs indicate that with lower transport costs expectant mothers are more likely to attend ANC services. Income was also significant indicating the possibility of an expectant mother to go for a visit given that the income is higher for women to attend the health facility. It was also proved that the education of the expectant mother has a greater influence on the number of visits and expectant mother made. That is, there is a possibility of an expectant to go for visits given the level of education such as primary education , secondary education and university education.

6.3 Conclusion

The purpose of this study was to analyze the major determinants of ANC services utilization in maternal health facilities in Lushoto district, Tanga. The study was guided by three objectives along which respondents were asked the prepared questions and the response was analyzed. The results of the study showed that there was an underutilization of ANC services which was merely caused by low adherence of the WHO recommendation schedule which suggested a maximum of eight visits.

For the case of first objective aimed to investigate on the proportions of recently delivered mothers' knowledge on ANC service residing Lushoto district and the study found that on the knowledge concerns the trimester they attended was found that larger percent of expectant mothers don't know at which trimester they are required to attend for care, also on the number of visits they are supposed to make, large percent of expectant mothers were not aware of the number of visits and also on the waiting time for care was found that expectant mothers were tired of long waiting time for accessing ANC than if the waiting time is short and reliable for receiving care.

The study findings from the second objective also indicated that mother's education, marital status, income, waiting time, insurance cover, information access(through media), and facility type were statistically significant and had influence on utilization of ANC services in maternal health facilities in Lushoto district, Tanga while age, occupation, time of accessing ANC and uninsured mother had no influence on the utilization of ANC in maternal health facilities.

On the third objective identifying factors affecting ANC utilization, The study findings established that like any other areas in the world, transport costs, income of expectant mother, uninsured mother and primary education, secondary and university education was statistically influences the frequency of visit among expectant mothers in maternal health facilities whereby waiting time and age, public facility, marital status, occupation and information access had no influence on the number of visit expectant mothers made upon receiving ANC in maternal health facilities which made expectant mothers not to come back for preceding appointments.

Generally, the findings of this literature could help the policymakers and researchers to design some specific strategies to improve utilization of ANC among mothers in public and private health facilities.

6.4 Policy Implications

The study recommends addressing the issues of waiting time for antenatal care services to improve their utilization. That is there is a need to increase the number of nurses, midwives and equip dispensaries so that high workload can be distributed among them.

The study recommends on the promotion and provision of education based on the ANC services package and be aware about the number of visits recommended by WHO which provides the need to educate pregnant mothers especially of younger ages on the need to utilize maternal health services including ANC so as to achieve WHO minimum requirement of number of visits on ANC and reducing maternal mortality under SDG 3 and 5. Also, the study recommends the training of health workers on interpersonal relationship to improve their health workers relationship and this should be done during basic professional training.

The study should recommend different efforts in the utilization of ANC which should be targeted in rural areas through strengthening maternal health program and should ensure that they are more efficient, friendly, focused and accessible to all pregnant women.

Exposure to mass media is a key determinant in the utilization of ANC services. The positive relationship between exposure to mass media and expectant mothers utilization to ANC. This provides great emphasize on government and other NGO's to provide basic information on maternal health through television, radio and in different government and NGO's health institutions specifically on ANC with the aim of reducing maternal mortality and enhance the utilization of maternal health services in Lushoto.

The facility type categorized as use of the public facility was significant in determining the level of utilization and frequency of visit of expectant mothers to ANC in Lushoto districts. With this regards expectant mothers were considered to utilize the service in public health facilities as compared to private ones. This then calls for sensitization to the government to increase public facilities especially in rural areas that will provide more health services to the public where the majority of the expectant mothers attend.

6.5 Limitations of the study

The study was also delimited to only ANC utilization among women of reproductive age (15-49) as defined by WHO whose were specifically of the recently delivered number in Lushoto district. The study based only on Lushoto district in Tanga and women of the prescribed age. Data collection was done in Lushoto (urban area) and the remaining rural areas covered with mountains which had some kind of rainy weather which posed difficulties in surveying the area where the researcher was supposed to use even bodaboda (motorcycles) during data collection.

6.6 Area for Further Study

The researcher suggested further studies on different factors affecting ANC in Lushoto and other areas in Tanzania which have underutilization of ANC services as one of the remedies for Maternal Mortality. The relationship between husband education, husband occupation, expectant mothers' income, transport costs, and age of expectant and utilization of ANC needs to be investigated since upon reducing maternal mortality utilization of ANC services still remain a challenge, especially in rural Tanzania. Also, the knowledge and practice of ANC guidelines and policy among expectant mothers on ANC utilization need to be emphasized.

REFERENCES

- Abosse Z, Woldie M and Ololo S. (2010) Factors Influencing Antenatal Care Services Utilization in Hadiya Zone. Ethiopia Journal of Health Science Vol.20, No.2, July 2010, Ethiopia
- Acharya K, Sunil (2018) Demographic and Socio-economic Factors Affecting Antenatal Care Services Utilization in Nepal. Journal of Development and Administrative Studies (JODAS), Vol.24(1-2),pp.71-78
- Acharya, K. S (2018) Demographic and Socio-Economic factors Affecting Antenatal Care Service Utilization. The Journal of Development and Administrative Studies (JODAS), Vol. 24 (1-2), pp.71-87
- Akowuah, A.J, Agyeu-Baffour P&Awunyo-Vito D (2018) Determinants of Antenatal Healthcare Utilization by Pregnant women in 3rd Trimester in Peri-Urban Ghana
- Alenoghena I.O, IsahEc&Isara AR (2015) Maternal Health Services Uptake and its determinants in Public Primary healthcare facilities in Edo State, Nigeria. Niger Postgrad Medical Journal.2015; 22(1);25-31
- Alkema, L. Chou D, Hogan D, Zhang S, BethMoller A, Gremmil A, Mafat, D, Boerma, T, Temmerman M, Mathers C, Say L (2015) Global, Regional and National levels and trends in Maternal Mortality between 1990 and 2015, with scenario-based projections to 2030; a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. www.thelancet.com Vol 387
- Banda I, Michelo, C and Hazemba, (2012) Factors associated with late Antenatal Care Attendance in Selected Rural and Urban Communities of the Copperbelt Province of Zambia. Medical Journal of Zambia, Vol. 39, No. 3(2012)
- Banda, C. (2013) Barriers to Utilization of Focused Antenatal Care among Pregnant Women in Ntchisi District in Malawi. Accessed on May 5, 2019, from <https://tampub.uta.fi/handle/10024/846400>

- Berhe K.K, Welearegay, G.H, Abera, B.G, Kahsay, B.H, and Kahsay B, A (2014) Assesment of ANC utilization and its associated factors among 15 to 49 years of age women in AyderKebelle, Melcelle City 2012/2013: A cross-sectional study, *American Journal of Advanced Drug Delivery*.
- Chepkorir (2014) Determinants of Maternal Healthcare Utilization in Rural Kenya
- Deepak C, Jauhari N, Dhungana H (2018) A study on Utilization of Maternal Health Services and Factors influencing the Utilization in Urban Slums of Lucknow. *International Journal of Medics Public Health* 2018;8(2);:77-81
- Eketish-Amponsah, E. Senadza, B. Arthur, E. (2013) Determinants of utilization of antenatal care services in developing countries: Recent evidence from Ghana' *African Journal of Economic and Management Studies*, Vol 4 Issue:1, Pp.58-73
- Greenaway S. E, Leon. J, Baker D. P, (2012) Understanding the Association Between Maternal Education and Use of Health Services in Ghana: Exploring the Role of Health Knowledge. *Journal Biosoc Sci.* 2012 November; 44(6): 733-747.doi:10.1017/S0021932012000041. National Institute of Health Public Access
- Gross, J &Ebu, N.A (2015) Factors influencing access to antenatal service and delivery care in Sub Saharan Africa. *African Journal of Midwifery and Women's Health* 9:2
- Gross, K, Alba, S, Glass, R.T, Schellenberg, J.A &Obrist, J (2012) Timing of Antenatal Care for Adolescent and Adult Pregnant Women in South-Eastern Tanzania. *BMC Pregnancy and ChildbIRTH*.
- Gupta, S, Yamada, G., Mpembeni, R, Framence G, Callaghan-Koru, A, J, Stevenson, R, Brades, N and Baqui, H. A (2014) Factors Associated with four or more Antenatal Care Visits and its decline among pregnant women in Tanzania between 1999 and 2010. *PLOS ONE* 9(7):e101893.doi:10.11371/journal.pone.0101893

- Halle-Ekane E. G, Obinchemti E. T, Nzang N, Mokube M. N, Njie M.M and Njamien N. T (2014) Assesment of the Content and Utilization of Antenatal Care Services in a Rural Community in Cameroon: A Cross-Section Study. Open Journal of Obstetrics and Gynecology, 2014, 4, 846-856. Accessed on May 8, 2019 from <http://www.script.org/jpurnal/ojoghttp://dx.doi.org/10.4236/ojog.2014.414119>
- Islam, M.M and Masud, M.S (2018) Determinants of Frequency and Contents of Antenatal Care Visits in Bangladesh: Assessing the extent of Compliance with the WHO recommendations. PLoS ONE 13(9): e0204752. Available on <https://doi.org/10.1371/journal.pone.0204752>
- Joshi P, Mahalingam G, Sorte, Y.D (2016) Factors influencing Utilization of Maternal and Child Health Services among the Postnatal Mothers in Hilly region. International Journal of Research in Medical Sciences 2016, June; 4(6); 2170-2176
- Kibusi M, S, Sunguya, F, B, Kimunai E and Hines S, C (2018) Health Insurance is Important in Improving Maternal Health Services utilization in Tanzania: Analysis of the 2011/2012 Tanzania HIV/AIDS and Malaria Indicator Survey. BMC Health Service Research.
- Kushwaha, P, Mehnaz, S, Ansari, M.A, Khalil, S (2016) Utilization of antenatal care services in Peri-Urban area Aligarh. International Journal of Medical Science and Public Health.
- Lincetto, O, Mothebesoane-Anoh, S, Gomez P, Munjanja, S (2015) Antenatal Care. *Opportunities for Africa's Newborns*. WHO Reproductive Health Indicator countdown to 2015 Child Survival Process.
- Mathe, M (2017) Social-demographic factors affecting utilization of Antenatal Care services in Botswana. International Journal of Academic Research in Business and Social Science. 2017, Vol.7, No.9 ISSN:2222-6990

- Neeta P.N, Sameena A, R. B, Suresh C.M, Goud G, Bharat, Sajjans, Chetana (2018) Assessment of Utilization of Maternal Healthcare services in rural field Practice areas of VIMS, Ballari. International Journal of Community Medicine and Public Health India, 2018 Jan; 5(1):170-176
- Nyathi L, Tugli AK, Tshitangano TG, Mpofu M (2017) Investigating the accessibility factors that influence antenatal care services utilization in Mangwe District, Zimbabwe. African Journal of Primary Healthcare & Family Medicine. 2017;9(1),a1337 accessed on <https://doi.org/10.4102/phcfm.v9i1.1337> accessed in 4, April 2019.
- Olayinka A, Onasoga, Joel A. A, Oladimeiji, Bukola, D (2012) Factors Influencing Utilization of ANC among pregnant women in Ife central Lga, Osun State Nigeria. Advances in Applied Science Research, 2012, 3(3);1309-1315. Available online at www.pelagiaresearchlibrary.com
- One Plan II (2016-2020) The National Road Map Strategic Plan to Improve Reproductive, Maternal NewBorns, Child & Adolescent Health in Tanzania. Ministry of Health, Community Development, Gender, Elderly and Children, URT.
- Rurangiriwa, A.A, Mogren, I, Nyirazinyoye, L, Ntaganira, J. &Krantz, G (2017) Determinants of Poor utilization of antenatal care services among recently delivered women in Rwanda; a population-based study.
- Rurangirwa A.A, Mogren I, Nyirazinyoye, Ntaganira J and Krantz G (2017) Determinants of Poor Utilization of Antenatal Care services among recently delivered women in Rwanda: a population-based study. BMC Pregnancy and ChildBirth.
- Rutaremwa G, Wandera O. S, Jhamba, T, Akior E, &Kiconco A (2015) Determinants of Maternal Health Services Utilization in Uganda. BMC Health Services Research.

Saad-Haddad G, Dejong, J, Terreri, N, Clara M, Restrepo- Mendez, Perin J, Vaz L, Newby H, Amouzou, A, Barros, J A, Bryce J(2016) Patterns and Determinants of Antenatal Care: Analysis of National Survey data in Seven Countdown Countries. Journal of Global Health.Vol 6 No 1010404 Beirut Lebanon.

TDH-MIS (2016) Tanzania Demographic Health Survey and Malaria Indicator Survey. Ministry of Health, Community Development, Gender, Elderly and Children, National Bureau of Statistics, Office of the Chief Government Statistician and ICF.Dar es Salaam, Tanzania, and Rockville, Maryland, USA.

Tekelab, T, Chonjeta, C, Smith R &Loxton D (2019) Factors Affecting Utilization of Antenatal Care Services in Ethiopia: A Systematic Review and Meta-analysis PLoS ONE 14(4): e0214848. <https://doi.org/10.1371/journal.pone.0214848>

Tolefac N.P, Halle-Ekane E.G, Agbor N, V, Sama B.C, Ngawasiri C and Tebeu M, P (2017) Why do Pregnant Women Present Late for their first Antenatal Care Consultation in Cameroon? Journal of Maternal Health, Neonatology and Perinatology, Cameroon.

Umar S. A and Bawa B, S (2015) Antenatal Care Services Utilization in Yobe State, Nigeria: Examining Predictors and Barriers.International Journal of MCH and AIDS. Available online at www.mchandaids.org ISSN 2161-864X.

UNICEF (2015) Progress for Children beyond Averages: Learning from the MDGs. New York, 2015.

UN(2017) Transforming Our World: The 2030 Agenda for Sustainable Development. UNITED NATIONS.www.sustainabledevelopment.un.org

WHO (2001/2002) WHO antenatal care randomized trial: Manual for implementation of the new model. Geneva, World Health Organization, 2002. Accessed on

http://www.who.int/reproductivehealth/publications/RHR_01_30/RHR_01_30.pfd

accessed on March 4, 2019.

URT (2008-2015) The National Road Map Strategic Plan To Accelerate Reduction of Maternal, Newborn and Child Deaths in Tanzania. *Ministry of Health and Social Welfare*.

WHO (2006) Provision of Effective Antenatal Care. Integrated Management of Pregnancy of Child Birth (IMPAC). Standards for Maternal & Neonatal Car.

WHO (2006) Provisions of Focused Antenatal Care of Pregnant Women. World Health Organization, Geneva.

WHO (2015) Opportunities for Africans Newborns. Practical data, Policy and Programmatic support for newborn care in Africa. Retrieved from <http://www.who.int/pmnch/media/publications/oanfullreport.pdf>

WHO (2016) WHO recommendations on antenatal care for a Positive pregnancy Experience. WHO, Geneva, 2015

WHOO, UNICEF, UNFPA and The World Bank (2015) Trends in Maternal Mortality: 1990 to 2015, WHO, Geneva, 2015.

APPENDICES

APPENDIX I: QUESTIONNAIRES

ANTENATAL HEALTHCARE UTILIZATION IN PUBLIC AND PRIVATE MATERNAL HEALTH FACILITIES IN LUSHOTO, TANGA

Dear respondent,

I am Jumanne Ally Setonga, a student at Mzumbe University in Morogoro, Tanzania. I am conducting research on “**Antenatal Healthcare Utilization in Public and Private Maternal Health Facilities in Lushoto District, Tanga**”. You are among the people who have been selected to participate in this study to obtain your contribution, perceptions, and views regarding various issues on Antenatal Healthcare. The purpose of this study and its findings is purely academic thus, I kindly request for your assistance by sparing some of your time to participate in this study. All information provided will be handled and treated with maximum confidentiality.

Thank You in advance.

RESPONDENTS NAMES:

RURAL/URBAN WARD:

PART A: EXPECTANT WOMEN’S DEMOGRAPHIC INFORMATION

1. How old are you?

Specify.....

2. What is your marital status?

a. Married []

b. Not married []

3. What is your religion or denomination?

- a. Christian []
 - b. Muslim []
 - c. Others (Specify).....
4. Have you ever attended school?
- a. Yes []
 - b. No []
5. If yes in 4 above, what is your highest level of education?
- a. None []
 - b. Primary education []
 - c. Secondary education []
 - d. University education []
6. What is the highest level of your husbands' education?
- a. None []
 - b. Primary education []
 - c. Secondary education []
 - d. University education []
7. What do you do for a living?
- a. Employed []
 - b. Unemployed []
 - c. Farmer []
8. What is your spouse occupation?
- a. Employed []
 - b. Unemployed []
 - c. Farmer []
9. What is your daily expenditure?
- Specify
10. How many deliveries have you ever had?
- a. One []
 - b. Two []
 - c. Three []
 - d. More than four []

- e. None []

SECTION B: INFORMATION OF KNOWLEDGE ON ANTENATAL CARE

11. Did you utilize the Service (ANC)?

- a. Yes []
- b. No []

12. Which type of facility did you attend?

- a. Public []
- b. Private []

13. How did you hear about Antenatal Care Services?

- a. Through friends []
- b. Through relatives []
- c. During a visit to health institution []
- d. Through the media []

14. With regard to your previous pregnancy, did you attend Antenatal care clinics?

- a. Yes []
- b. No []

15. If yes in number 12 above, how many antenatal clinic visits did you make?

.....

16. When is it appropriate trimesterfor pregnant women to access Antenatal Care Services?

- a. Don't know
- b. 1st Trimester []
- c. 2ndTrimester []
- d. 3rd Trimester []
- e. 4th Trimester []

16. At which month of the pregnancy did you start antenatal care?

- a. Don't know
- b. 0 – 3 months (0-12 Weeks) []
- c. 4 – 6 months (13-24 Weeks) []
- d. 7 – 9 months (25-36weeks) []

17. How many visits did you make to the Antenatal Care Services during the entire period of pregnancy?

Specify.....

18. How often have you accessed Antenatal Care Services?

- a. Once []
- b. Twice []
- c. Thrice []
- d. 4 times []
- e. As often as there are signs of danger []

19. For how long did you wait to receive ANC care?

.....

20. In your opinion, do you think that the waiting time has an influence on the utilization of ANC service?

- a. Yes []
- b. No []

21. If yes in 19 above, please explain the reasons

.....
.....
.....
.....

22. In your opinion, how can you rate the waiting time in the hospital you have visited?

- a. Enough / Convenient
- b. Long
- c. Too long

23. Were you satisfied with the services offered at this facility regarding antenatal care?

- a. Extremely satisfied
- b. Very satisfied
- c. Not all satisfied

24. In case you become expectant again, would you prefer to come for ANC services in this hospital?
- a. Yes
 - b. No

PART B: INFORMATION ON ACCESS TO ANTENATAL HEALTH CARE

25. Is the ANC healthcare provided at the facility you attend?
- a. Yes []
 - b. No []
26. a) How far do you live from the facility (in kilometers)?
- b) Does that motivate you to attend the facility when time is due?
- a. Yes []
 - b. No []
27. What is the means of transportation to the Antenatal Care center?
- a. Walking []
 - b. Public means []
 - c. Private Car []
 - d. Others (Specify).....
28. How much do you pay for to and from the antenatal care center or estimated cost of transportation?
- Specify
29. How much do you pay for hospital spending during a visit?
- Specify
30. A) Do you consult anybody for permission before attending a health facility?
- a. Yes []
 - b. No []
- B) If Yes, Who?
- a. Father []
 - b. Mother []
 - c. Husband []

d. Religious head []

e. Other (specify)

C) Does that have an influence you to seek care?

Specify.....

31. Do you have health insurance?

a. Yes []

b. No []

**PART C: QUESTIONNAIRES BASED ON THE FACTORS INFLUENCING
FREQUENCY OF VISITS OF AN EXPECTANT MOTHER**

32. How much do you spend per day on a daily basis?

.....

33. How much do you pay for hospital spending during a visit?

Specify

34. From question 2, how can you rate that amount of spending on hospitals?

a. High []

b. Medium []

c. Low []

35. How much do you pay for to and from the antenatal care center or estimated cost of transportation?

Specify

36. From question 35, with that costs you incur, are you encouraged to go to another visit?

a. Yes []

b. No []

37. How far do you live from the facility (in kilometers)?

Specify

38. From question 37, does the distance encourage you to receive frequency of visits?

a. Yes []

b. No []

39. If yes/ no give reasons

.....
.....
.....

40. For how long do you wait to receive the ANC at the prescribed facility?

Specify

41. From question 40, how can you rate the level of time waiting for care?

a. Enough / Convenient []

b. Long []

c. Too long []

42. Do you have Health Insurance?

a. Yes []

b. No []

43. From question 42, does health insurance encourage to attend for ANC care?

a. Yes []

b. No []

44. If yes/ no give reasons

.....
.....
.....

*****Thanks for your cooperation*****

APPENDIX I: LOGIT REGRESSION

```
. logit ANCutil2 Age Mstatus2 Farmer Unemployed lnincome TimeofaccesstoCare Infoacc2 public Wtime uninsured secondaryeduc uni
> versityeduc, robust
```

```
Iteration 0:   log pseudolikelihood = -180.02262
Iteration 1:   log pseudolikelihood = -79.759669
Iteration 2:   log pseudolikelihood = -57.70003
Iteration 3:   log pseudolikelihood = -55.341945
Iteration 4:   log pseudolikelihood = -55.267971
Iteration 5:   log pseudolikelihood = -55.267824
Iteration 6:   log pseudolikelihood = -55.267824
```

```
Logistic regression               Number of obs   =           396
                                Wald chi2(12)    =          104.38
                                Prob > chi2      =           0.0000
Log pseudolikelihood = -55.267824 Pseudo R2      =           0.6930
```

ANCUtil2	Robust					[95% Conf. Interval]
	Coef.	Std. Err.	z	P> z		
Age	-.0305064	.0452633	-0.67	0.500	-.1192209	.058208
Mstatus2	2.362856	.5366428	4.40	0.000	1.311055	3.414657
Farmer	.8032984	.8282417	0.97	0.332	-.8200255	2.426622
Unemployed	.8083096	.5843706	1.38	0.167	-.3370357	1.953655
lnincome	2.288272	.6011051	3.81	0.000	1.110127	3.466416
TimeofaccesstoCare	-.2553228	.2100079	-1.22	0.224	-.6669307	.1562851
Infoacc2	1.447643	.5692344	2.54	0.011	.3319642	2.563322
public	2.284091	.4896022	4.67	0.000	1.324488	3.243694
Wtime	-.1113971	.0258604	-4.31	0.000	-.1620826	-.0607117
uninsured	.4469409	.4691165	0.95	0.341	-.4725106	1.366392
secondaryeduc	1.939822	.7310321	2.65	0.008	.5070255	3.372619
universityeduc	1.820335	.7411891	2.46	0.014	.3676309	3.273039
_cons	-26.69497	6.986322	-3.82	0.000	-40.38791	-13.00203

```
.
end of do-file
```

II: MARGINAL EFFECT FOR LOGIT REGRESSION

```
. mfx
```

```
Marginal effects after logit
y = Pr(ANCUtil2) (predict)
= .97822456
```

variable	dy/dx	Std. Err.	z	P> z	[	95% C.I.	]	X
Age	-.0006498	.00102	-0.64	0.524	-.002649	.00135		28.3182
Mstatus2*	.0978321	.05195	1.88	0.060	-.003993	.199657		.722222
Farmer*	.0129777	.01107	1.17	0.241	-.008713	.034669		.111111
Unempl~d*	.0174917	.01384	1.26	0.206	-.009634	.044618		.489899
lnincome	.0487431	.01766	2.76	0.006	.01412	.083366		12.2004
Timeof~e	-.0054387	.00444	-1.23	0.220	-.014136	.003258		1.46717
Infoacc2*	.0336757	.01774	1.90	0.058	-.001095	.068447		.510101
public*	.0893846	.03841	2.33	0.020	.0141	.16467		.707071
Wtime	-.0023729	.0009	-2.65	0.008	-.004128	-.000618		20.5303
uninsu~d*	.0101419	.01108	0.92	0.360	-.01157	.031854		.631313
second~c*	.0423612	.01881	2.25	0.024	.00549	.079232		.441919
univer~c*	.0273879	.01253	2.19	0.029	.002831	.051945		.232323

(*) dy/dx is for discrete change of dummy variable from 0 to 1

III: LINKTEST FOR LOGIT MODEL SPECIFICATION

```
. linktest

Iteration 0:  log likelihood = -180.02262
Iteration 1:  log likelihood = -67.279451
Iteration 2:  log likelihood = -58.180398
Iteration 3:  log likelihood = -55.490495
Iteration 4:  log likelihood = -55.206486
Iteration 5:  log likelihood = -55.188976
Iteration 6:  log likelihood = -55.188943
Iteration 7:  log likelihood = -55.188943

Logistic regression              Number of obs   =          396
                                LR chi2(2)           =        249.67
                                Prob > chi2            =         0.0000
Log likelihood = -55.188943      Pseudo R2        =         0.6934
```

ANCUt1l2	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
_hat	.9774823	.1331605	7.34	0.000	.7164925 1.238472
_hatsq	.0169131	.042827	0.39	0.693	-.0670262 .1008525
_cons	-.0609071	.3142709	-0.19	0.846	-.6768667 .5550525

IV: TEST FOR GOODNESS OF FIT

```
. estat gof

Logistic model for ANCUt1l2, goodness-of-fit test

number of observations =          396
number of covariate patterns =          396
Pearson chi2(383) =          190.42
Prob > chi2 =              1.0000
```

V: SPECIFICATION TEST (CLASSIFICATION TABLE)

```
. estat classification

Logistic model for ANCUt1l2
```

Classified	True		Total
	D	~D	
+	323	14	337
-	6	53	59
Total	329	67	396

Classified + if predicted Pr(D) >= .5
True D defined as ANCUt1l2 != 0

Sensitivity	Pr(+ D)	98.18%
Specificity	Pr(- ~D)	79.10%
Positive predictive value	Pr(D +)	95.85%
Negative predictive value	Pr(~D -)	89.83%
False + rate for true ~D	Pr(+ ~D)	20.90%
False - rate for true D	Pr(- D)	1.82%
False + rate for classified +	Pr(~D +)	4.15%
False - rate for classified -	Pr(D -)	10.17%
Correctly classified		94.95%

VI: ORDERED PROBIT REGRESSION

```
. oprobit Freqvisit Age Mstatus2 Infoacc2 primaryeduc universityeduc secondaryeduc Transcost Wtime lnincome Farmer Unemploy
> ed public uninsured, robust
```

```
Iteration 0: log pseudolikelihood = -590.04255
Iteration 1: log pseudolikelihood = -557.39159
Iteration 2: log pseudolikelihood = -557.21893
Iteration 3: log pseudolikelihood = -557.21893
```

```
Ordered probit regression      Number of obs   =      394
                              Wald chi2(13)         =      58.24
                              Prob > chi2            =      0.0000
Log pseudolikelihood = -557.21893      Pseudo R2       =      0.0556
```

Freqvisit	Robust					[95% Conf. Interval]
	Coef.	Std. Err.	z	P> z		
Age	-.0064259	.0092591	-0.69	0.488	-.0245734	.0117217
Mstatus2	.0609122	.1564889	0.39	0.697	-.2458003	.3676248
Infoacc2	.0173002	.1352237	0.13	0.898	-.2477334	.2823338
primaryeduc	.471597	.2655116	1.78	0.076	-.0487962	.9919903
universityeduc	.4417605	.2187184	2.02	0.043	.0130804	.8704406
secondaryeduc	.4976881	.2282333	2.18	0.029	.0503591	.9450172
Transcost	-.000028	.0000149	-1.88	0.060	-.0000571	1.16e-06
Wtime	-.0045814	.005809	-0.79	0.430	-.0159669	.0068042
lnincome	.2528953	.1369986	1.85	0.065	-.015617	.5214076
Farmer	-.0868988	.174514	-0.50	0.619	-.42894	.2551425
Unemployed	.0329697	.1243616	0.27	0.791	-.2107745	.276714
public	.096289	.1486037	0.65	0.517	-.1949689	.3875469
uninsured	.4862753	.1264402	3.85	0.000	.2384572	.7340935
/cut1	3.09125	1.691788			-.2245927	6.407093
/cut2	3.571756	1.694683			.2502387	6.893274
/cut3	4.35157	1.702153			1.015411	7.687729
/cut4	5.190482	1.710753			1.837467	8.543496

```
.
end of do-file
```

VII: MARGINAL EFFECTS FOR ORDERED PROBIT

```
. mfx,predict(outcome(1))
```

Marginal effects after oprobit

```
y = Pr(Freqvisit==1) (predict, outcome(1))
= .32198974
```

variable	dy/dx	Std. Err.	z	P> z	[	95% C.I.	]	X
Age	.0023039	.00331	0.70	0.486	-.004183	.00879	28.3426	
Mstatus2*	-.0219722	.0568	-0.39	0.699	-.133307	.089363	.72335	
Infoacc2*	-.0062033	.04851	-0.13	0.898	-.10129	.088883	.51269	
primar~c*	-.1541217	.07729	-1.99	0.046	-.305599	-.002645	.159898	
univer~c*	-.1480684	.0676	-2.19	0.028	-.280562	-.015574	.230964	
second~c*	-.174722	.07755	-2.25	0.024	-.326712	-.022732	.444162	
Transc~t	.00001	.00001	1.88	0.060	-4.3e-07	.00002	3245.46	
Wtime	.0016426	.00208	0.79	0.429	-.002431	.005716	20.5584	
lnincome	-.0906721	.04902	-1.85	0.064	-.186744	.0054	12.2017	
Farmer*	.0316199	.0644	0.49	0.623	-.094599	.157839	.111675	
Unempl~d*	-.0118181	.04456	-0.27	0.791	-.099147	.075511	.48731	
public*	-.0348302	.05426	-0.64	0.521	-.14118	.071519	.71066	
uninsu~d*	-.1778363	.0466	-3.82	0.000	-.269171	-.086502	.634518	

(*) dy/dx is for discrete change of dummy variable from 0 to 1

```

. mfx,predict(outcome(2))

Marginal effects after oprobit
      y = Pr(Freqvisit==2) (predict, outcome(2))
      = .18533611

```

variable	dy/dx	Std. Err.	z	P> z	[	95% C.I.	]	X
Age	.0002592	.00039	0.66	0.508	-.000509	.001027	28.3426	
Matatus2*	-.0023121	.00558	-0.41	0.679	-.013255	.008631	.72335	
Infoacc2*	-.0006972	.00542	-0.13	0.898	-.011327	.009933	.51269	
primar-c*	-.0304529	.02335	-1.30	0.192	-.076215	.01531	.159898	
univer-c*	-.0258798	.01719	-1.51	0.132	-.059562	.007802	.230964	
second-c*	-.021788	.01224	-1.78	0.075	-.045769	.002193	.444162	
Transc-t	1.13e-06	.00000	1.65	0.098	-2.1e-07	2.5e-06	3245.46	
Wtime	.0001848	.00025	0.75	0.451	-.000296	.000666	20.5584	
lnincome	-.0102015	.00641	-1.59	0.111	-.02276	.002357	12.2017	
Farmer*	.0029898	.00505	0.59	0.553	-.006898	.012878	.111675	
Unempl-d*	-.0013322	.00506	-0.26	0.792	-.011246	.008582	.48731	
public*	-.00354	.00499	-0.71	0.478	-.013324	.006244	.71066	
uninsu-d*	-.0136051	.00577	-2.36	0.018	-.024915	-.002296	.634518	

```

(*) dy/dx is for discrete change of dummy variable from 0 to 1

.
end of do-file

. do "C:\Users\QUEENT-1\AppData\Local\Temp\STD01000000.tmp"

. mfx,predict(outcome(3))

Marginal effects after oprobit
      y = Pr(Freqvisit==3) (predict, outcome(3))
      = .2802904

```

variable	dy/dx	Std. Err.	z	P> z	[	95% C.I.	]	X
Age	-.0006989	.00101	-0.69	0.487	-.002671	.001273	28.3426	
Matatus2*	.0068062	.01801	0.38	0.705	-.028492	.042105	.72335	
Infoacc2*	.0018824	.01473	0.13	0.898	-.026981	.030746	.51269	
primar-c*	.0190003	.01039	3.07	0.002	.011532	.052268	.159898	
univer-c*	.0346375	.01321	2.62	0.009	.008746	.060529	.230964	
second-c*	.0495625	.02178	2.28	0.023	.006883	.092242	.444162	
Transc-t	-3.04e-06	.00000	-1.75	0.079	-6.4e-06	3.6e-07	3245.46	
Wtime	-.0004983	.00062	-0.80	0.425	-.001721	.000725	20.5584	
lnincome	-.0275052	.0158	-1.74	0.082	-.003457	.058468	12.2017	
Farmer*	-.0100855	.02151	-0.47	0.639	-.052243	.032072	.111675	
Unempl-d*	.0035823	.01352	0.27	0.791	-.022908	.030072	.48731	
public*	.0108933	.01757	0.62	0.535	-.023538	.045325	.71066	
uninsu-d*	.0581673	.01957	2.97	0.003	.019817	.096518	.634518	

```

(*) dy/dx is for discrete change of dummy variable from 0 to 1

.
end of do-file

. do "C:\Users\QUEENT-1\AppData\Local\Temp\STD01000000.tmp"

. mfx,predict(outcome(4))

Marginal effects after oprobit
      y = Pr(Freqvisit==4) (predict, outcome(4))
      = .16157787

```

variable	dy/dx	Std. Err.	z	P> z	[	95% C.I.	]	X
Age	-.001193	.00172	-0.70	0.487	-.004557	.002171	28.3426	
Matatus2*	.0112544	.02883	0.39	0.696	-.045254	.067762	.72335	
Infoacc2*	.0032116	.02509	0.13	0.898	-.045964	.052387	.51269	
primar-c*	.0887555	.04987	1.78	0.075	-.008984	.186495	.159898	
univer-c*	.0830638	.04174	1.99	0.047	-.001251	.164877	.230964	
second-c*	.091679	.04272	2.15	0.032	.007959	.175399	.444162	
Transc-t	-5.19e-06	.00000	-1.86	0.064	-.000011	2.9e-07	3245.46	
Wtime	-.0008506	.00108	-0.79	0.432	-.002973	.001272	20.5584	
lnincome	.0469515	.02595	1.81	0.070	-.003906	.097809	12.2017	
Farmer*	-.0159348	.03156	-0.50	0.614	-.077793	.045923	.111675	
Unempl-d*	.0061214	.02312	0.26	0.791	-.03919	.051432	.48731	
public*	.0177428	.02722	0.65	0.515	-.035615	.071101	.71066	
uninsu-d*	.0868908	.02213	3.93	0.000	.043525	.130256	.634518	

```

(*) dy/dx is for discrete change of dummy variable from 0 to 1

.
end of do-file

. do "C:\Users\QUEENT-1\AppData\Local\Temp\STD01000000.tmp"

. mfx,predict(outcome(5))

Marginal effects after oprobit
      y = Pr(Freqvisit==5) (predict, outcome(5))
      = .05080589

```

variable	dy/dx	Std. Err.	z	P> z	[	95% C.I.	]	X
Age	-.0006712	.00099	-0.68	0.497	-.002607	.001265	28.3426	
Matatus2*	.0062237	.01559	0.40	0.690	-.024329	.036776	.72335	
Infoacc2*	.0018065	.01413	0.13	0.898	-.02588	.029493	.51269	
primar-c*	.0639188	.04545	1.41	0.160	-.02517	.153007	.159898	
univer-c*	.0562469	.0333	1.69	0.091	-.009019	.121513	.230964	
second-c*	.0552686	.02796	1.98	0.048	.000459	.110078	.444162	
Transc-t	-2.92e-06	.00000	-1.84	0.066	-6.0e-06	2.0e-07	3245.46	
Wtime	-.0004786	.00062	-0.77	0.443	-.001701	.000744	20.5584	
lnincome	.026417	.01465	1.80	0.071	-.0023	.055134	12.2017	
Farmer*	-.0085894	.01643	-0.52	0.601	-.040788	.023609	.111675	
Unempl-d*	.0034466	.013	0.27	0.791	-.02203	.028923	.48731	
public*	.0097342	.01456	0.67	0.504	-.018807	.038275	.71066	
uninsu-d*	.0463834	.01294	3.59	0.000	.021029	.071738	.634518	

```

(*) dy/dx is for discrete change of dummy variable from 0 to 1

.
end of do-file

.

```

VIII: LINKTEST FOR SPECIFICATION TEST OF ORDERED REGRESSION

```
. linktest

Iteration 0:  log likelihood = -590.04255
Iteration 1:  log likelihood = -556.57917
Iteration 2:  log likelihood = -556.11834
Iteration 3:  log likelihood = -556.11753
Iteration 4:  log likelihood = -556.11753

Ordered probit regression      Number of obs   =       394
                               LR chi2(2)           =        67.85
                               Prob > chi2           =         0.0000
Log likelihood = -556.11753    Pseudo R2         =         0.0575
```

Freqvisit	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
_hat	3.486581	1.735767	2.01	0.045	.084541	6.888621
_hatsq	-.3620343	.2510976	-1.44	0.149	-.8541765	.1301079
/cut1	7.282512	2.967812			1.465707	13.09932
/cut2	7.7654	2.97012			1.944071	13.58673
/cut3	8.542735	2.969781			2.722072	14.3634
/cut4	9.376276	2.967963			3.559177	15.19338