

**YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF ECONOMICS
Ph.D. PROGRAMME**

**PATTERNS AND DETERMINANTS OF MATERNAL AND
REPRODUCTIVE HEALTH CARE SERVICES
UTILIZATION IN MYANMAR
(A CASE STUDY OF BAGO TOWNSHIP)**

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MAY, 2024**

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REPRODUCTIVE HEALTH CARE SERVICES
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(A CASE STUDY OF BAGO TOWNSHIP)**

**This Thesis Submitted in Partial Fulfillment of the Requirements for the
Degree of Doctor of Philosophy (Ph.D.) in Economics,
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YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF ECONOMICS
Ph.D. PROGRAMME

This is to certify that this dissertation entitled “**Patterns and Determinants of Maternal and Reproductive Health Care Services Utilization in Myanmar (A Case Study of Bago Township)**” submitted as the requirements for the Degree of Doctor of Philosophy in Economics has been accepted by the Board of Examiners.

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ABSTRACT

Maternal mortality ratio is a key health indicator of development. This study aims to identify maternal and reproductive health care seeking behaviors, to determine the factors influencing maternal and reproductive health care services and to assess the effect of these health care service utilizations on infant mortality in Bago Township. Descriptive statistics was used to examine the patterns of maternal and reproductive health care services; binary and multinomial logistic regression were used to analyze the determinants of maternal and reproductive health care services and to assess the effects of maternal and reproductive health care service utilization on infant mortality. This study reveals that more than half of pregnant women receive at least four ANC visits whereas three quarters of them receive it from skilled providers. More than half of live births were delivered in a health facility whereas more than three quarters of births are assisted by skilled providers. Furthermore, nearly half of mothers receive PNC within the first 2 days after birth and more than half of currently married women use modern contraceptive method in Bago Township. This study also found that woman's occupation, household monthly income, age, education, knowledge of health and place of residence have positive effect on the maternal and reproductive healthcare service use. In contrast, problems concerning money needed for delivery/drugs/ treatments and distance to health facility and cultural practices have negative effect on these health care services. Women with over third birth order are less likely to use antenatal care, delivery care, and postnatal care but they are more likely to use modern contraceptive method. This study observes that the risk of infant mortality decreases if a mother receives ANC from a skilled provider, gives birth assistance by a doctor, receives PNC, or uses modern method of contraception. Maternal and reproductive health of women would improve if policy makers focused more on promoting health knowledge, increasing the availability of skilled health providers in rural areas, and transmitting mass media for the safety and well-being of mothers and infants in Myanmar, including Bago Township.

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LIST OF ABBREVIATIONS

AMW	- Auxiliary Midwife
ANC	- Antenatal Care
BMI	- Body Mass Index
CPR	- Contraceptive Prevalence Rate
DC	- Delivery Care
DOH	- Department of Health
EmOC	- Emergency Obstetric Care
EPMM	- Eliminating Preventable Maternal Mortality
FGC	- Female Genital Cutting
HA	- Health Assistant
HDP	- Hypertensive Disorder Pregnancy
HIV	- Human Immunodeficiency Virus
HSS	- Health System Strengthening
IMR	- Infant Mortality Rate
IUD	- Intrauterine Device
LHV	- Lady Health Visitor
LMIC	- low and middle income countries
MDGs	- Millennium Development Goals
MDHS	- Myanmar Demographic Health Survey
MDR	- Maternal Death Review
MDSR	- Maternal Death Surveillance and Response
MMCWA	- Myanmar Maternal and Child Welfare Association
MMEIG	- Maternal Mortality Estimation Interagency Group
MMR	- Maternal Mortality Ratio
MMR	- Maternal Mortality Ratio
MOH	- Ministry of Health
MOHS	- Ministry of Health and Sport
MRCS	- Myanmar Red Cross Society
MRH	- Maternal and Reproductive Health
MW	- Midwife
NMR	- Neonatal Mortality Rate

PAD	- Processionary Assisted Delivery
PHS	- Public Health Supervisor
PMR	- Perinatal Mortality Rate
PNC	- Post Natal Care
PPH	- Postpartum Hemorrhage
RH	- Rural Health
RH	- Reproductive Health
RHC	- Rural Health Center
RTI	- Respiratory Tract Infection
SBA	- Skilled Birth Attendant
SDGs	- Sustainable Development Goals
TBA	- Traditional Birth Attendant
STI	- Sexually transmitted infections
TBA	- Traditional Birth Attendant
TFR	- Total Fertility Rate
U5MR	- Under-five Mortality Rate
UHC	- Urban Health Center
UN	- United Nation
UN IGME	- United Nations Inter-Agency Group for Child Mortality Estimation
UN MMEIG	- United Nation Maternal Mortality Estimation Interagency Group
UNFPA	- United Nations Population Fund
UNICEF	- United Nations Children's Fund
USAID	- United States Agency for International Development
WHO	- World Health Organization

CHAPTER I

INTRODUCTION

1.1 Rationale of the Study

The World Health Organization (WHO) defines maternal health as the health of women throughout the stages of pregnancy, childbirth, and the postpartum period. It includes both the well-being of women and the sufficiency of health services to fulfill their requirements. The process of giving birth introduces various health risks to women, encompassing physical, mental, and social impacts. Failure to manage these risks effectively can lead to severe health complications and can even result in death for both mother and child (WHO, 2010). Maternal deaths occur predominantly during delivery, or in the immediate postpartum period, often due to anemia, infections, or hypertensive disorders. Roughly 50% of maternal deaths happen within 24 hours after giving birth which underscore the need of timely and comprehensive maternal healthcare interventions (Hogan, Gorman & Naghavi, 2010). Most of these deaths are prevented by accessing health care services during pregnancy, giving birth assistance by skilled health provider at health facility, receiving healthcare services within 2 days after childbirth as recommended by WHO. Thus, to decrease maternal mortality by enhancing maternal healthcare service utilization, it is necessary to explore the factors that affect maternal health care service use. Despite the collective global endeavors to enhance maternal health, these remains major threatening health challenges.

Various factors contribute to the global issues encountered in maternal health. Key issues encompass political and inadequate health systems, socio-economic and gender disparities, and restricted availability of high-quality care. Parental illness can reduce children's emotional and financial support, as well as cause them to miss school or drop out to enter the workforce, which lowers future economic productivity. A mother's death affects the family, the community, and the remaining children, who are frequently at a higher risk of poverty, abuse, and death (World Bank, 1993). Fundamentally, a healthier population represents better health and, consequently,

higher levels of economic productivity for many individuals. Better macroeconomic performance can result from the accumulation of these individual effects at the community level.

Healthy women are more capable of actively participating in the labour market, leading to effective labor supply and thereby influencing the level and growth of economic output. Improved health also enhances the returns on educational investments, achieved through reduced morbidity facilitating increased labor market participation and lower mortality impacting participation levels. (Jayachandran and Lleras-Muney, 2009; Albanesi and Olivetti, 2014). Furthermore, better maternal health directly influences children's health during pregnancy and breastfeeding, contributing to intergenerational transmission of human capital (Field et al., 2009). Enhanced female health can also lower fertility rates, impacting youth dependency which affect contribution of women in the labour market and investments in education (Bloom et al.,2009). Improving women's health can reduce fertility rates, which in turn reduces the number of young dependents. This has a positive impact on women's participation in the labour market and investments in education. Maternal health interventions, especially access to modern health care during pregnancy, delivery, and postpartum, are highly effective in reducing maternal death and illness (Bloom et al., 2009).

According to the modernization theory perspective, countries that have experienced modernization will have lower fertility rate which will result in lower maternal mortality rate. Thus, a decline in maternal mortality is a key health status indicator of the population to improve the level of economic development. The effort to improve the usage of family planning is linked to modernization from the assessment of modernization theory. The human development index consists of three components namely health, education, and income. The health aspect of the index is measured by life expectancy at birth, which aggregates the long and healthy life of the population (Okwan Frank and Peter Kovacs, 2020). Maternal mortality is a key health indicator for a country's development and is predicted by economic conditions, educational attainment, and health care. Maternal mortality as well as deaths during pregnancy, childbirth or within 42 days after delivery remain major challenges for world health systems. The maternal mortality ratio (MMR) is a crucial measure of the health status and socio-economic progress of a community. (Yousef Alimohamadi et al., 2019).

The year 2016 marked the beginning of the Sustainable Development Goals (SDGs), with target 3.1 aiming to reduce maternal deaths to 70 per 100,000 live births by 2030. Target 3.2 is to eliminate preventable deaths among infants and children under 5 years old with the goal of reducing neonatal mortality to a minimum of 12 deaths per 1,000 live births and under-5 mortality to a minimum of 25 deaths per 1,000 live births by 2030. Furthermore, SDG 3.7 aims to ensure universal access to sexual and reproductive healthcare services, encompassing family planning, information, and education, incorporated into national strategies and programs by 2030 (United Nations, 2016). Achieving these targets requires significant efforts, as highlighted in the country's National Health Plan 2017-2021 launched on 31 March 2017, which acknowledges the importance of meeting the new Sustainable Development Goals in ending preventable deaths of mothers, newborns, and children (Ministry of Health and Sports, 2018).

As of 2020, Myanmar has reported a higher maternal mortality ratio (179 per 100,000 live births) compared to many other countries in Southeast Asia (World Bank, 2023). Understanding the determinants of healthcare service utilization is crucial for enhancing maternal well-being and achieving the targets outlined in SDGs 3.1, 3.2, and 3.7. It is imperative to identify the specific needs of Myanmar to meet these SDG targets. Bago Region in Myanmar has the highest infant mortality rate, standing at 80 deaths per 1,000 live births (MDHS, 2015-2016). Additionally, the maternal mortality ratio in the Bago Region is 315.6 per 100,000 live births, surpassing the national average (2014 Myanmar Census). These statistics highlight the importance of analyzing the patterns and factors influencing maternal and reproductive health care service utilization in both rural and urban areas of Bago Township, Myanmar.

1.2 Problem Statement

According to reports from the United Nation Maternal Mortality Estimation Interagency Group (UN MMEIG), Myanmar's maternal mortality ratio (MMR) was recorded at 179 per 100,000 live births in 2020. In Myanmar, 16% of maternal deaths occurred during the antenatal period, 26% during the intra-natal period (delivery), and 55% in the post-natal period, with 3% lacking information (Maternal Death Review in Myanmar, 2016).

The 2015–16 Myanmar Demographic and Health Survey (MDHS) indicated that 60% of births were attended by skilled personnel or skilled birth attendants (SBAs) such as doctors, nurses, or midwives, while 40% were attended by unskilled personnel (29% by Traditional Birth Attendants (TBAs), 6% by Auxiliary Midwives (AMWs), and 4% by others). The discrepancy between urban and rural areas is notable, with 94% of urban women and 77% of rural women having a skilled attendant for antenatal care (ANC) for at least one visit.

In Myanmar, just over one-third (37%) of births are delivered in a health facility. This means that 63% of births occur at home. Most women in urban areas deliver in a health facility (70%), while only 28% of women in rural areas deliver in a health facility. The use of the current delivery facilities was insufficient, which is inadequate for reducing maternal mortality and achieving SDG 3 in Myanmar. Nearly one-quarter of women did not receive any postnatal checkup within 41 days of delivery. Additionally, postnatal care for newborns was found to be lacking, with only 6% receiving a checkup within 2 days of birth, as recommended by the WHO (MDHS, 2015-2016).

Approximately 51% of currently married women were utilizing a method of modern contraception in Myanmar. However, there was a notable gap as 16% of married women had unmet contraceptive needs, indicating that they desired to avoid pregnancy but were not using any contraceptive method. In particular, nearly 1 in 5 married adolescents aged 15–19 years have an unmet need for modern contraception. High rates of fertility and unmet need for family planning pose greater risks to adolescents as they face the consequences of unintended pregnancy and unsafe abortion. Long-term contraceptive methods are not easily available. One in four women of reproductive age (24.2 percent) have an unmet need for modern contraceptives. This means that although these women would like to use modern methods of contraception, they cannot access these methods to practice family planning. These barriers, intensified by financial constraints, result in unintended pregnancies and unsafe abortions (MDHS,2015-2016). A considerable number of unintended pregnancies end up in unsafe abortions and contributing to maternal mortality (MCH section, 2014).

There are significant challenges in the Bago Region regarding infant mortality (80 deaths per 1,000 live births) and under-5 mortality (85 deaths per 1,000 live births), both surpassing national averages. Additionally, the maternal mortality ratio

in Bago Region (315.6 per 100,000 live births) exceeds the country's overall rate (MDHS, 2015-2016). Addressing these issues requires enhanced access to modern maternal and reproductive health care services for women of reproductive age. Therefore, it is essential to investigate the determinants influencing the utilization of such services, focusing on antenatal care, delivery care, postnatal care, and contraceptive use, and analyzing their effect on infant mortality in Bago Township, Bago Region.

Moreover, most of the research on maternal and reproductive health care services primarily investigate into aspects such as the availability of quality emergency obstetric services, women's perceptions of quality, and the role of traditional birth attendants. However, there is a lack of conclusive research about the factors that affect accessing to maternal health care services, particularly from the demand side, as most studies have predominantly focused on supply-side factors. This study seeks to fill this gap by analyzing maternal and reproductive health-seeking behavior and its associated determinants among women of reproductive age in Bago Township. Furthermore, it aims to examine the effect of these healthcare service uses on infant mortality in Bago Township, Myanmar.

1.3 Research Questions

This study mainly seeks to answer the following questions:

- (1) To what extent is there an existence of differences in the pattern of maternal and reproductive health care service utilization in Bago Township?
- (2) What are the factors influencing the utilization of maternal and reproductive health care services in Bago Township?
- (3) How does the utilization of maternal and reproductive health care services affect infant mortality in Bago Township?

1.4 Objectives of the Study

The objectives of the study are as follow:

- (1) To identify the various patterns of maternal and reproductive health care services used by women of reproductive age in Bago Township.
- (2) To determine the factors that affect maternal and reproductive health care services used in Bago Township.

- (3) To assess the effect of maternal and reproductive health care service utilization on infant mortality in Bago Township.

1.5 Method of Study

Qualitative and quantitative analysis were used based on primary and secondary data and focused on quantitative measures of differences in health care service use. Two stage stratified random sampling method was used in the study. The primary data were collected by using structured questionnaires and in-depth interviews with women who had given birth within the past 5 years before the survey in Bago Township. Descriptive statistics was used to identify the patterns of maternal and reproductive health care services used in Bago Township, Bago Region. Binary and multinomial logistic regression models were used to examine the determinants of maternal and reproductive health care services used in Bago Township, Bago Region. The effects of maternal and reproductive health care service utilization on infant mortality were explored by binary logistic regression model.

The secondary data were obtained from Bago Township Health Department, Bago Regional Health Department, Department of Public Health under Ministry of Health, Department of Population under Ministry of Labour, Immigration and Population, Central Statistical Organization under Ministry of National Planning and Economic Development, official websites of World Health Organization and World Bank.

1.6 Scope and Limitations of the Study

The study focuses on four broad dimensions of maternal and reproductive health care services, namely: 1. antenatal care (ANC provider and number of antenatal visits); 2. delivery care (health birth provider and delivery place); 3. postnatal care (use of postnatal care); 4. family planning (use of contraception); and then it estimates the outcome by using infant mortality. It identifies the patterns of the maternal and reproductive utilization of health care service dimensions and factors influencing these four dimensions. The study specifically targets women within the reproductive age range who have given birth within the five years prior to the survey in Bago Township. Ever-married women or currently married women are asked in the survey by using questionnaire. There are 40 quarters and 66 village tracts including 211 villages in Bago Township. The study collected data throughout the period of June to

July 2023. In this study, the number of sample respondents is 481 including 231 from urban areas and 250 from rural areas in Bago Township.

This study used the 2015–2016 Myanmar Demographic and Health Survey as a reference to compare with the survey data of Bago Township in 2023. Although MDHS (2015–2016) was conducted seven years ago, even the Ministry of Health and other official and international organizations still use it as a reliable reference. Since then, Myanmar has been unable to conduct any updated Myanmar Demographic and Health Survey due to Covid-19 and unstable political situation.

1.7 Organization of the Study

This study is organized into six chapters. Chapter one is introduction which includes rationale of the study, problem statement, research questions, objectives of the study, method of the study, scope and limitations of the study and organization of the study. Chapter two presents literature review consisting of detail review on academic publications and various studies. Chapter three states overview of maternal and reproductive health care service use in Myanmar. Chapter four outlines research methodology consisting of survey area, sample size determination, sampling design, questionnaire design, model specification and description of the variables used in the study. Chapter five states analysis of the survey result including descriptive statistics and regression analysis. Chapter six presents conclusion.

CHAPTER II

LITERATURE REVIEW

2.1 Concept of Maternal Health and Maternal Health Care

Maternal health refers to the health condition of women during pregnancy, childbirth, and the postnatal period. Although parenting is often a satisfying experience, it led to distress, poor health, and even mortality for many women (WHO 2014b). Maternal death refers to the death of a woman during pregnancy, child birth or within 42 days after child birth. This includes deaths caused by factors related to or worsened by the pregnancy or its management, but excludes deaths caused by accidental or incidental factors WHO (2008).

Maternal mortality is measured by the ratio, rate, and the lifetime risk of maternal death. The maternal mortality ratio is a widely used measure for evaluating maternal health status. It indicates the risk associated with pregnancy and its related factors (WHO 2014a, Bhandari 2013). The World Health Organization (WHO) introduced the mother-baby Package as a strategy to enhance the health of both mothers and children. The package is founded on four fundamental principles: family planning, prenatal care, delivery care, and obstetric care (WHO, 1998; Abekah-Nkrumah & Abor, 2016). In addition, the Sustainable Development Goals (SDGs) expand upon the Millennium Development Goals (MDGs) to enhance the prospects of achieving sustainable development globally. SDG target 3.7 is the goal of ensuring that everyone has access to sexual and reproductive healthcare services, which included family planning (Haq, Sakib & Talukder, 2017). Women frequently obtain vital health information for themselves and their children when they attend maternal health services.

Maternal health care encompasses the medical attention provided to women throughout the stages of pregnancy, delivery, and the early postpartum period. This care is important for the overall health and welfare of both the mother and the newborn. Maternal health care service refers to the services that women receive to ensure the quality of maternal health during the antenatal period, childbirth in public

health facilities, and postnatal care facilities (Dairo & Owoyokun, 2010; Dhaher et al., 2008). The services encompass antenatal care, childbirth assistance, and postnatal care. The utilization of antenatal, delivery, and postnatal care services can be evaluated by examining the frequency and timing of antenatal care visits, the percentage of births that occur in healthcare facilities, skilled attendants during delivery and antenatal care, and the number of postnatal visits.

Various studies highlighted the obstacles that consistently prevent marginalized communities from accessing maternal and child health services, particularly in low-income countries. The obstacles encompass both direct and indirect costs that lead to a socioeconomic burden (Parkhurst & Ssengooba, 2009, Kowaleswski, Mujinja & Jahn, 2002). The direct costs include transportation cost and associate with distance to healthcare facilities, and the quality of healthcare (Gabrysch & Campbell, 2009).

(i) Antenatal Care

Antenatal care is a crucial healthcare service that plays a vital role in preventing various health issues during a woman's pregnancy. Antenatal care services are necessary to provide preventive treatments, diagnose, and manage issues during pregnancy. It offers information to advocate for skilled care during normal childbirth as well as emergency obstetric care (EmOC). Antenatal care is an essential component of maternal healthcare services that provides valuable possibilities for additional care during childbirth and the postnatal period (Simkhada, Porter & Vanteijlingen, 2010). Initiating antenatal care during the first trimester enables prompt detection of anemia and enables therapy at the periphery, so allowing correction of the condition before delivery. Early access to services such as anemia correction and hookworm elimination has a significant positive effect on the health of both the newborn and the mother. These services are particularly important in developing countries where anemia and hookworm are prevalent health issues (WHO, 1998).

Women need to identify risk factors and receive suitable guidance, tetanus toxoid vaccinations, health education, and counselling on personalized birth planning. Additionally, they also need to receive intermittent presumptive treatment for malaria and iron supplementation at the ANC clinic. Hence, the utilization of antenatal care can aid in the identification of pre-existing health conditions and the detection of health difficulties (Sharma,2004). Additionally, postnatal care can effectively address

any complications that may emerge following childbirth, thereby resulting in a decrease in maternal mortality. It is crucial to undergo thorough antenatal check-ups and seek assistance from qualified antenatal care providers to enhance the health outcomes of both mothers and children and reduce the likelihood of maternal death in pregnant women (Regassa, 2011). The World Health Organization (WHO) advises that every pregnant woman should get a minimum of four antenatal care (ANC) visits. The study considers skilled antenatal care and the frequency of ANC visits as dependent variables because of their positive impact on maternal health.

(ii) Delivery Care

Delivery care is considered as safe when it is attended by a skilled health care provider either in the health facility or at home. The birth practices in different locations are influenced by the availability and accessibility of health care (Bhandari and Dangal 2013). Attended by skilled health provider is essential in order to decrease maternal and newborn mortality rates (Mpembeni. et al., 2007). The presence of skilled birth attendants at all births is considered the most crucial measure for decreasing pregnancy-related fatalities and impairments (Bell, Curtis & Alayon, 2003). The utilization of antenatal care services has been linked to a higher probability of a pregnant woman giving birth in a hospital. Various studies indicate that women who received antenatal care demonstrated a higher likelihood of utilizing additional services available to pregnant women, in comparison to those who did not receive ANC (Obermeyer & Potter, 1991). Institutional delivery is a crucial component of maternal healthcare services aimed at mitigating the incidence of maternal mortality resulting from problems during childbirth.

There is a strong linkage between the presence of skilled healthcare provider during childbirth and maternal mortality. The maternal mortality ratio decreases as the number of newborns attended by skilled health professionals increases. A study conducted in Ethiopia found that there is a strong association between the poor utilization of institutional delivery and characteristics such as low educational attainment among women, birth order, and limited financial access at both the individual and community levels (Mekonnen & Mekonnen, 2002). A study indicated that women who attended ANC services more than four times were more likely to give birth in healthcare facilities, regardless of their economic status (Trinh, Dibley & Byles, 2007). In Myanmar, the lack of essential maternal health services has led to a

strong preference among women to give birth at home rather than in a healthcare facility, with around 80% of women making this choice (Mullany, Becker & Hindin, 2007). This situation intensified a human rights violation issue in Myanmar. Mullany et al. (2007) suggested that a smaller proportion of women, specifically 5.1% out of a total of 2914 women sampled, had access to skilled birth attendants during delivery. Additionally, 16% of the sampled women received the necessary number of antenatal health care visits. Consequently, the insufficient use of essential maternal health care leads to a subsequent rise in the preference for giving birth at home rather than in a healthcare facility (Kosum & Yurdakul, 2013).

(iii) Postnatal Care

Postnatal care (PNC) refers to the medical attention given to both the mother and infant after childbirth. The postnatal period refers to the period of time that begins immediately after birth within 42 days. Mothers need to receive treatment during this period because statistics show that over 60% of maternal deaths occur after childbirth (Gil, Pande & Malhotra, 2007). The primary objectives of postnatal care are to maintain and improve the overall health of both the mother and the child, as women may experience severe and perhaps fatal difficulties during this period. The utilization of postnatal care services has been well established to decrease both maternal and newborn illness and mortality, according to the World Health Organization (WHO). Throughout the duration of PNC, numerous essential services and information are accessible. These services encompass family planning, which involves providing information on child spacing and methods to prevent unintended pregnancy.

Postpartum healthcare services provide a significant challenge in the healthcare systems of many underdeveloped nations worldwide (WHO, 2014). Research on factors influencing the utilization of postpartum health care services has identified a wide range of determinants that are connected with postnatal health care. Yanagisawa, Oum & Wakai (2006) proposed that there is a considerable association between the geographical location and place of residence with the utilization of postnatal care in the Philippines. A study conducted in Ethiopia found that factors such as the education level of both parents, the place of delivery, and awareness of postpartum services all have a beneficial impact on the utilization of postnatal care. The study also found that women who give birth at home without complications do

not require postnatal healthcare services. The study also found that women who had a healthy status and experienced a vaginal delivery without complications were more inclined to not use postpartum care services compared to those who had a history of problematic childbirth (Aregay et al., 2014).

2.2 Concept of Reproductive Health and Reproductive Health Care

Reproductive health plays a crucial role in the overall health and welfare of women, families, and communities. The World Health Organization (WHO) defines reproductive health as a state of complete well-being encompassing physical, mental, and social aspects, rather than simply the absence of diseases or weakness, in relation to the reproductive system and its functions and processes.

Reproductive health care refers to a range of procedures, techniques, and services that aim to promote and maintain reproductive health and well-being by preventing and addressing reproductive health issues. Facilitating individuals plan the number and spacing of their children, empowers parents to sufficiently provide for the physical, nutritional, residential, and educational needs of all their children, resulting in favorable health effects for the entire family. Moreover, the utilization of contraceptives not only helps to avoid maternal mortality and morbidity, but also diminishes the economic and emotional consequences that arise from the death or chronic illness of mothers, so benefiting both children and families. Furthermore, research has demonstrated that family planning has a positive impact on the self-confidence and overall well-being of women and girls. It also enhances their access to school, career prospects, and ability to generate revenue (Centre for Reproductive Rights, 2009).

Bloom et al. conducted a cross-country analysis and discovered that using abortion regulation as a means of controlling fertility has a negative impact on the supply of female labor force when total fertility rates are high. It is estimated that, on average, each birth decreases a reproductive woman's lifetime labour supply by nearly two years. Furthermore, the enhancement of a mother's reproductive health has a direct influence on the development of her children's human capital. This is achieved by supporting smaller family sizes and placing greater emphasis on child development (Jensen, Ahlburg, and Costello, 1996). The utilization of family planning methods, such as contraceptives, is crucial for the sexual and reproductive well-being of women (Nonvignon & Novignon, 2014).

Family planning: It involves the use of contraception as a crucial aspect. It empowers women to determine the timing between their pregnancies. Widespread use of contraception can decrease birth rates in countries with high birth rates. Contraceptive use pertains to the utilization of procedures that try to prevent or postpone pregnancy among women in reproductive age. Contraceptive use diminishes the economic and emotional consequences of maternal death or chronic disease on children and families by preventing maternal mortality and morbidity. Contraceptive usage enhances the autonomy and social well-being of women and girls. Research indicates that the utilization of contraceptives to prevent unwanted pregnancy might enhance the social standing of women and augment their authority in making decisions within their households.

Unsafe abortions are a significant contributor to maternal morbidity, resulting in around 25% of women requiring hospitalization. Enhanced availability and utilization of contraceptives have been acknowledged as a crucial approach to assist women in preventing unwanted pregnancies and mitigating the potential problems associated with pregnancy, childbirth, or unsafe abortion (Centre for Reproductive Rights, 2009). The United Nations Population Fund (UNFPA) acknowledges that women who face the greatest constraints in accessing contraceptives, such as young and impoverished women, experience disproportionately high rates of maternal mortality. Contraceptive use not only decreases maternal mortality but also aids in preventing maternal morbidity (WHO, 2014).

The Centre for Reproductive Rights (2009) asserts that the use of contraceptives has been sustained to have significant advantages for the health of both mothers and newborns. This is particularly evident in the prevention of pregnancies that could endanger the lives of both mother and child. The prevention of pregnancy-related problems, the reduction of unsafe abortions resulting from unwanted pregnancies, the postponement of first pregnancies among adolescent girls, and the mitigation of risks associated with high parity among older women are all effective strategies for reducing maternal and infant fatalities (USAID, 2014). Furthermore, the utilization of contraceptives has been demonstrated to have a critical influence on the attainment of sustainable development goals (SDGs) by affecting individuals, families, communities, and nations. These benefits include the advancement of gender equality and empowerment, the elimination of poverty and attainment of economic

growth, the contribution to peace and political stability, and the mitigation of the effects of rapid population expansion (Starbird, Norton and Marcus, 2016).

2.3 Indicators of Maternal and Reproductive Health

The participants from WHO, UNFPA, international partner agencies, nongovernmental organizations, technical experts, and national reproductive health program managers evaluate 17 reproductive health indicators that have been identified for global monitoring, as well as the millennium development goal framework. Indicators for key components of family planning, maternal and newborn health, reproductive tract infections (RTIs) and HIV/AIDS were reviewed separately to cover all the main areas of reproductive health (MoH, 2012).

The 17 reproductive health indicators are as follows:

1. Total Fertility Rate (TFR): The total number of children a woman would have by the end of her reproductive period.
2. Contraceptive Prevalence Rate (CPR): The prevalence of contraceptive use among women of reproductive age (15–49) at a specific period.
3. Maternal Mortality Ratio (MMR): Annual number of deaths per 100,000 live births in a specific period.
4. Antenatal Care Coverage: Percentage of women who received care from skilled health providers (excluding trained or unskilled traditional birth attendants) at least once during pregnancy, specifically for pregnancy-related reasons.
5. Percent of Births Attended by Skilled Health Personnel: Percentage of deliveries assisted by skilled health workers.
6. Availability of Basic Essential Obstetric Care: Number of facilities with functioning basic essential obstetric care per 500,000 population.
7. Availability of Comprehensive Essential Obstetric Care: Number of healthcare institutions providing comprehensive essential obstetric care per 500,000 individuals.
8. Perinatal Mortality Rate (PMR): Number of perinatal deaths per 1,000 total births.
9. Low Birth Weight Prevalence: Percentage of live births with a weight below 2,500g.

10. Positive Syphilis Serology Prevalence in Pregnant Women: Percent of pregnant women (15–24) with positive serology for syphilis.
11. Prevalence of Anemia in Women: Percentage of women between the ages of 15 and 49, with hemoglobin levels of 110 g/l for pregnant women and 120 g/l for non-pregnant women.
12. Percent of Obstetric and Gynecological Admissions Owing to Abortion: Percentage of all cases admitted to service delivery points offering in-patient obstetric and gynecological care that are attributed to abortion.
13. Reported Prevalence of Women with FGC: Percentage of women surveyed in the community who had undergone Female Genital Cutting (FGC).
14. Prevalence of Infertility in Women: Percentage of women between the ages of 15 and 49 at risk of pregnancy who report trying for a pregnancy for two years or more.
15. Reported Incidence of Urethritis in Men: A percentage of men aged 15 to 49 who were interviewed in a community survey reported experiencing episodes of urethritis within the past 12 months.
16. HIV Prevalence among Pregnant Women: Percentage of pregnant women (aged 15-24) who are found to be HIV positive.
17. Knowledge of HIV-related Prevention Practices: Percentage of respondents who accurately identify all three primary methods of avoiding sexual transmission of HIV and who reject three common misunderstandings regarding HIV transmission or prevention (MoH,2012).

This study covers four of these indicators (from 2nd to 5th indicators) which reflect the MDG-5 (to improve maternal health).

2.4 Economic Benefits of Improving Maternal and Reproductive Health

Globally, the evaluation of a nation's economic growth has been based on its health outcomes; enhanced national riches have also been linked to better health. Health is a fundamental aspect of both well-being and success (Arthur, 2012). The health and wealth of individuals are interconnected, and this connection operates in both directions (Smith, 1999). The empirical evidence from both micro and macro levels has substantiated the theoretical advantages of improved health conditions (Mitchell, Ozminkowski, & Serxner, 2013). A recent study found that healthy people are more productive due to factors such as reduced absence and improved physical

fitness during work hours (Goetzal, 2004). On a large scale, there is a positive correlation between improved health status and economic growth (Oni, 2014; Bloom & Canning, 2015). Recent data also suggests that greater health status is connected to a decrease in poverty (Peters et al., 2008). Although there is a positive correlation between health status, productivity, and well-being, health status has remained relatively low in low-income countries (LIC).

Various studies show that individuals who are in good health tend to be more productive and have a higher capacity to generate wealth. However, financially disadvantaged individuals may face barriers to accessing healthcare services, which can further contribute to their impoverishment (Smith, 1999). The Millennium Development Goals (MDG) and the subsequently established Sustainable Development Goals (SDG) both have health-related components, underscoring the significance of enhancing health conditions. The inclusion of health in the SDG targets is significant, and it will have a critical role in the 2030 Agenda for Sustainable Development. This programme consistently prioritizes gender issues and highlights the crucial responsibilities of women, both as individuals and as key contributors to economic and societal progress. There is a positive association between health and production for both males and females. A micro-level study reveals that when adults die, it has an intergenerational effect on male and female adolescents. Specifically, it increases the chances of these adolescents participating in the labor force. However, this effect is more harmful for females, as it leads to a decrease in female school attendance. Although it can be difficult to fully comprehend the situation, enhancing women's access to healthcare services is a highly successful approach to enhancing the overall health and productivity of the population.

The significance of maternal health lies in its impact on women's productivity in the labour market, which in turn directly affects economic output. Impaired maternal health is linked to reduced child health, affecting factors such as birth weight, survival in the first month of life, cognitive growth, behaviour in childhood, academic achievement, and long-term health and productivity in adulthood. Victora et al. (2008) analyzed the associations between maternal and child undernutrition, adult health, and human capital by using data from five cohorts in low- and middle-income countries (LMIC). The study concluded that childhood sickness can cause long-lasting damage and affect future generations. Enhancing the nutritional status of mothers can

have two positive outcomes: it can contribute to economic growth by enhancing the accumulation of human capital and the health of future generations.

Albanesi and Olivetti discovered that in the United States, a combination of lower maternal death rates and the availability of excellent infant formula allowed women to balance both paid employment and maternity responsibilities. This led to a significant increase of 52% in the number of women aged 23-33 who were actively participating in the workforce between 1920 and 1970. The WHO African Region (AFRO) conducted a study that estimated a substantial economic benefit from reducing maternal mortality. Specifically, each maternal death is associated with a decline of US\$ 0.36 in per capita GDP annually. Optimal health in women is crucial for the development of children and the generation of future human resources.

Enhancing reproductive health has a direct impact on socioeconomic growth through its influence on individual outcomes, as well as an indirect effect by reducing resource limitations. Initially, advancements in reproductive health have consequences at the individual, family, and household scale (micro level). Enhancing reproductive health has a direct impact on socioeconomic growth because it boosts women's human capital. Reproductive health indirectly enhances the development of young children's human capital by ensuring the survival and well-being of their mothers. Furthermore, improvements in reproductive health have societal effects at the macro level by reducing population growth (Seligman et al, 1997).

Women who possess the resources to manage their reproduction and control the results of their reproductive activities tend to have fewer children (Tsui, 1991). This, in turn, contributes to the reduction of population growth. Reducing population growth lessens the burden on natural resources and public services, while also promoting sustainable development (Birdsall, 1988). Reproductive health is critical to socioeconomic development because it promotes human capital development and controls population growth. Furthermore, it also has indirect effects at both the macro and micro levels. Access to secure, efficient, and affordable reproductive health services enables women to participate in both non-reproductive and reproductive roles in society, thus directly contributing to socioeconomic development by raising per capita income. Enabling women to take on non-reproductive tasks has a positive impact on socioeconomic development. This can be achieved by increasing their productivity both within and outside the household or by improving the quality of time they spend with their children (Schultz, 1993).

Matlab found that in Bangladesh, decline in fertility rates in regions with enhanced availability of reproductive health services was associated with an increase in women's income and possessions, as well as a decrease in fertility. The programme intervention areas had seen improvements in child survival, schooling, and the body mass indexes (BMI) of mothers and daughters. Additionally, the physical assets of households in these villages were 25% greater compared to non-program intervention areas. Notably, even though this programme specifically focused on women of childbearing age and their children, it also enhanced the health of the older women residing in the households, demonstrating a beneficial spillover impact. Investing in reproductive health, which includes providing access to contraceptives and abortion, can result in significant advantages for women, their families, and their societies.

2.5 Models of Health Care Service Utilization

(i) Supply and Demand Approach

In theory, better health status promotes economic development by increasing productivity and the ability to learn, lessening the burden of medical treatment, and enhancing the well-being and happiness of families and people (Grossman, 1972). Access to healthcare can be influenced by various factors, both on the supply side and the demand side. These factors can include social, economic, and behavioural issues, as well as environmental ones. Both demand-side and supply-side factors have a significant influence on a woman's utilization of maternal health care services, with substantial disparities observed among different socioeconomic categories and geographical areas. Financial constraints, geographical and cultural hurdles significantly hinder a woman's access to delivery care services, affecting the demand side. Demand-side determinants refer to the factors that affect the demand for and utilization of health care at the individual, household, or community level (Borghetti et al., 2005).

Conversely, insufficient resources from both public and private sectors, along with limited availability and poor quality of health services, restrict the provision of these services. Both types of factors play a crucial role in determining the utilization of maternal health care services. Supply-side determinants refer to the various healthcare factors that work together to create efficient healthcare services and impact the utilization of these services (Ensor and Cooper, 2004). Ensor and Cooper (2004) provide a framework, depicted in figure (2.1), which identifies three main obstacles to

healthcare utilization: supply-side barriers, demand-side barriers, and demand and supply interaction barriers. Therefore, the factors that influence the utilization of healthcare services, as identified by Ensor and Cooper (2004), are illustrated in Figure (2.1).

Consumers perceive their demand for healthcare services as both a consumption and investment commodity (Grossman, 1972). This study explores the importance of economic, social, and environmental factors in influencing a woman's utilization of antenatal care (ANC), professional delivery care, postnatal care services, and contraceptive use from a demand perspective.

Figure (2.1) Supply and Demand Factors of Healthcare Service Utilization

Supply	↔	Demand
- Official price		- Price (official, unofficial charge,
- Input prices (staff, capital equipment, buildings)		Travel cost, lost work)
- Knowledge of technology of treatments		- Quality
- Management efficiency		- Income
		- Social, household, cultural characteristics
		- Knowledge of health care available
		- Education (general and health)

Source: (Ensor and Cooper, 2004)

(ii) Health Behavior Model

The demand for maternal healthcare can be realized by employing Andersen's behavioral model, which aims to explain and forecast the utilization of health services by individuals (Andersen, 1968). In this model, such utilization depends on the interaction among individual attributes, population characteristics, and the surrounding environment. Andersen submits that the relevant factors can be categorized into three main groups: an individual's predisposition to use medical services; enabling or impeding circumstances (such as infrastructure); and the need for health care.

- (1) Predisposing characteristics: This category belongs to the preference to make use of healthcare services. Andersen proposes that an individual's likelihood of using health services is influenced by their demographics, social status, and

perceptions of the advantages of health services. A person who believes in healthcare services will likely use them.

- (2) Enabling characteristics: This group encompasses resources that are present within both the family and the community. Family resources consist of the financial situation and the geographic location of the household. Community resources encompass the provision of healthcare facilities and the presence of individuals available to provide aid.
- (3) Need-based characteristics: This category encompasses the perception of the necessity for health care, which can be based on individual, social, or clinically weighed perceptions of need.

During the 1970s, Andersen's model undertook expansion and modification to incorporate the healthcare system. The health care system encompasses health policy, resources, and organization as well as the changes in this over time. Resources encompass the quantity and allocation of both workforce and financial assets, which encompass the training of healthcare professionals and the availability of equipment. Organization pertains to the management of resources within a healthcare system, which ultimately impacts the availability and arrangement of healthcare services. Furthermore, the updated model incorporates the acknowledgment that consumer satisfaction is indicative of healthcare utilization. Moreover, the model includes the concept that various health services are accessible, and the specific type of service (such as a hospital, dentist, or pharmacy) and the purpose of the healthcare service (such as primary or secondary care) would influence the service utilized.

Therefore, based on the updated model, the utilization of a particular health care service and its frequency will be determined differently depending on the characteristics of the population and the health services. In the 1980s and 1990s, Andersen's model was updated to create three components that were interconnected in a linear relationship.

- (1) Primary determinants: These factors are identified as the direct cause of health behaviors. The determinants encompass factors such as population characteristics (i.e. demographics), the healthcare system (i.e. resources and organization), and the external environment (i.e. political, physical, and economic effects on utilization).
- (2) Health behaviours: These behaviours encompass individual health practices, such as diet and physical exercise, as well as the utilization of healthcare resources.

Finally, the model suggests that health behaviours directly determine health outcomes.

(3) Health outcomes: These outcomes encompass perceived health status, evaluated health status, and consumer satisfaction (Andersen, 1968).

Identifying the key factors that influence the use of healthcare services can be very challenging (Andersen, 1995). The 1995 behavioural model placed significant emphasis on the various factors that influence the utilization of healthcare services and overall health status. The model describes the key factors that can impact health care behaviour and health outcomes, which are environmental and population characteristics. Environmental factors encompass the health care system and the external environment, while population characteristics include predisposing factors (demographic and social structure), enabling factors (family resources and community resources), and need factors (healthcare access factors) (Andersen, 1995). The behavioral model of 1995 is also known as the Andersen model of health care utilization (1995).

(iii) Social Ecological Model

According to the social-ecological model of health promotion proposed by Stokols (1996), the environment plays a crucial role in facilitating health behaviors. Various environmental factors, such as population density, changes of residences, or economic recession, have distinct impacts on individuals' health and health-related behaviors, which vary depending on their personalities, health practices, and available resources. Health behaviors can be influenced by social environmental conditions, including factors such as the educational attainment within the community, the poverty level, and the accessibility of maternal health care facilities. The geographic conditions, such as the region and place of living (whether rural or urban), can indicate the location where women live, which in turn can impact their health behaviors. Technological factors, such as transportation and mass media, along with organizational factors, such as religious affiliation, have a significant impact on women's choices to utilize maternal health care facilities. Socio-cultural factors, such as the adhering cultural practices and norms, also affect maternal healthcare behaviors (Stokols, 1996).

2.6 Theoretical Background of Health Care Service Utilization

Grossman's Demand Function for Health Care Services

According to Grossman (1972), consumers perceive their demand for health care services as a consumption commodity and an investment commodity. Health care serves as a consumption commodity, improving the well-being of consumers and directly influencing their preferences. Additionally, it functions as an investment commodity since the quality of health affects the amount of work and leisure time. The direct utility can be expressed as a function of the improvement in health status achieved through receiving treatment and consumption of consumer goods as:

$$U_{ij} = U_{ij}(H_{ij}, C_{ij}) \quad (1)$$

Where U_{ij} is the expected utility individual i derives by receiving health care services from provider j ; H_{ij} is the expected improvement in health status of individual i after receiving treatment from provider j ; and C_{ij} is the consumption of all other goods and services other than the health care services. The amount of C_{ij} is assumed to depend upon the choice of provider j because of the associated monetary and non-monetary treatment costs.

Since H_{ij} and C_{ij} are not directly observable, it becomes necessary to introduce new functions that relate them with observable variables. Following Behrman and Deolaikar (1988) and Senauer and Garcia (1991) with some modifications (i.e. by picking out those variables that are not observable, for instance, genetic endowment, nutrient intake, etc.) the health care production function for the i^{th} individual can be expressed as:

$$H_{ij} = H(I_i, F_{ij}) \quad (2)$$

Where I_i is a vector of observable socio-economic characteristics of individual i and his households (e.g., age, gender, education, household size, etc); and F_{ij} is a vector of characteristics that individual i faces at the health care service provider j (e.g., the quality of treatment obtained, treatment costs, etc.).

Moreover, along with this production function the individual is constrained by the following usual full-income constraint, which combines both time and income into one total resource constraint:

$$Y_i = P_h H_{ij} + P_c C_{ij} + W_i T_H \quad (3)$$

Where Y_i is the total monthly income of individual i ; P_h and P_c are prices associated with the consumption of health care services and all other goods and

services, respectively; W_i is the opportunity cost of time for individual i ; and T_H is total time spent by individual i for treatment (i.e., in travelling to and waiting for treatment) at the health care service provider j .

By maximizing the utility function (1) while considering the health care production function and (2) the full-budget constraint, a set of demand equations for health care services can be derived. These equations reflect the demand for health care services as a function of the pricing of these services, income, and other external factors.

Generally, the demand functions for health care services, developed from this theoretical framework and accounting for other factors that influence demand, can take the following functional form. This form includes individual/household specific variables and choice specific variables:

$$D_{ij} = f (Z_i, X_{ij}) \quad (4)$$

where D_{ij} is individual i 's demand for health care service of type j ; Z_i is a vector of individual and household specific variables, such as education, age, income, etc; and X_{ij} is a vector of choice specific variables individual i faces when choosing provider j , such as experience problem with distance to health facility, experience problem with getting money needed for advice/treatment, etc.(Asteraye, N. , 2002)

2.7 Review on Empirical Studies

Navaneetham and Dharmalingam (2000) conducted an analysis on the utilization of maternal health care services in South India, specifically in the states of Andhra Pradesh, Karnataka, and Tamil Nadu. The study employed logistic regression models to assess the impact of variables on the utilization of maternal health services, including antenatal care, tetanus toxoid immunization, place of delivery, and assistance during delivery. The study's findings revealed that the factors influencing maternal health care services vary between states and among different indicators of maternal health care. The survey revealed that Tamil Nadu has the greatest utilization level of maternal health care services, followed by Andhra Pradesh and Karnataka. The study revealed that the disparity in healthcare access between rural and urban areas significantly contributed to the lower utilization of maternal healthcare services in rural areas of the three states. This was particularly evident in the lower rates of institutional delivery and delivery assistance by skilled health providers. The study's

findings revealed that women residing in urban regions had a 50 percent lower likelihood of receiving antenatal care compared to their counterparts in rural areas, both in Andhra Pradesh and Karnataka. The study demonstrated the crucial role of ANMs in providing essential maternal health care services, particularly prenatal care, to pregnant women living in rural regions of the southern states. Based on the study, it was found that while illiterate women were less inclined to utilize maternal health care facilities, there was no discernible disparity among those who were educated. The study's findings revealed that in all three states, higher-order births were associated with a lower probability of utilizing maternal health care services across all three states.

Mekonnen & Mekonnen (2002) examined the utilization of maternal health care services in Ethiopia. The study employed bivariate and multivariate analyses to determine the factors that have an impact on three variables related to maternal health care: antenatal care (ANC), professionally assisted delivery (PAD), and postnatal care (PNC). The study incorporated many independent variables, such as maternal age at birth, parity, number of children under five, educational status of women, marital status, work status, religion, residence, and age at last birth. Demographic and social factors primarily influenced the utilization of maternal health services in Ethiopia, according to the study. The study revealed several demographic and sociocultural characteristics, including mother education, marital status, place of residence, parity, and religion. The study revealed that education significantly influences the utilisation of maternal health services, and women with a higher number of children were less inclined to have deliveries attended by modern healthcare professionals. The study revealed that rural women had a lower propensity to use the services, whereas unmarried or unpartnered women had a lower likelihood of doing so.

Stephen and Joshua (2008) investigated the factors that influence the use of healthcare services and nutritional status among mothers in a rural community in south-west Nigeria. The study employed statistical analysis techniques such as Chi-square, logistic regression, and generalized linear models to analyze the data. The study targeted women in reproductive age who had been in the study area for a minimum of 5 years prior to the survey. The dependent variables included indices of maternal health, such as the number of antenatal care (ANC) visits, kind of ANC provider, place of delivery, delivery provider, time of postnatal care initiation, and maternal nutritional status. The study used women's socio-demographic

characteristics—age at birth, level of education, family type, religion, ethnicity, job status, occupation, and income—as independent factors. There was no disparity observed in terms of the mother's age at last birth, education level, household structure, religion, ethnicity, employment status, occupation, income, and number of antenatal care visits. Education, ethnicity, work status, and income were not statistically associated with ANC providers. Delivery provider was significantly associated with various variables such as education, race, and income. Significant associations were seen between the timing of postnatal checkup after delivery and the mother's age at birth, education, religion, and income.

Lillian (2010) investigated the utilization of skill attendance for maternal health care services in Northern Malawi. The study conducted a quantitative analysis using a descriptive cross-sectional survey to identify patterns and factors influencing the use of maternal health care services. Data on patterns and determinants of maternal health care service use and women's perceptions of these health care services were collected using a structured questionnaire. The study utilized chi-square test and logistic regression models. The study revealed that factors such as education level, socio-economic position, and distance to health facilities have been consistently significant predictors of maternal health care service utilization.

Lidoroh (2013) conducted an analysis of the factors that influence the use of maternal health care services among women of reproductive age in the Western Province of Kenya. The study specifically focused on the variety of health care for pregnant women, which includes the utilization of antenatal care services and skilled assistance during delivery. The study used data from the 2008-09 Kenya DHS, specifically focusing on women who had given birth five years before the survey. The study included descriptive techniques of analysis and multivariate ordinal regression to assess the impact of independent variables on the utilization of prenatal care and delivery services. The independent factors considered in this study encompassed age, marital status, educational attainment, residence, and household wealth index. The descriptive and multivariate analysis revealed that the independent variables have an impact on the utilization of maternal healthcare services. Specifically, it was found that married, young, and rich women were more likely to utilize maternal health care services compared to unmarried, older, and poor women. Therefore, it is crucial to make extra efforts to educate the general population about the importance of maternal

health care services. The study indicated that age and marital status were the main factors influencing the utilization of maternal health care services.

Vickita (2014) analyzed the influence of socio-economic and cultural factors on the utilization of healthcare services in Ghana. A binary logistic regression model was employed, with healthcare utilization serving as the dependent variable. Health care service utilization was used as a binary variable among those who were in ill health within the previous three months. The determinants of health care service utilization, including socio-economic and cultural practices, were identified according to Andersen's (1968) framework. The study revealed that factors such as age, gender, socioeconomic status, marital status, level of education, ethnicity, religion, family size, employment status, and type of occupation were statistically significant with the use of health care services in Ghana.

Chepkwony (2014) examined the factors that influence the attendance of antenatal care (ANC) in the Rift Valley region of Kenya. The study used data from the Kenya Demographic Health Survey (2008–2009) to examine the impact of various independent variables, such as the mother's educational level, age, marital status, religion, household wealth index, ethnicity, birth order, and husband's occupation, on the dependent variable of ANC attendance. The study employed both bivariate analysis and multivariate regression. The study revealed that ethnicity did not have a significant correlation with ANC attendance. However, education level, marital status, birth order, husband's occupation, household income index, and religion were found to be significantly associated with ANC attendance. ANC attendance is positively correlated with education level, mother's age, and religion, but adversely correlated with birth order.

Akhter (2015) investigated the maternal healthcare-seeking behavior of women from upper and lower socio-economic groups in Dhaka, Bangladesh. The study focused on their perception, experience, and practice of seeking maternal healthcare during childbirth and the post-partum period. Additionally, the study explored the factors that influence these behaviors disparities. Employing a "social constructionist" perspective, the study utilized a research methodology that involved conducting in-depth interviews with two different groups of women who had given birth during the five years before the survey. The study revealed that mothers belonging to households with lower socio-economic status showed a sense of distress and disbelief at receiving healthcare services for childbirth and the postpartum period

from public or private maternal healthcare facilities, despite the availability of low-cost or free maternity care at nearby health facilities. In contrast, the research also revealed that women belonging to households with higher socio-economic status displayed a clear expression of confidence and reliance on contemporary maternity healthcare facilities, specifically private clinics. According to this study, a lower economic status, a low level of education, a lack of scientific knowledge, and increased cultural practices inhibited receiving maternal health care.

Umar (2016) studied the utilization of maternal health care and its impact on pregnancy outcomes in Nigeria. The study used a cross-sectional approach, utilizing data from the 2008 National Demographic and Health Survey (NDHS). Logistic regression was employed to forecast predisposing, enabling, and need factors using the Anderson health behavior model. The study discovered that women who were married or living together with their partner exhibited greater utilization for antenatal care (ANC) compared to those who had never been married, were widowed, divorced, or separated. In addition, Christian women had a greater percentage of individuals who had four or more antenatal care (ANC) visits compared to those who identified with the Islamic faith. Women without media access were less likely to use these health care services compared to women with media access. Women with a minimum of primary education were more inclined to have more than four antenatal care (ANC) visits compared to those who had no formal education. Unemployed women had the lowest utilization of ANC services. In comparison to rural counterparts, urban-dwelling women had a higher likelihood of utilizing ANC services and were more inclined to opt for skilled birth attendants. Women residing near a health facility exhibited a higher likelihood of achieving the recommended 4 antenatal care (ANC) visits and giving birth at a health facility compared to those residing at a considerable distance from the health facility. Women who had the opportunity to consult with skilled health providers were more inclined to complete a minimum of four antenatal care (ANC) visits compared to those who did not have access to skilled health workers.

Machira (2017) examined the factors that influence the utilization of maternal health care services in Malawi. Logistic regression was employed to examine the factors influencing women's utilization of postnatal care services. The estimated odds ratios obtained from the regression analysis, together with a decomposition technique, were utilized to find out the impacts of each factor on women's utilization of postnatal

care. The study found that factors such as the age of the mother, utilization of ANC services, place of delivery, and the educational attainment of women, specifically secondary school or higher, consistently predicted the likelihood of women using postnatal care services in Malawi over a period. In contrast, it was discovered that factors such as high treatment costs, lack of transportation, media exposure, and limited availability of healthcare services within communities reduce women's utilization of postnatal care services over time.

Meh (2017) examined the disparities in maternal mortality and factors influencing them between the northern and southern regions of Cameroon. The study utilized data from the Cameroon Demographic and Health Surveys and employed multivariable logistic regressions for analysis. The study revealed a strong association between maternal mortality and factors such as age, parity, and education in Cameroon. In the North, the distance to the health facility was associated with maternal mortality, but in the southern region, maternal mortality was associated with abuse at home and ethnicity. Maternal fatalities in different areas of Cameroon have shown variances. This study's findings highlighted the necessity for implementing policies aimed at enhancing the socioeconomic and sociocultural circumstances of women in both the northern and southern regions of Cameroon, respectively.

Tsawe (2018) investigated disparities in the utilization of maternal and reproductive health care in Sierra Leone. Logistic regression analysis was employed to examine the factors influencing maternal and reproductive health utilization. The study revealed a strong correlation between women of greater socioeconomic status and their increased likelihood of utilizing four or more antenatal visits, skilled birth attendants, facility-based deliveries, and any kind of contraception, as compared to women of lower socioeconomic status. Urban dwellers exhibited a considerably higher likelihood of utilizing four or more antenatal visits, giving birth at health facility, skilled birth attendants, and any method of contraception compared to women residing in rural areas. Women who had the opportunity to access the media had a significant prevalence of utilizing maternal and reproductive health services. Women who had few or no children had a greater chance of using delivery care services, whereas women with four or more living children had a higher probability of contraceptive use. The education level of mothers and wealth of households were positively associated with women's health, since these directly influenced the living conditions and, consequently, the health status of individuals. The study revealed that

women receiving antenatal care were more aware of maternal complications. According to this study, maternal age, marital status, socioeconomic level, number of living children, decision-making power, media exposure, skilled antenatal care, and geographic location were identified as influential factors in determining the utilization of maternal and reproductive health services.

Thandar Aung (2020) investigated the utilization of antenatal care is being used in South Okkalapa Township, Yangon, Myanmar. The study found that maternal age influenced the use of antenatal care services by pregnant women in South Okkalapa Township. Women between the ages of 24 and 34 showed a preference for having early and frequent visits compared to both younger and older age groups. The study revealed that mothers in the low-parity group, who had children aged 0-2, received antenatal care at an earlier stage and with greater frequency compared to those with three or more children. The study also found that women with higher levels of education received antenatal care early and frequent visits compared to those with lower levels of education. The study notified that the favorable and substantial influence of household economic status on the utilization of antenatal care. Based on the study, if a woman's spouse or partner had a higher level of education and occupation, this woman would receive more than five times the appropriate amount of early antenatal care, as well as the recommended frequent visits. The study found that there was a positively association between the utilization of antenatal care services and the educational attainment of both mothers and fathers. The study additionally discovered that maternal health knowledge played a crucial role, as having adequate knowledge about the significance, timing, and frequency of antenatal care visits, treatments, and tests enabled women to access appropriate health services. A direct correlation was observed between women's level of awareness regarding health and their utilization of antenatal care services.

Su Yi Toe, Higuchi, San San Htay & Hamajima (2021) conducted a study to examine the factors influencing health care seeking behaviors regarding antenatal care among married women in Naung Cho Township, Myanmar. The study focused on married women who had given birth within the past 12 months in Naung Cho Township. These women were selected as the sample using a three-stage sampling method. A structured questionnaire was used to conduct face-to-face interviews and a cross-sectional survey in Naung Cho Township, Shan State, Myanmar. The sample size was determined to be 245. The study employed Poisson regression to determine

the adjusted risk ratios (aRR) of two healthcare-seeking behaviors for each of the explanatory factors under investigation. The study revealed a correlation between the educational level of a woman's husband and her probability of visiting antenatal care (ANC). The study found that women with a lower level of education had a greater likelihood of giving birth without the assistance of a skilled birth attendant (SBA). The study found that women who married at a later age had a lower probability of giving birth without the assistance of a skilled birth attendant (SBA). According to this study, women who were pregnant for the second time or more were less inclined to adhere to recommended practices for both antenatal care (ANC) attendance and skilled birth attendance (SBA) service utilization. The educational level of the individual and their spouse, the number of pregnancies, and the age at married were associated with maternal health care-seeking behaviors.

The above reviews of the literatures suggest that cultural, religious, social, demographic, and economic factors had significant influence on the use of maternal and reproductive health care services. It is within the context of this observation that this study seeks to contribute to the existing empirical literature by including economic factors and other maternal health care service factors that have been excluded in earlier empirical studies.

2.8 Conceptual Framework

This study analyzes the factors that influence the utilization of maternal and reproductive health care services in Bago Township, Bago Region, Myanmar, based on existing theoretical and empirical research. The factors that influence the decision to seek healthcare and to choose healthcare provider are highly varied: economic, social, and environmental factors are considered in this study. Since healthcare utilization is complex, several theories and models have been developed to understand it clearly and in detail. Ensor and Cooper (2004) developed supply and demand factors influencing healthcare utilization (Supply and Demand Approach). The behavioral model, proposed by Andersen in 1995, highlights the various factors that influence the utilization of healthcare services and overall health status. The Stokols' social ecological model of health promotion postulates that healthcare behavior is influenced by various factors, including social environmental conditions, geographic conditions, technology conditions, organizational conditions, and social cultural

elements. The purpose of these theories and models is to understand and identify the key factors that influence the sources of variability in health care utilization.

Among various theories and models, this study is mainly based on Andersen's behavioral model of health service use and the social ecological model of health promotion. Developing frameworks is important for a wide range of understandings of factors influencing maternal health care-seeking behavior and it could be applied to research as well as health promotion and intervention programmes. The behavioral model of health service use has also outlined important factors influencing health care behavior but has focused mainly on the individual as the unit of analysis. Despite the recognition of individual and household factors, there is scant attention given to broader environmental factors that may influence behavior related to the use of health services (Andersen, 1995).

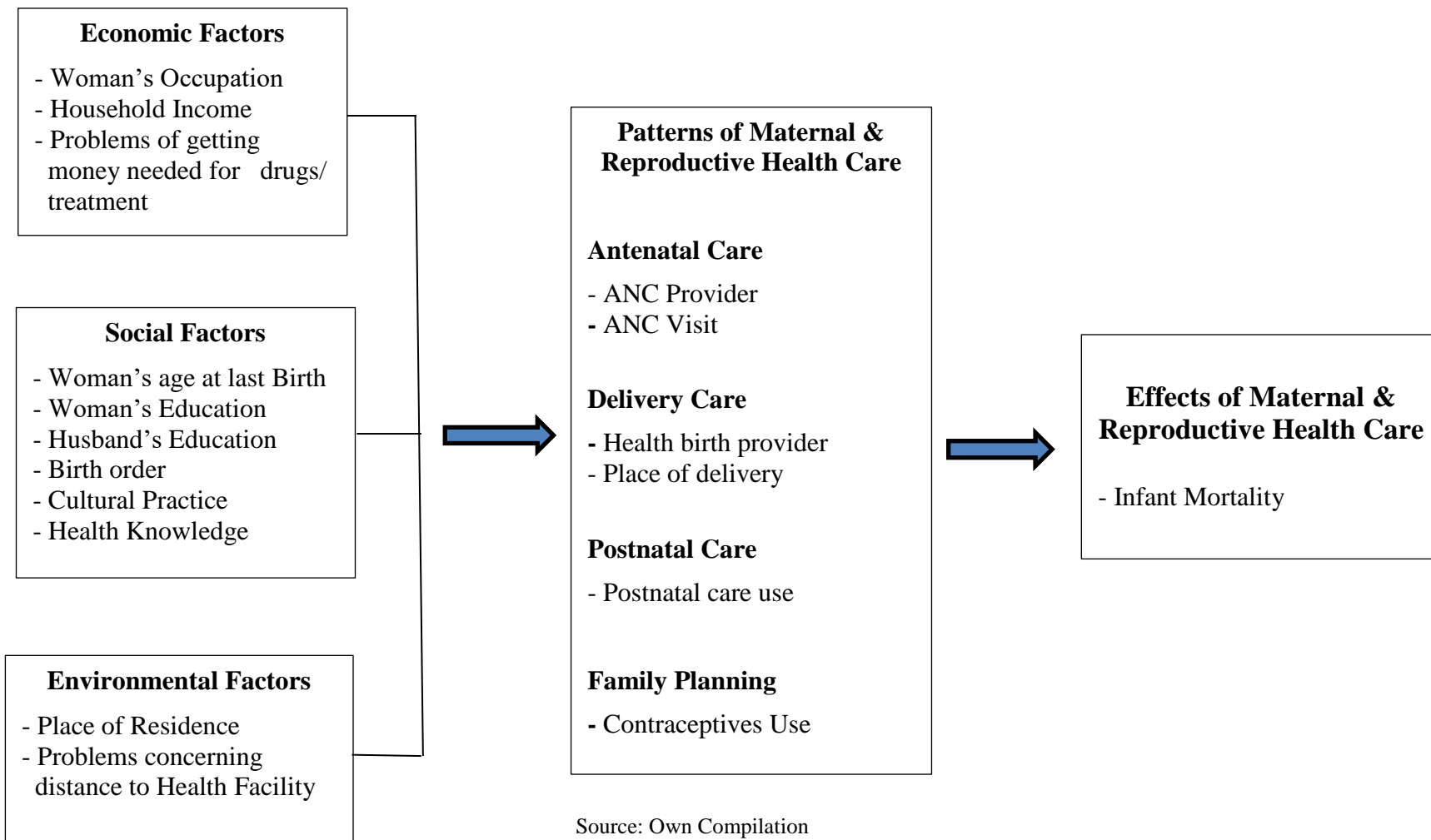
The social ecology model of health promotion suggests that changes in the indicators or factors existing in the environment lead to changes in individuals' behaviors. This theory aids in identification of environmental factors from an ecological perspective, such as intrapersonal, interpersonal, and institutional features, to examine the utilization of healthcare services among women. The relationship between maternal health seeking behaviors and various factors can be verified, including intrapersonal aspects such as ANC visitation and maternal age, interpersonal aspects such as knowledge and birth order, and institutional factors such as distance to health facility and financial barriers to seeking advice or treatment.

The conceptual framework of this study is based on Andersen's behavioral model of health service utilization and the social ecology model of health promotion as depicted in Figure (2.2). In this study, these two models have been modified by adhering Grossman's demand function for health care services. This study uses economic, social, and environmental factors as independent variables. The dependent variables are classified into four categories: antenatal care, delivery care, postnatal care, and contraceptive use. Infant mortality is considered as outcome variable in this study.

In this framework, variables are included based on behavioral model of health service use and social ecological model. Household income, woman occupation, and experience problems with getting money needed for treatment or drugs, which are known as enabling resources in the behavioral model, are used as economic factors in this study. Age, education, birth order, cultural practice, and knowledge (social

environmental and cultural conditions in social ecological model) which are referred to predisposing characteristics in behavior model, are used as social factors in this study. Place of residence (geographic condition in social ecological model whereas enabling characteristics in behavior model) and experience problems with distance to health facility are used as environmental factors in this study. Experience problem with distance to a health facility (known as need factor in behavior model) is included in environmental factor in this study because it can vary depending on the place of residence (geographical condition).

Figure (2.2) Conceptual Framework



Source: Own Compilation

CHAPTER III

OVERVIEW ON THE MATERNAL AND REPRODUCTIVE HEALTH IN MYANMAR

3.1 Myanmar Health Care System

Myanmar health care system evolves with changing political and administrative structure. The relative roles played by the key health providers are also changing. Despite these changes, the Ministry of Health continues to be the primary provider of comprehensive healthcare services. It encompasses a diverse mix of public and private elements, both in terms of financing and provision. Healthcare services are structured and delivered by a combination of public and private providers. Within the public sector, the Ministry of Health serves as the primary entity offering comprehensive healthcare services, with other ministries also providing healthcare, primarily focused on curative treatments for their employees and families. In addition to service provision, the Ministry of Health collaborates with many medical, dental, nursing, and related universities and institutes to train and graduate various healthcare professionals and workers. Despite undergoing organizational restructuring and reengineering processes in early 2015 due to administrative reforms, it continued its role in education and training within the healthcare sector (MoHS, 2020).

The Ministry of Health is organized with seven primary departments aimed at providing essential healthcare services nationwide: the Department of Public Health, the Department of Medical Services, the Department of Health Professional Resource Development and Management, the Department of Medical Research, the Department of Food and Drug Administration, the Department of Traditional Medicine and the Department of Sport and Physical Education. The Department of Public Health plays a significant role by offering comprehensive healthcare services to the entire country, including remote and border areas that are challenging to access. The core responsibilities of the Department of Public Health include providing primary healthcare and essential health services, promoting nutrition, ensuring environmental

cleanliness, improving maternal and child health, implementing school health programmes, and conducting health education initiatives(MoHS,2018).

The Department of Medical Services offers efficient medical treatments and rehabilitation services. The Department is responsible for supervising the delivery of therapeutic interventions by various categories of healthcare services. The Department of Health Professional Resource Development and Management focuses primarily on training and producing various categories of health personnel, excluding traditional medicine personnel. Its goal is to achieve equitable healthcare access for the entire population. The Department of Medical Research conducts nationwide surveys and research to support evidence-based medicine and policy development. The Department of Food and Drug Administration is responsible for ensuring the safety of food, pharmaceuticals, medical equipment, and cosmetics. The Department of Traditional Medicine is responsible for delivering healthcare services using traditional medicine and for providing training to traditional medicine personnel (MoHS,2018).

Other ministries, such as the Ministries of Defence, Railways, Mines, Industry, Energy, Home, and Transport, have their own healthcare systems for their employees and their families. The Ministry of Labour operates three general hospitals in Yangon and Mandalay, offering services to individuals who have the rights to be under the social scheme. The Ministry of Industry governs the operations of the Myanmar Pharmaceutical Factory, which supplies medications and therapeutic agents to local regions(MoHS,2018).

In addition, there are various government agencies that have the authority to register and licence doctors, dentists, nurses, midwives, and traditional medical practitioners.

- MDOMC (Myanmar Dental and Oral Medical Council);
- MNWC (Myanmar Nurse and Midwife Council);
- TMC (Traditional Medical Council);
- MFDBA [FDA] (Myanmar Food and Drug Board of Authority)

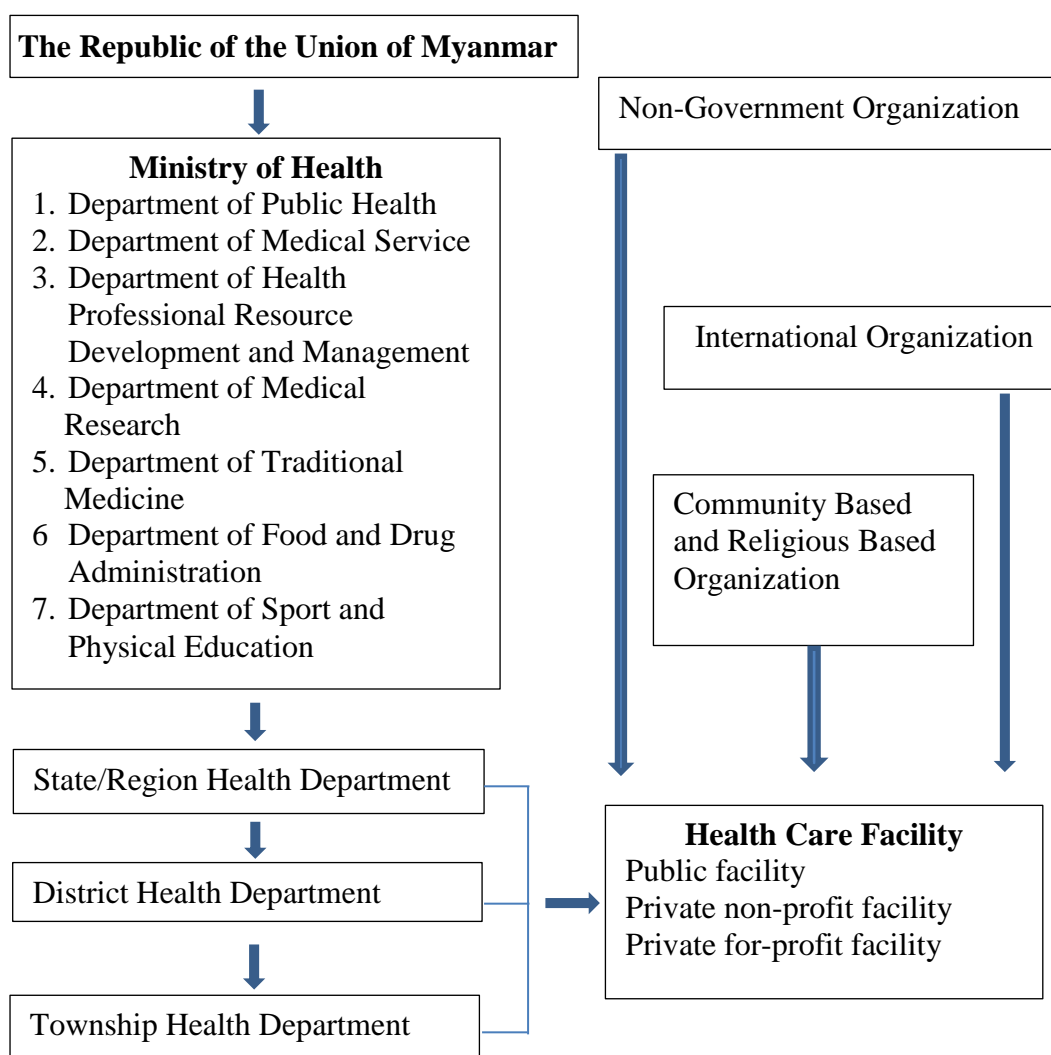
In the field of allopathic medicine, several private traditional practitioners are licensed and regulated in accordance with provisions outlined in relevant laws.

The private, for-profit sector primarily offers ambulatory care services, including outpatient care involving diagnosis, observation, consultation, treatment, intervention, and rehabilitation. Additionally, some private facilities provide institutional care in major cities like Nay Pyi Taw, Yangon, Mandalay, and others.

The private, non-profit sector is organized by the community based and religious based organizations and provide the ambulatory care as well as some provide the institutional care and social health protection in big cities and townships (MoHS, 2020).

International organizations such as WHO and UNDP, as well as local community-based and religion-based organizations, share the deliverance of healthcare services. Non-profit organizations are increasingly playing a significant role in providing services and collaborating for health-related actions (MoHS, 2020).

Figure (3.1) Organization of Health Care in Myanmar



Source: Ministry of Health

The following non-government organizations are also providing healthcare followed with the national health policy.

- Myanmar Woman’s Affairs Federation
- Myanmar Maternal & Child Welfare Association
- Red Cross Society
- Medical Association
- Dental Association
- Nurses Association
- Health Assistant Association
- Traditional Medicine Practitioners Association
- Community Based Organization
- Faith Based Organization
- Parent-Teacher Association

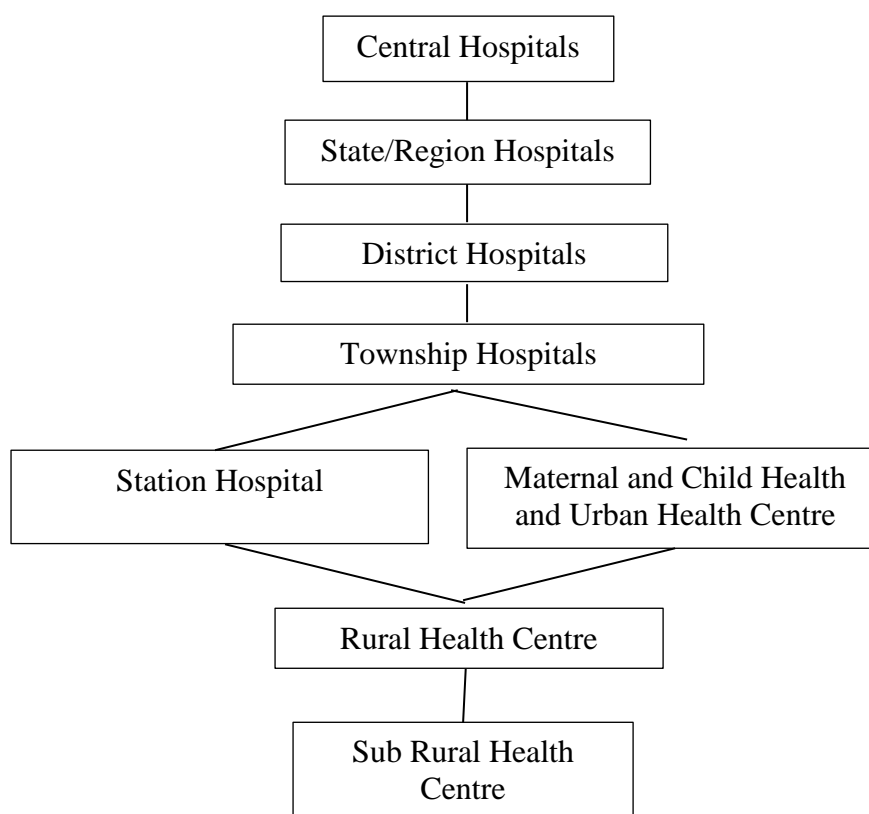
Major sources of financial contributions for health are from the government, households, social security system, community contributions and external aid. Government has increased health spending yearly both on current and capital. (MoHS, 2020). The organization of the healthcare system in Myanmar is depicted in Figure (3.1).

3.2 Structure of Health Service Facility in Myanmar

In Myanmar, healthcare services are delivered through networks of health facilities and health centers that extend down to the village level, as depicted in Figure (3.2). Regional and state health departments in Myanmar are responsible for managing regional and state tertiary hospitals with 200–500 beds, including services and referrals. Below this level, township health departments oversee township hospitals with 25–100 beds, which act as the first referral hospitals for patients from station hospitals (16–25 beds), rural health centers (RHCs), and sub-rural health centers (sub-RHCs). Each RHC is associated with four sub-RHCs. Station hospitals, under township hospitals, provide basic health services such as general medical care, surgical services, and obstetric care. The station hospitals are accessibly located for the rural population, typically within 10 to 20 kilometers from the township hospitals. The staff at RHCs consists of one public health supervisor (I), four public health supervisors (II) (one at each sub-center), six midwives (two at the RHC and one at each of the four sub-centers), one lady health visitor, and one health assistant at the RHC. Their responsibilities encompass various aspects of healthcare, including maternal and child health (both clinic and home care), school health, promotion of nutrition, immunization,

community health education, environmental sanitation, disease surveillance and control, treatment of common illnesses, referral services, birth and death registration, and training of volunteer health workers such as community health workers (CHWs) and auxiliary midwives. To enhance the efficiency of service delivery and implementation, necessary safety measures are to be taken at two different levels of healthcare facilities: health centers and hospitals. The health center level comprises of Rural Health Centers (RHCs) and sub-RHCs, as well as maternity and child health centers, and urban health centers. The hospital level includes station hospitals and above (MoHS, 2020).

Figure (3.2) Flow of Health Service Facility



Source: Ministry of Health

(i) Primary Health Care Services

In Myanmar, people can access primary healthcare services through various health facilities, such as sub-Rural Health Centers (sub-RHCs), Rural Health Centers (RHCs), Urban Health Centers (UHCs), Maternal and Child Health Centers (MCHs), Station Hospitals, and Township Hospitals. The number of individuals seeking primary health care services increased from 13.2 million in 2016 to 13.7 million in

2019 (Public Health Statistics, 2017 - 2019). The number of individuals seeking primary health care services from hospitals increased from 0.2 million in 2016 to 2.84 million in 2019. At the same time, there was a significant increase in the number of cases being heightened to higher-level health facilities, rising from 290,000 to 420,000. The improved transport infrastructure and the patient-friendly hospital environment in recent years have led to a substantial rise in the number of patients seeking healthcare services from primary level hospitals (MoH, 2021).

(ii) Maternal and Reproductive Health Care Services

The Ministry of Health in Myanmar has been actively planning and implementing interventions aimed at improving the health status of mothers, newborns, and children. These efforts focus on reducing maternal, neonatal, and child mortality and morbidity rates. The Ministry of Health in Myanmar employs several key strategies to improve the health of mothers, newborns, and children. These strategies include creating a supportive environment, enhancing the availability of information for decision-making, strengthening health systems and capacity for providing reproductive health services, and promoting positive community and family practices (MoH, 2022).

The Ministry also acknowledges the necessity for further actions based on past implementation experiences. In addition to the previous implementations, the Ministry of Health has acknowledged undertaking additional necessary responsibilities. While there has been significant training of service providers, particularly midwives, there is a need to enhance other aspects that contribute to the quality-of-service delivery. These include improving supplies and transportation, upgrading equipment and infrastructure, implementing effective monitoring and supervision, and providing incentives to retain healthcare staff in underserved areas (MoH, 2021).

On the demand side, the knowledge of clients and families, as well as the availability of cheap, high-quality services are needed to be promoted. The Ministry of Health must prioritize enhancing quality within the health sector as a specific area of concentration. This will further develop the existing work. The work includes: (1) Providing funding to enhance the quality of midwifery services, (2) Enhancing the supervision and monitoring of services by township health departments in areas where 3MDG is providing financial support, (3) Providing on-the-job training and capacity

building for basic health staff, and (4) Strengthening the connections between skilled midwives and auxiliary midwives to improve quality and ensure the continuum of care. In Myanmar, Maternal health care services are provided by primary health care provider at the township level and below, by specialist obstetricians and gynaecologists at the district, state, and regional levels. Midwives have a crucial role in providing antenatal, delivery, and postnatal care services in rural areas (MoHS, 2020).

In Myanmar, over 50% of women between the ages of 15 and 49 experience one or more problems while trying to get healthcare. Among these problems, the major issue was getting money needed for advice or treatment, accounting for 34% of the respondents, followed by unwillingness to go alone, which was reported by 31% of the participants, and the distance to a health facility, which was a concern for 23% of the respondents (MDHS, 2015-2016).

3.3 Health Facilities and Human Resources of Health Sector in Myanmar

3.3.1 Health Facilities in Myanmar

In Myanmar, the Ministry of Health has the responsibility of enhancing the well-being of the population through the provision of a comprehensive of health services including initiatives to promote health, prevent diseases, provide medical treatment, and support rehabilitation. The organization comprises seven departments specializing in Health Planning and Medical Sciences, three departments dedicated to Medical Research (particularly for Lower, Upper, and Central Myanmar), and one department focused on Traditional Medicine. The Department of Health is the largest entity, with over 58,000 employees, making up nearly 93% of the entire workforce. Furthermore, it accounts for around 75% of the Ministry's budget. Its primary obligation is to supervise the technical and administrative functions of health departments at the state/ region, district, and township levels, along with hospitals and clinics (MoH, 2022).

Table (3.1) Development of Health Facilities in Myanmar

Health Facilities	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
Hospitals (Private)	182	212	215	224	253	256	259
General Clinics (Private)	3,911	3554	3759	4900	6664	6399	8717
Specialist Hospital (Public)	28	28	32	33	33	33	33
General Hospital (Public)	947	1,022	1,092	1,101	1,118	1,135	1144
Rural Health Centre	1,696	1,778	1,778	1,796	1,849	1,849	1904
Primary and Secondary Health Centre	88	93	93	93	93	93	98
Maternity and Child Health Centre	348	348	348	348	348	348	348
School Health Team	80	80	80	80	330*	330*	330*
Indigenous Hospital	17	22	22	34	42	44	46
Indigenous Medical Centers	247	260	260	260	260	260	260

Source: Department of Medical Services; MOH

Note: * Organizational set up of the Department of Public Health

Public hospitals are classified into different categories based on size and specialization. These categories include general hospitals, which can have up to 2,000 beds, specialized hospitals and teaching hospitals, which typically have 100-1,200 beds, regional/state hospitals and district hospitals, which usually have 200-500 beds, and township hospitals, which typically have 25-100 beds. The operational level of healthcare is based at the Township Health Department, which offers to a population of 100,000 to 200,000 individuals and is led by the Township Medical Office. At the township level, the hospital and clinics are responsible for providing medical treatment, while the health department is responsible for managing public health initiatives. Every township is equipped with a minimum of 1-2 station hospitals and 4-

7 RHCs, which are under its authority and are responsible for delivering healthcare services to the rural population (MoH, 2022).

The Urban Health Centre, School Health Team, and Maternal and Child Health Centre provide healthcare services for the urban population. Rural areas are served by sub-township hospitals and station hospitals, which have a capacity of 16-25 beds. Additionally, there are rural health centers without beds and sub-rural health centers without beds that offer health services, including public health services. The development of health facility between 2014-2015 and 2020-2021 in Myanmar is depicted in Table (3.1). There was an increase in the number of public hospitals from 975 in 2014-2015 to 1177 in 2020-2021. These facilities primarily offer curative and rehabilitative services. In the year 2020-2021, there was a total of 98 primary and secondary health centers, 348 maternity and child health centers, and 1904 rural health centers. These facilities primarily handle preventive care and engage in public health activities. Myanmar has a total of 46 traditional public health facilities as of 2020-2021 (MoH, 2022).

Myanmar has a significant number of private facilities providing to the rich people. The number of private hospitals increased from 182 in 2014-2015 to 259 in 2020-2021. In the same period, the quantity of private general clinics increased from 3911 in 2014-2015 to 8717 in 2020-2021. In Myanmar, there are many charity hospitals that are managed by private sectors for poor. Community-based organizations and religion-based societies operate private non-profit clinics that offer ambulatory care services. Some healthcare facilities have expanded their services to include inpatient care in Nay Pyi Taw, Yangon, Mandalay, and other major cities. However, the funding and supply of care remains insufficient. The government's Hospital Statistics report cover only public facilities and limit the information of private facilities both for the rich and poor.

Since 2018-2019, Department of Public Health and the Department of Medical Services were separated under the Ministry of Health in Myanmar. Until the 2017-2018, there were a total of 80 township school health teams according to the old organization structure. The number of school health teams has increased from 80 in the 2017-2018 to 330 in the 2018-2019 according to the new township organization structure. Medical Officer, who specialized in maternal health, child health, school health, and nutrition, is responsible for providing and supervising school health services in 330 townships according to the new township organization structure. The

school health team include basic health staff, Township Health Nurse, Nurse, and school social worker.

In Myanmar, the private healthcare sector has grown significantly and now provides 75–80% of ambulatory care services. However, private service providers have had limited participation in public health programs. Members of the Myanmar Medical Association and its various branches are involved in training health workers in the private sector on public health topics like reproductive health and malaria. Additionally, organizations such as Myanmar Maternal and Child Welfare Association (MMCWA) and Myanmar Red Cross Society are increasingly involved in service provision (MoHS, 2020).

3.3.2 Human Resources in Health Sector

In 2007, the government enacted "The Law Relating to Private Health Care Services". Although private sector health care has experienced significant growth, providing around 75-80% of ambulatory care, private health service providers have demonstrated very limited participation in public health programme. The Myanmar Medical Association and its branches are offering training sessions to health workers in the private sector, focusing on public health issues such as reproductive health and malaria. The Myanmar Maternal and Child Welfare Association (MMCWA) and the Myanmar Red Cross Society (MRCS) are increasingly involved in providing services. Cities and towns are experiencing growth in the private sector although reports indicate the emergence of general practices at the village level. Public-private collaborations have proven to be effective in managing tuberculosis (TB) and malaria (MoHS, 2020).

The health system assessment conducted in the 20 townships has revealed the presence of understaffing in rural areas, notwithstanding the equitable allocation of health staff between urban and rural areas. All RHCs in the sample had vacant positions. The survey also verified that the key obstacles to retaining health staff were lack of incentive, high traveling costs, and daily expenditures for food. National Health Workforce Strategic Plan is under the process of developing the National Health Plan. Table (3.2) shows the number of human resources for health sector from 2014-2015 to 2020-2021. This table shows that the number of doctors and nurses employed in the department of public health and medical services increased from 8,936 and 21,598 in 2015-2016 to 11,245 and 24,117 in 2020-2021, respectively. The

number of midwives employed in the Department of Public Health and Medical Services declined from 14,280 in 2017-2018 to 13,470 in 2020-2021.

Rural Health Centers (RHCs) are staffed by a Health Assistant (HA), Lady Health Visitor (LHV), and a midwife. Each Rural Health Centre (RHC) consists of four to five sub-centers, each of which is staffed by a midwife and a Public Health Supervisor. Each sub-health center offers healthcare services to a group of five to ten villages, typically staffed by voluntary health workers such as auxiliary midwives and community health workers. The number of HA increased from 2074 in 2014-2015 to 2382 in 2019-2020. However, the number of LHV declined from 3578 in 2014-2015 to 1884 in 2019-2020. The number of public health supervisors (I) and (II) has increased during this period. Volunteers and members of local NGOs and faith-based organizations are also active in the field of health. For instance, the participants of Myanmar Maternal and Child Welfare Association (MMCWA) and Myanmar Red Cross Society (MRCS) are from many villages. Health committees and local administrative authorities can transfer these participants to assist and advance the provision of health-care services in their villages (MoHS, 2020).

Table (3.2) Medical and Health Personnel in Myanmar

Medical/Health Personnel	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
Doctor	32,861	8,936*	10,479*	17,845*	12,371*	11,993*	11245*
Dental Surgeon	3,413	498*	760*	861*	870*	914*	664*
Health Assistant	2,074	2,156	2,156	2,500	2,518	2,604	2382
Nurse	32,609	21,598*	20,881*	20,842*	22,340*	24,292*	24117*
Midwife	22,258	13,811	13,651	14,280*	14,305*	13,913*	13470*
Lady Health Visitor	3,578	2,329	1,897	2,033	1,974	1,992	1884
Public Health Supervisor (I)	657	1,098	1,098	775	742	758	728
Public Health Supervisor (II)	4,871	11,607	11,607	10,463	10,628	10,409	9885
Traditional Medical Practitioner	1,033	1187	1161	1135	1280	1252	NA

Sources: Department of Public Health, Department of Medical Services; MOHS

Note: * Only appointed people at department of public health and medical service.

According to Table (3.2), The number of doctor and dental surgeon were significantly decreased from 32,861 and 3,413 in 2014- 2015 to 8,936 and 498 in 2015-2016 respectively. It is because Table (3.2) shows only the number of doctor and dental surgeon who have been appointed staffs at department of public health and medical service since 2015-2016. The number of PHS II increased from 4871 in 2014- 2015 to 11607 in 2015-2016 because new PHS (II) have been appointed during this period. PHS (I) increased from 657 in 2014- 2015 to 1098 in 2015-2016 because PHS (II) have been promoted to PHS (I). And then PHS (I) decreased from 1098 in 2014- 2015 to 775 in 2015-2016 because they have been promoted to HA or they resigned, or the number of retired staff was removed.

The 2012 health system assessment identified major constraints in the provision of healthcare services, particularly in terms of the availability, acceptability, and accessibility of these services for the population. The primary constraints in terms of availability encompass insufficient human resources at various levels of the system, particularly overworked basic health staff (BHS), limited healthcare spending, shortages of essential medicines, and lack of infrastructure and programme coverage. Midwives experience excessive workloads and face a lack of support from colleagues and limited access to training opportunities. Poor communication, inadequate skills, and negative attitudes among health workers contribute to reduced demand for healthcare services. Consumers lack information of health care services offered at various levels. Regarding accessibility, numerous regions still pose challenges due to factors such as distance, road conditions, season-based access, or the insecurity of mobile and migrant people. Traditional health providers, such as home-based care, often offer greater accessibility in many cases (MoH, 2022).

During the pre-2021 period, Myanmar had a total proportion of doctors, nurses, and midwives that resulted in a density of 17.8 health workers per 10,000 people. The World Health Organization (WHO) recommends an optimal ratio of 22.8 health workers per 10,000 people to effectively provide a comprehensive range of health services that align with the Millennium Development Goals (MDGs). After ten years, the predictions had nearly risen to 44.5 health workers per 10,000 people to align services with the standards set by the Sustainable Development Goals (SDGs). Nevertheless, Myanmar has not yet achieved the desired level of health workforce density per 10,000 population. Myanmar has a very limited number of health workers

available compared to other countries in the South-East Asia Region. It is ranked slightly higher than Bangladesh in terms of health worker availability (WHO, 2023).

3.4 Health Development Plans in Myanmar

In pursuit of the objective of achieving universal health coverage, a sequence of National Health Plans centred on basic health care services has been systematically developed and implemented. Since 1978, the Ministry of Health has developed four annual People's Health Plans. Since 1991, a series of National Health Plans have been developed and implemented. Considering the changes in demographic, epidemiological, and economic trends at both the national and global levels, 30 years health development plan has been formulated to address future health challenges. Myanmar Health Vision 2030(from 2000-2001 to 2030-2031) consists of nine main areas: health policy and law, health promotion, health service provision, human resources development for health, traditional medicine promotion, health research development, involvement of co-operatives, joint ventures, private sectors, and NGOs, partnership for health system development, and international collaboration (MoH,2014). The anticipated advantages of the strategic long-term plan are outlined in Table (3.3).

Table (3.3) Expected Benefit for Myanmar Health Vision 2030

Indicator	2001	2011	2021	2031
Life expectancy at birth	60 – 64	64 - 71	-	75 - 80
Infant Mortality Rate/1000 LB	59.7	40	30	22
Under five Mortality Rate/1000 LB	77.77	52	39	29
Maternal Mortality Ratio/1000 LB	2.55	1.7	1.3	0.9

Source: Ministry of Health (2014)

In order to achieve the government's objective of "Health for All Goal", a sequence of National Health Plans have been systematically developed at aiming enhancing basic health care services. The National Comprehensive Development Plan-Health Sector (2010-2011 to 2030-2031) is interconnected with other sectors and aligns with the States and Regional Comprehensive Development Plans. This

comprehensive strategic plan, with its clearly defined goals, will serve as a blueprint for the development of future short-term national health programmes (MoH,2014).

The long-term health development plan 'Myanmar Health Vision 2030' was formulated at the ministerial level in 2000. To support this vision, Ministry of Health has developed National Health Plan (2011-2016) in line with the most recent five-year National Development Plan, Rural Health Development Plan, Project for Upgrading Hospitals, and National Plan for Promoting National Education. The National Health Programme (NHP) is a crucial component of the country's economic and development plan. It focuses on tackling current health challenges, achieving Millennium Development Goals (MDGs), enhancing the health system, and addressing factors that influence health. The World Health Organisation (WHO) has worked closely with health stakeholders in Myanmar at different stages of National Health Plans (NHPs), offering technical guidance for the advancement of the health sector (WHO Country Cooperation Strategy, Myanmar 2014 - 2018).

According to the Myanmar Health Vision 2030, the infant mortality rate is expected to be 30 per 1000 live births, the under-5 mortality rate to be 39 per 1000 live births, and the maternal mortality ratio to be 130 per 100,000 live births in 2021. Myanmar's infant mortality rate is 33.7 per 1000 live births, and the under-five mortality rate is 42 per 1000 live births in 2021, according to the United Nations Inter-Agency Group for Child death Estimation (UN-IGME,2023). The maternal mortality ratio is 179 per 100,000 live births in 2020(UN-MMEIG,2023). Thus, it's possible that the goals of Myanmar Health Vision 2030 will have been achieved by 2031.

3.5 Myanmar Reproductive Health Policy (2002)

The aim of the Myanmar Reproductive Health Policy (2002) is to enhance the reproductive health of women, men, and adolescents through the implementation of effective and appropriate reproductive health programs that adopt a life-cycle approach, with the ultimate purpose of attaining an improved quality of life. The National Reproductive Health Policy declares:

- i. Political commitment should be sustained to improve reproductive health status in accordance with the National Health Policy and to promote rules, regulations and laws on reproductive health.

- ii. Reproductive health care services and activities should be conformed with National Population Policy.
- iii. Full respect to laws and religion, ethical and cultural values must be ensured in the implementation of reproductive health services.
- iv. The concept of integrated reproductive health care must be introduced into existing health services.
- v. Effective partnerships must be strengthened among and between government departments, non- governmental organizations and the private sector in providing reproductive health.
- vi. Reproductive health services must be accessible, acceptable and affordable to all women and men, especially underserved groups including adolescents and elderly people.
- vii. Effective referral systems must be developed among and between different levels of services.
- viii. The development of appropriate information, education and communication (IEC) material must be strengthened and disseminated down to the grass-root level to enhance the community awareness and participation.
- ix. Appropriate and effective traditional medicines and socio-cultural practices beneficial for reproductive health must be identified and promoted.
- x. Adequate resources must be ensured for sustainability of reproductive health programme (MoH, 2013).

The Ministry of Health (MoH) closely monitors the execution of policies, specifically focusing on the extent to which these policies are integrated into and represented in national strategic plans. The programme was supported by State/Region/Township Health Plans and a development partner. The Strategic Plan for Reproductive Health was developed in accordance with the National Population Policy (1992) and the National Health Policy (1993), which led to the creation of the Myanmar Reproductive Health Policy (2002). The Strategic Plan on Reproductive Health is guided by the National Comprehensive Development Plan for the Health Sector (2010-2011 to 2030-2031) and the National Health Plan (2011-2016), which serve as the main frameworks (MoH, 2013).

3.6 National Strategic Plan for Reproductive Health (2014-2018)

The National Strategic Plan for Reproductive Health supports Myanmar Health Vision 2030 by focusing on health promotion and service delivery to enhance the reproductive health of women, men, and adolescents. Myanmar Health Vision includes other important aspects such as improving human resource for health, conducting health research, and enhancing partnerships with both national and international organizations. These components are crucial in the development and execution of the Strategic Plan. Building up on this progress, the 2014-2018 Strategic Plan will also address the UN Secretary-General's Global Strategy for Women and Children's Health (2010) (MoH,2013).

The specific objectives of the Strategic Plan on RH (2014-2018) are:

1. To reduce rates of maternal, perinatal, and neonatal morbidity and mortality by increasing equitable access to maternal and newborn services; improving quality, efficiency and effectiveness of service delivery at all levels; and improving responsiveness to the client needs
2. To reduce unmet need for contraception, unplanned births as well as socio-economic disparities in access to and use of contraception
3. To strengthen management of miscarriage and post-abortion cares as integral component of comprehensive reproductive health services
4. To expand access to RTI/STI/HIV services within RH programmes, reduce transmission of RTI/STI/HIV including prevention of mother to child transmission of syphilis and HIV
5. To expand reproductive health information and services for adolescents and youth
6. To increase services for screening and treatment of cervical cancer, and
7. To support access to investigation and management of the infertile couple (MoH, 2013).

The strategies and key activities for effective and efficient implementation are:

- (i) Strengthening health systems to enhance the provision of an essential package of RH interventions, (ii) Increasing access to quality, integrated RH services at all levels of care, (iii) Engaging the community in promotion and delivery of RH (iv) Incorporating gender perspectives in the RH Strategic Plan, and (v) Integrating RH in humanitarian settings. The strategic Plan follows the

principles of the AAAQ framework to deliver effective, safe quality health interventions to those in need (MoH, 2013).

AAAQ Framework

It recognizes availability, accessibility, acceptability and quality of health care facilities, goods and services as crucial components of the right to health.

Availability: The primary objective of the national reproductive health programme is to ensure that there are an adequate number of functioning reproductive health care facilities, goods, services, and activities accessible within the country.

Accessibility: Reproductive health facilities, goods, and services will be available to all individuals without any discrimination. Accessibility encompasses four interrelated dimensions:

- **Non-discrimination:** Reproductive health facilities, goods, and services will be available to everyone, with a particular focus on ensuring access for the most marginalized segments of the population.
- **Physical accessibility:** Reproductive health facilities, goods, and services are easily accessible to all members of the population, particularly marginalized groups. These groups include individuals living in poverty, disadvantaged adolescents and youth, out-of-school youth, minorities and indigenous people, women who have experienced violence and abuse, women living with HIV, women engaged in sex work, women with disabilities, as well as refugees and internally displaced persons.
- **Economic accessibility:** Reproductive health facilities, goods, and services will be inexpensive for everyone. Payment for these services will be based on the principle of equality, ensuring that they are affordable for all, including socially disadvantaged populations.
- **Information accessibility:** The right to seek, receive and impart information and ideas concerning reproductive health issues are considered as accessibility (MoH, 2013).

Acceptability: Reproductive health (RH) facilities, goods, and services will adhere to medical ethics and be culturally sensitive. This means they will respect the cultural practices of individuals, minorities, peoples, and communities. They will also take into consideration gender and life-cycle needs. Additionally, these facilities will

prioritize confidentiality and aim to enhance the health status of the individuals they serve (MoH, 2013).

Quality: RH facilities, commodities, and services will adhere to cultural norms and also meet scientific and medical standards, ensuring high quality. These requirements include proficient medical staff, scientifically validated and non-expired medicines, hospital equipment, clean and drinking water, and sufficient cleanliness (MoH, 2013).

3.7 Maternal and Reproductive Health in Myanmar

3.7.1 Maternal Health Indicators in Myanmar

To evaluate the extent of maternal health service coverage, the researchers utilized specific indicators to produce a summary measure known as the Maternal Health Index. The researchers categorized the amount of coverage for each indicator as high, intermediate, or low, as outlined in Table (3.4). The summary measure, known as the Maternal Health Index, was standardized by assigning a value of 1 if all maternal health indicators had been successfully accomplished at a high level (MoH, 2014).

The maternal health index used to measure maternal health service coverage are as follow.

- Antenatal care coverage (%)
- Proportion of births attended by Skilled Health Personnel (%)
- Postnatal care coverage (%)
- TT2 coverage (%)
- Still-birth ratio
- Abortion rate (%)
- Maternal mortality ratio

Table (3.4) Level of Measures for Maternal Health Indicators

Indicators	High Level	Middle Level	Low Level
Antenatal Care Coverage (%)	>75%	50-75%	<50%
Proportion of births attended by Skilled Health Personnel (%)	>75%	50-75%	<50%
Postnatal Care Coverage (%)	>75%	50-75%	<50%
TT2 Coverage (%)	>75%	50-75%	<50%
Still-birth ratio (per 1000 LBs)	< 10	10-20	>20
Abortion rate (%)	<2	2-4	>4
Reported Maternal mortality ratio (per 1000 LBs)	0-0.99999	1-1.5	>1.5

Source: Ministry of Health (2014)

3.7.2 Maternal and Reproductive Health Care Service Utilization in Myanmar

The percentage of pregnant women seeking Antenatal Care (ANC) from health facilities has been steadily increasing. ANC coverage has increased from 83.6% in 2014 to 88% in 2019, as shown in Table (3.5). The proportion of pregnant women who had a minimum of four antenatal care (ANC) visits increased from 67.1% in 2014 to 78% in 2018. Table (3.5) shows that 61% of live births occurred in a healthcare facility, and 78.4% of births were attended by skilled health provider such as nurses, midwives, and doctors in 2016. There were upward trends in skilled birth attendance and health facility delivery between 2014 and 2019 (MoH,2021).

In 2019, around 70% of deliveries occurred at health facilities, with 60% taking place at both public and private hospitals as shown in Table (3.5). In 2019, skilled birth attendance was an average of 87% of deliveries. Due to the revised operational definition of PNC, which now includes only those who received care within two days after delivery, data on hospital deliveries would be significantly underestimated. The coverage of postnatal care decreased from 85.2% in 2014 to 66.2% in 2019 because of the World Health Organization's revised definition of postnatal check-ups within the first two days after giving birth. The Myanmar DHS (2015-2016) revealed that just 71% of women and 36% of newborns adhere to the recommended practice of receiving a postnatal check-up during the first two days

after birth. In 2019, there was a significant decrease of 66 percent, which can be attributed to the modification in the data definition for PNC. Specifically, the time frame was changed from within 42 days to within 2 days after birth. In addition, 50% of infants below the age of six months are breastfed. Regarding health-seeking behaviours, only 54% of children suffering from diarrhea were brought to a healthcare facility for treatment, and 86% of these children received oral rehydration therapy or were given increased fluid (MoH, 2021).

Table (3.5) Maternal and Reproductive Health Care Use in Myanmar

Health Care Utilization	2014	2015	2016	2017	2018	2019
Antenatal Care Coverage (%)	83.6	82.4	86.1	85.7	86.3	88
ANC visit of 4 or more times (%)	67.1	70.1	72.3	NA	78	70.4
Skill Birth Attendance (%)	74.4	77.4	78.4	85.8	85.1	87.3
Institutional Delivery (%)	NA	NA	61	62.3	64.2	69.3
Postnatal Care Coverage (%)	85.2	86.3	91	92.1	91.5	66.2
Contraceptive Prevalence Rate (%)	50.4	55.3	61.3	67.2	69.3	71.1

Source: Department of Public Health, Ministry of Health.

The Public Health Statistics 2017-2019 report highlighted the importance of contraception in both family planning and the prevention of unwanted pregnancies and unsafe abortions. It also highlighted that contraception services are a part of the fundamental package of health services in Myanmar. The utilization of modern contraceptive methods among eligible couples showed a steady increase, with the contraceptive prevalence rate (CPR) increasing from approximately 50 percent in 2014 to over 71 percent in 2019. From 2016 to 2019, the combined usage of intramuscular (IM) injections and oral pills constituted over 80 percent of contraceptive use among modern method users. The utilization of each of the remaining contraceptive methods, such as IUCD, implant, and condom, accounted for two to four percent of overall utilization. The subcutaneous injection was implemented into the reporting system in 2019, representing around 4 percent of contraceptive usage during that year. 71% of married women are using a method of contraception in 2019 (Myanmar Health Statistics, 2020).

Contemporary methods of family planning meet the needs of women who desire to postpone or cease having children. According to MDHS (2015-16), 69% of

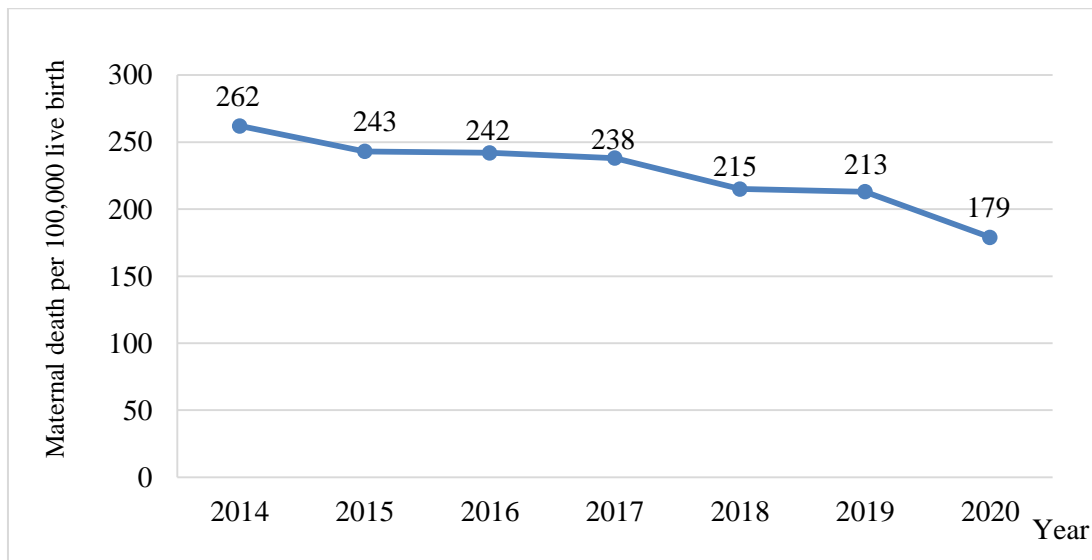
married women express a desire for family planning in Myanmar. The demand satisfied by modern method assesses the proportion of women who choose to postpone or cease childbearing and those who are utilizing contemporary family planning method. Currently, contemporary methods meet 75% of the need for family planning in Myanmar. Currently, 52% of married women are utilizing contraception, with 51% opting for modern methods and 1% choosing traditional methods. Injectables are used by 28% of married women, whereas the contraceptive pill is used by 14% and female sterilisation is used by 5%. Modern contraceptive methods are provided by the public sector, accounting for somewhat more than half (54%) of the total. The private sector accounts for 29% of the methods, whereas NGOs provide 3% and other sources contribute 12% of the methods. The public sector provides around 75% of female sterilizations and injectables. The pill is predominantly distributed by the private medical sector (47%) and shops (38%) (MoHS,2017).

The contraceptive prevalence rate in Myanmar increased from 50.4% in 2014 to 71% in 2019. Nevertheless, additional advancements are necessary to achieve SDG 3.7, which seeks to guarantee universal access to sexual and reproductive healthcare services. This includes family planning, comprehensive information, education, and the integration of reproductive health into national strategies and initiatives by 2030.

3.7.3 Maternal Mortality Ratio in Myanmar

The maternal mortality ratio (MMR) is the number of maternal deaths per 100,000 live births during a specific period of time. It illustrates the likelihood of a mother dying in relation to the number of live births and effectively measures the risk of death during a single pregnancy or live birth. Live birth refers to the full expulsion or extraction of a product of conception from its mother, regardless of the length of the pregnancy. After this separation, the newborn must exhibit signs of life, such as breathing, a beating heart, pulsating umbilical cord, or voluntary muscle movement. It is not necessary for the umbilical cord to be cut or the placenta to be attached for a birth to be considered live. Maternal mortality is an indicator that signifies the status of women in society and the general well-being of the population. It also serves as a reflection of the effectiveness of the healthcare system (WHO, 2006). The primary indicator employed to assess maternal mortality is the maternal mortality ratio (MMR), which quantifies the number of maternal deaths per 100,000 live births (WHO, 2006).

Figure (3.3) Trend in Maternal Mortality Ratio of Myanmar



Source: Estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA/Population Division (UN MMEIG)

The MMR indicator measures the ability of health services to efficiently prevent and manage the complication that arise during pregnancy and delivery. It can also indicate insufficient nutrition and overall health of women, and demonstrate the failure to fulfil their reproductive rights, leading to frequent and poorly space pregnancies. The Maternal death Estimation Interagency Group (UN MMEIG) reported a 32 percent decrease in Myanmar's maternal death ratio, from 262 per 100,000 live births in 2014 to 179 per 100,000 live births in 2020, as depicted in Figure 3.3. The United Nations Multilateral Mechanism for Early Impact Grant (UN MMEIG) consists of the World Health Organization, the United Nations Children's Fund (UNICEF), the United Nations Population Fund (UNFPA), the World Bank Group, and the United Nations Department of Economic and Social Affairs, Population Division (UNDESA/ Population Division). The purpose of this initiative is to generate comprehensive data on maternal mortality at the global, regional, and national levels. The data is used to track progress towards achieving the Sustainable Development Goal (SDG) target and to enhance maternal health on a global scale (MoH, 2021).

Maternal deaths refer to the yearly count of female fatalities caused by any factors directly linked to or worsened by pregnancy or its medical care (excluding accidental or unrelated causes) during pregnancy, childbirth, or within 42 days after birth. This measurement is expressed as the number of deaths per 100,000 live births,

in a specific time. Direct obstetric causes, such as hemorrhage, eclampsia, obstructed labour, sepsis, and complications of unsafe abortion, account for over two-thirds of maternal deaths globally. The indirect causes of maternal deaths are mostly due to interaction between preexisting medical conditions (mostly cardiac diseases) and pregnancy (MoHS, 2018).

In Myanmar, 84% of the 235 occurrences of maternal death caused by obstetric hemorrhage were attributed to postpartum hemorrhage (Maternal Death Surveillance and Response, 2017). While this has been a consistent finding in the previous maternal death reviews, the number has declined, comprising 23 per cent (2017) compared to previous years as 30 per cent (2015) and 29 per cent (2016). 11% of the issues in management were attributed to unanticipated complications, primarily resulting from anesthetic accidents during pregnancy and delivery, as well as cardiovascular or neurological complications (MoHS, 2018). The indirect causes of maternal mortality in Myanmar were primarily attributed to pre-existing medical conditions, maternal illnesses, and respiratory and circulatory system disorders (MoHS, 2018).

In 2017, H1N1 contributed to deaths due to superimposed pneumonia. Malignant neoplasms and disorders of the blood and blood-forming organs collectively contributed to other medical causes of indirect fatalities. A significant number of women are unaware of the presence of an underlying medical condition which became worse during pregnancy (MoHS, 2018). Another condition that might affect pregnant women is anemia. Although the specific severity of anemia was not assessed, it was found that nearly half (47 percent) of women between the ages of 15 and 49 suffer from anemia. Most of these women have mild anemia, as reported by MDHS in 2015-2016. Pregnant women have a higher likelihood of experiencing anemia compared to women who are not pregnant, with rates of 57 percent and 46 percent, respectively. Therefore, they are unable to withstand even a minimal amount of blood loss during pregnancy, childbirth, or the postpartum period (MoHS, 2018).

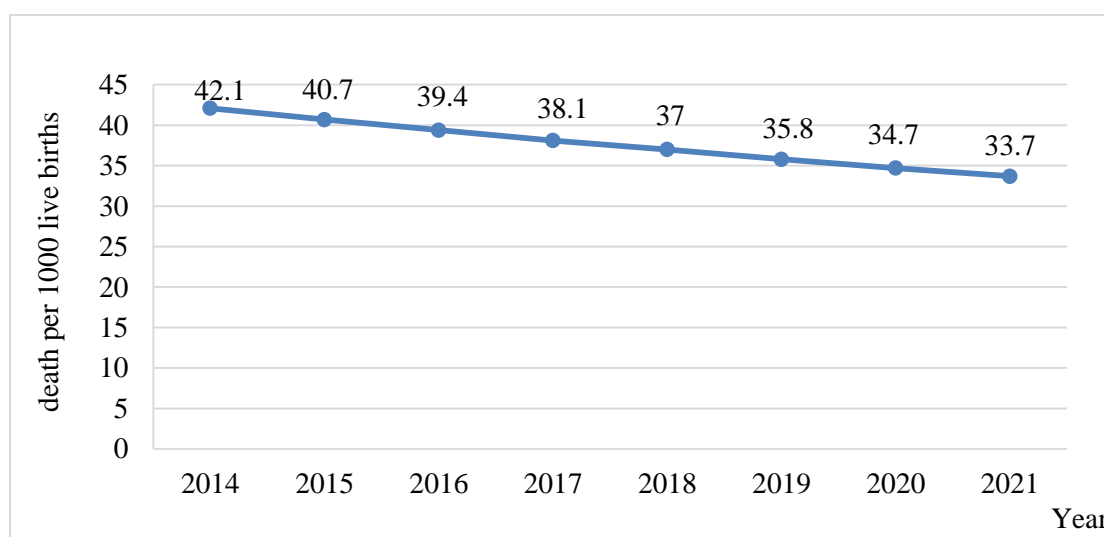
Addressing quality of care concerns and minimizing delays within health systems are crucial steps to further decrease maternal mortality (MoHS, 2017). These causes are linked to the availability of health professionals or skilled provider for women during pregnancy, childbirth, and the immediate postpartum period, as well as to the presence of an effective and responsive healthcare system. In 2014, Myanmar had a maternal mortality ratio (MMR) of 262 per 100,000 live births, which reduced

to 179 per 100,000 live births in 2020(World Bank, 2023). Nevertheless, further reduction is necessary to meet SDG 3.1, targeting MMR of 70 per 100,000 live births by 2030.

3.7.4 Infant Mortality in Myanmar

Infant mortality rate refers to death of a live born infant within the first year of life, per 1,000 live births in a given year. Myanmar has the lowest life expectancy at birth among ASEAN countries. Additionally, it ranks second highest in terms of infant and under 5 death rates, prevalence of underweight, prevalence of HIV, and incidence of tuberculosis in region (World Bank,2023).

Figure (3.4) Trend in Infant Mortality Rate of Myanmar



Source: Estimated by the UN Inter-agency Group for Child Mortality Estimation

In Myanmar, maternal and child mortality as well as malnutrition remain serious problems, despite notable progress occurred over the past twenty years (Department of Population and United Nations Population Fund, 2005). Infant and child mortality rates have decreased during the 20th century due to the progressive spread of Western medicine and other public health interventions in Myanmar. Myanmar has achieved significant advancements in delivering modern healthcare and medical services to all sectors of its population. (Department of Population and United Nations Population Fund, 2005)

In Myanmar, 71% of women and 36% of newborns received postnatal checkup within 2 days after birth. Additionally, 58% of children with symptoms of Acute

Respiratory Infection (ARI) were brought to a healthcare facility, while 54% of children with diarrhoea received medical attention. Moreover, 68% of children with diarrhoea were provided with Oral Rehydration Therapy (ORT) or increased fluid . Furthermore, 51% of children under 6 months of age were exclusively breastfed, and 58% of children under 5 years old were found to be anemic, according to the (MDHS, 2015-2016). In Myanmar, 13% of children were unsupervised or under the care of a kid younger than 10 years old for more than 1 hour each week. (MDHS ,2015-2016).

According to the United Nations Inter-Agency Group for Child Mortality Estimation (UN IGME), the infant mortality rate in Myanmar has decreased from 82 to 37 deaths per 1,000 live births between 1990 and 2018, resulting in a reduction of about 45 %. This rate remains high compared to other LMCs. Only Lao People's Democratic Republic (Lao PDR or Laos) shows a higher number of deaths than Myanmar. However, there is still a significant distance to go to achieve the aims of the Sustainable Development Goals by 2030. Even within the nation, the likelihood of maternal and infant mortality is significantly high among the most susceptible sections of the population. The infant mortality rate in Myanmar has had a steady decrease, falling from 42.1 deaths per 1,000 live births in 2014 to 33.7 deaths per 1,000 live births in 2021, as shown in Figure 3.4 (UN IGME,2023). However, further reduction is necessary to meet the targets of SDG 3.2, which aims to bring the rate down to 12 deaths per 1,000 live births by 2030.

3.8 Patterns of Maternal and Reproductive Health Care Services Utilization in Myanmar

The patterns of maternal and reproductive health care service utilization by background characteristics in Myanmar are identified by using survey data from Myanmar Demographic and Health Survey (MDHS, 2015-2016). In Myanmar, the first demographic and health survey could be conducted only in 2015-2016. Ministry of Health and Sports of the Republic of the Union of Myanmar implemented Myanmar Demographic and Health Survey (MDHS, 2015-16). United States Agency for International Development (USAID) and the three Millenium Development Goal Fund (3MDG) provided the funding for the MDHS. ICF offered technical support as part of the DHS program. Although ministry of health intended to conduct demographic health survey in 2019-2020 for the second time, it could not be implemented due to Covid -19 and political situation. Thus, this study can only

explore the patterns of maternal and reproductive health care service utilization in Myanmar (2015-2016).

3.8.1 Patterns of Antenatal care (ANC) by Background Characteristics

Antenatal care (ANC) from a skilled provider refers to pregnancy care received from skilled providers, that is, doctors/lady health visitors/ nurses/midwives. WHO recommends that pregnant women receive a minimum of four antenatal care visits from skilled providers to ensure that problems are identified and managed. Myanmar adopted this recommendation in its standard national guidelines for antenatal care and postnatal care. The 2015-16 MDHS indicates that four in five women aged 15-49 (81%) received minimum of one ANC visit with skilled providers during the pregnancy for their most recent birth. Women are less likely to get ANC from a skilled provider for higher order births as shown in Table (3.7). Only 60% of women with a sixth or higher order birth received ANC from a skilled provider, compared with 89% of women giving birth to their first child. 94% percent of women in urban areas received ANC from a skilled provider, compared with only 77% of those in rural areas. Women in rural areas are also more likely than women in urban areas to receive no ANC (16% versus 4%) (MDHS, 2015-2016).

Women with more than secondary education are almost two times more likely than those with no education to receive ANC from skilled providers. Women in the highest wealth quintile are more likely to receive ANC from skilled providers than women in the lowest quintile (98% versus 67%). According to Myanmar Demographic Health Survey (2015-16), percent distribution of women aged 15-49 who had a live birth and received antenatal care from various health care providers for the most recent birth by background characteristics in the 5 years preceding the survey are as shown in Table (3.6) (MDHS,2015-2016).

Table (3.6) Percentage of Women Receiving Antenatal Assistance by Background Characteristics in Myanmar

Background Characteristics	Antenatal care provider							Percentage receiving antenatal care from a skilled provider ¹
	Doctor (%)	Nurse/ midwife/ LHV (%)	Auxiliary midwife (%)	Community/ village health worker (%)	Traditional birth attendant (%)	Other (%)	No ANC (%)	
Mother's age at birth								
<20	25.0	51.9	4.1	1.2	0.7	0.3	16.7	77.0
20-34	27.8	53.6	3.5	1.3	2.1	0.2	11.6	81.4
35-49	22.9	56.5	2.1	0.6	1.8	0.1	16.1	79.3
Birth order								
1	38.4	50.3	3.3	0.8	0.3	0.2	6.6	88.8
2-3	25.6	56.0	2.9	1.5	2.2	0.2	11.5	81.7
4-5	11.6	58.5	4.1	0.9	4.5	0.0	20.3	70.2
6+	8.3	51.6	3.1	1.1	2.5	0.3	33.1	59.9
Residence								
Urban	59.2	35.2	0.4	0.2	1.2	0.0	3.9	94.4
Rural	16.6	59.9	4.1	1.4	2.1	0.2	15.6	76.5
Education								
No education	11.2	44.9	4.0	2.4	1.5	0.0	36.1	56.1
Primary	17.0	63.1	3.3	1.2	2.6	0.3	12.5	80.1
Secondary	38.0	51.8	3.6	0.6	1.7	0.1	4.2	89.8
More than secondary	68.5	31.0	0.4	0.0	0.0	0.0	0.1	99.5
Wealth quintile								
Lowest	7.6	59.5	4.3	0.7	4.0	0.2	23.6	67.1
Second	16.4	58.7	5.3	2.8	2.1	0.4	14.4	75.0
Middle	22.8	61.0	2.8	0.9	1.0	0.0	11.5	83.8
Fourth	33.9	56.4	2.2	0.7	1.1	0.1	5.6	90.4
Highest	70.8	27.3	0.2	0.3	0.0	0.1	1.4	98.1
Total	26.6	54.1	3.3	1.1	1.9	0.2	12.8	80.7

Sources: MDHS (2015-2016)

1: Skilled provider includes doctor and nurse/midwife/Lady Health Visitor

As shown in Table (3.6), 59% percent of pregnant women in Myanmar receive at least four antenatal care visits, as recommended by WHO. 13% of women receive

no ANC visits. 40% of women get ANC within their first trimester of pregnancy, while 30% of women initiate ANC during the fourth to fifth month, and 3% delay until the eighth month or even later. Women in urban areas (84%) are more likely to have at least four antenatal care visits than women in rural areas (51%) (MDHS,2015-2016).

Standard national guidelines for antenatal care have been developed in Myanmar. These guidelines emphasize that every pregnant mother should receive ANC from a skilled provider that includes services such as a thorough physical examination, blood tests for infection screening and anemia, a urine test, tetanus toxoid injections, iron and folate supplements, and deworming medications. In Myanmar, 87% of women aged 15-49 took iron supplements (tablets or syrup), and 55% took drugs for intestinal parasites during the pregnancy of their most recent birth in the 5 years preceding the survey. Among those who received ANC, about 6 in 10 women had a blood sample (61%) and a urine sample (62%) taken as a part of an ANC visit, while 91% had their blood pressure measured. Three-quarter of the women received information about signs of pregnancy complications during their ANC visits (76%) (MDHS, 2015-2016).

3.8.2 Patterns of Delivery Services by Background Characteristics

In this section, patterns of delivery services are expressed by health birth provider and place of delivery.

(i) Health Birth Provider

Skilled assistance during delivery refers to births delivered with the assistance of doctors, nurses, midwives, or lady health visitors. In Myanmar, three-fifths of births are assisted by skilled providers (60%) that include nurses, midwives, and doctors. Another 29% of births are assisted by traditional birth attendants, 6% are assisted by auxiliary midwives, and 4% are assisted by relatives or friends. Skilled assistance declines sharply with birth order: three-quarters of first births have skilled assistance (76%), compared with only one-third of sixth or higher order births (33%) as shown in Table (3.9). Skilled assistance during delivery is much more common in urban areas (88%) than rural areas (52%). Three-fifths of urban deliveries (65%) are assisted by doctors, whereas one-third of rural deliveries (35%) are assisted by traditional birth attendants (MDHS, 2015-16).

Table (3.7) Percentage of Women Receiving Delivery Assistance by Background Characteristics in Myanmar

Background Characteristic	Person providing assistance during delivery					
	Doctor (%)	Nurse/ midwife/ LHV (%)	Auxiliary midwife (%)	Traditional birth attendant (%)	Relative/ other (%)	No one (%)
Mother's age at birth						
<20	24.6	32.9	5.7	31.5	5.3	0.0
20-34	31.9	28.6	6.3	28.9	3.8	0.5
35-49	34.0	26.3	6.0	29.4	3.3	1.0
Birth order						
1	47.6	28.3	4.6	16.7	2.8	0.0
2-3	27.6	31.6	7.5	30.4	2.7	0.3
4-5	15.1	25.8	7.0	44.3	6.6	1.2
6+	14.1	18.7	4.8	49.7	9.3	3.4
Antenatal care visits						
None	5.7	10.7	4.8	66.8	9.7	2.2
1-3	21.5	30.4	8.1	35.6	3.9	0.5
4+	47.8	31.4	5.4	14.0	1.3	0.0
Place of delivery						
Health facility	83.4	15.9	0.5	0.2	0.1	0.0
Elsewhere	1.3	36.0	9.6	46.3	6.0	0.9
Residence						
Urban	64.6	23.3	1.8	9.1	1.1	0.1
Rural	22.3	30.0	7.5	35.0	4.6	0.7
Mother's education						
No education	11.3	16.7	6.1	51.5	11.9	2.4
Primary	23.1	32.9	7.1	34.2	2.5	0.2
Secondary	46.6	32.1	5.7	13.8	1.6	0.1
More than secondary	77.1	17.6	2.7	2.4	0.2	0.0
Wealth quintile						
Lowest	10.7	25.6	6.4	50.8	5.5	1.0
Second	19.2	31.5	8.1	36.5	4.2	0.5
Middle	32.7	32.0	7.3	23.5	3.7	0.8
Fourth	44.6	35.0	6.4	10.6	3.1	0.3
Highest	78.9	18.1	1.4	1.0	0.6	0.0
Total	31.7	28.5	6.2	29.2	3.8	0.6

Source: MDHS (2015-2016)

Births to women with more than secondary education are three times (95%) more likely to receive skilled assistance at delivery than those to women with no education (28%). Births in the highest wealth quintile are almost three times more likely than those in lowest quintile to be assisted by skilled providers (97% versus 36%). The percentage of women aged 15-49 who had given birth assistance by health care provider for the most recent birth according to background characteristics in the 5 years preceding the survey are as shown in Table (3.7) (MDHS, 2015-16).

(ii) Place of Delivery

According to MDHS (2015-2016), only 37% of births take place in a health facility; however, 60% of these births are delivered by skilled providers. Institutional deliveries refer to Deliveries that take place in a health facility. Delivery at a health facility, with skilled medical attention and hygienic conditions, reduces complications and infections during labor and delivery. Access to health facilities in rural areas is more difficult than in urban areas because of distance, inaccessibility, and lack of appropriate facilities. Although institutional delivery has been promoted in Myanmar, home delivery is still common, mostly in hard-to-reach areas. The reproductive health programs in the country encourage use of skilled birth attendants wherever delivery takes place. Even at home deliveries, it is highly recommended that skilled providers be present so that deliveries are clean and safe. The use of clean delivery kits and birth preparedness procedures is recommended (MDHS, 2015-16).

In Myanmar, 37% of the live births in the 5 years preceding the survey were delivered in a health facility and 63% were delivered at home as shown in Table (3.7). Sixth and higher order births are more likely to be delivered at home (84%) than first births (44%). Only 16% of higher order births take place in health facilities, compared with 55% of first births. Among live births in the 5 years preceding the survey, delivery in a health facility is about two and a half time higher in urban areas (70%) than in rural areas (28%). Institutional deliveries are more common among women with more than secondary education than those with no education (83% versus 13%). Percent distribution of live births in the 5 years preceding the survey by place of delivery and the percentage delivered in a health facility, according to background characteristics are as shown in Tables (3.8) (MDHS, 2015-16).

Table (3.8) Percentage of Women Delivered in Various Places by Background Characteristics in Myanmar

Background Characteristic	Health facility			Home	Other
	Public sector	Private sector	NGO sector		
Mother's age at birth					
<20	26.9	4.4	0.0	68.1	0.6
20-34	30.6	6.6	0.0	62.5	0.3
35-49	32.7	6.0	0.0	61.3	0.0
Birth order					
1	45.3	10.1	0.0	44.4	0.2
2-3	27.0	5.6	0.0	67.2	0.2
4-5	15.4	2.3	0.1	81.5	0.7
6+	14.3	1.4	0.1	84.1	0.0
Antenatal care visits					
None	6.2	0.3	0.0	92.9	0.6
1-3	24.2	2.3	0.0	73.0	0.5
4+	44.1	10.6	0.0	45.2	0.1
Residence					
Urban	52.7	17.4	0.0	29.7	0.2
Rural	24.4	3.2	0.0	72.1	0.3
Mother's education					
No education	11.9	0.8	0.1	86.8	0.4
Primary	26.4	2.8	0.0	70.4	0.3
Secondary	44.5	8.9	0.0	46.5	0.1
More than secondary	51.0	31.6	0.0	17.4	0.0
Wealth quintile					
Lowest	15.3	1.5	0.0	83.0	0.2
Second	23.5	2.0	0.0	74.1	0.4
Middle	33.2	3.9	0.1	62.3	0.5
Fourth	45.2	4.9	0.0	49.9	0.0
Highest	54.5	28.0	0.0	17.4	0.1
Total	30.7	6.3	0.0	62.7	0.2

Source: MDHS (2015-2016)

3.8.3 Patterns of Postnatal Care by Background Characteristics

In Myanmar, 71% of mothers and 36% of newborns receive the recommended postnatal checkup within the first 2 days after birth (MDHS, 2015-2016). The World

Health Organization (WHO) recommends that women receive a postnatal care within 24 hours after delivery (WHO 2015b). Overall, 71% of mothers receive postnatal check-ups in the first two days after delivery and 24% do not receive any postnatal check-up.

Table (3.9) Percentage of Women Receiving Postnatal Care by Background Characteristics in Myanmar

Background Characteristic	Time after delivery of mother's first postnatal checkup							% of women with a postnatal checkup in the first 2 days after birth
	Less than 4 hours (%)	4-23 hours (%)	1-2 days (%)	3-6 days (%)	7-41 days (%)	Don't know/missing (%)	No postnatal checkup (%)	
Mother's age at birth								
<20	37.3	12.9	16.4	5.2	0.0	0.0	28.2	66.6
20-34	45.2	12.3	13.5	3.2	2.1	0.4	23.4	71.0
35-49	47.2	10.7	15.9	1.0	2.0	0.1	23.0	73.8
Birth order								
1	51.7	14.3	12.5	1.8	1.7	0.3	17.7	78.5
2-3	44.2	11.5	13.5	4.1	2.1	0.4	24.2	69.2
4-5	35.3	9.1	18.1	3.9	1.2	0.0	32.4	62.5
6+	33.2	8.8	19.1	0.0	2.8	0.4	35.7	61.1
Place of delivery								
Health facility	63.4	15.0	10.9	0.7	1.4	0.4	8.2	89.3
Elsewhere	29.8	9.5	16.9	4.8	2.3	0.2	36.5	56.2
Residence								
Urban	52.3	13.8	15.0	1.0	2.5	0.3	15.2	81.1
Rural	42.5	11.4	13.9	3.6	1.7	0.3	26.5	67.8
Education								
No education	30.4	8.3	8.9	3.4	2.4	0.3	46.2	47.6
Primary	43.9	12.0	16.3	3.4	0.9	0.3	23.2	72.2
Secondary	49.5	11.8	15.3	2.7	2.6	0.4	17.7	76.5
More than secondary	60.6	19.6	9.0	0.8	3.1	0.0	6.8	89.2
Wealth quintile								
Lowest	35.3	9.9	12.9	4.4	1.7	0.1	35.9	58.0
Second	41.5	10.1	15.0	4.7	2.2	0.6	26.0	66.5
Middle	46.5	14.3	16.2	2.1	0.6	0.6	19.6	77.1
Fourth	46.0	13.2	15.4	2.2	2.6	0.0	20.5	74.7
Highest	63.0	14.4	11.7	0.1	2.3	0.2	8.4	89.0
Total	45.0	12.0	14.2	3.0	1.9	0.3	23.7	71.2

Source: MDHS (2015-2016)

Women who deliver in a health facility are more likely to receive a postnatal check-up than those who deliver elsewhere (89% versus 56%). Women in urban areas are more likely to receive a postnatal check-up in the 2 days after delivery than women in rural areas. The percent distribution of the mother's first postnatal check-up for the last live birth by time after delivery, and the percentage of women with a live birth in the 2 years preceding the survey who received a postnatal checkup in the first 2 days after giving birth by background characteristics are as shown in Table (3.9) (MDHS, 2015-16).

Nearly three-fifths of the women giving birth in the 2 years before the survey (58%) received postnatal care from doctors, nurses, midwives, or lady health visitors, while 10% received care from traditional birth attendants, and 3% received care from auxiliary midwives. According to the World Health Organization (WHO), postnatal care services for newborns should start as soon as possible after birth because many neonatal deaths occur within the first 48 hours of life (WHO 2015b). In Myanmar, of the last births in the 2 years preceding the survey only 36% received a postnatal checkup in the first 2 days after birth, while the majority of newborns (60%) received no postnatal checkup in the first week after birth. Births to women with more than secondary education are more likely to receive a postnatal check-up in the first two days after birth than those to women with no education (44% and 29%, respectively). In Myanmar, 28% of newborns receive a postnatal check-up within 2 days after birth from a doctor, nurse, midwife, or lady health visitor, while 2% receive a check-up from an auxiliary midwife, and 7% from a traditional birth attendant (MDHS, 2015-16).

3.8.4 Patterns of Contraceptive Use

In Myanmar, 52% of currently married women use a method of family planning, with 51% using a modern method and 1% using a traditional method. The most commonly used modern methods are injectables (28%), followed by the pill (14%), female sterilization (5%), and the IUD (3%). Over half of modern contraceptive users (54%) receive modern methods from public sector sources—government hospitals, health centers, and clinics. 16% of currently married women have an unmet need for family planning: they want to space or limit births but are not currently using contraception.

Table (3.10) Percentage of Women using Contraceptive Method by Background Characteristics in Myanmar

Background Characteristic	Method of Contraceptive Uses			
	Any method	Any modern method	Any traditional method	Not currently using
Mother's age at birth				
15-19	54.0	53.2	0.8	46.0
20-24	59.5	59.3	0.1	40.5
25-29	58.7	57.9	0.8	41.3
30-34	57.8	57.1	0.7	42.2
35-39	63.1	61.8	1.3	36.9
40-44	47.9	46.6	1.3	52.1
45-49	23.7	22.3	1.3	76.3
Number of living children				
0	31.3	29.9	1.4	68.7
1-2	59.0	58.1	0.9	41.0
3-4	54.9	53.9	1.0	45.1
5+	31.8	31.2	0.6	68.2
Residence				
Urban	59.6	57.3	2.3	40.4
Rural	49.6	49.1	0.5	50.4
Education				
No education	38.2	37.5	0.7	61.8
Primary	51.1	50.6	0.5	48.9
Secondary	59.0	58.0	1.0	41.0
More than secondary	61.3	57.2	4.1	38.7
Wealth quintile				
Lowest	46.8	46.3	0.6	53.2
Second	50.5	50.2	0.3	49.5
Middle	50.2	49.8	0.5	49.8
Fourth	55.7	54.7	1.0	44.3
Highest	58.6	55.9	2.7	41.4
Total	52.2	51.3	1.0	47.8

Source: MDHS (2015-2016)

Modern contraceptive use peaks at 62% among currently married women aged 35-39 as shown in Table (3.10). More than half of currently married adolescents (women aged 15-19) (53%) use modern contraceptive methods. Three-quarters of the total demand for family planning is satisfied by modern methods (75%). Couples can use contraceptive methods to limit or space the number of children they have. The benefits of family planning are not limited to promoting maternal or child health. Family planning can significantly enhance opportunities to attain higher socioeconomic status, education, employment, and empowerment, especially for girls and women (MOHS, 2017).

In Myanmar, percent distribution of currently married women aged 15-49 by contraceptive method currently used, according to background characteristics are as shown in Table (3.10) (MDHS 2015-16). Modern contraceptive use is highest among married women with 1-2 living children (58%) and generally declines as the number of living children goes up as shown in Table (3.10). Women in urban areas are somewhat more likely to use modern contraceptives than those in rural areas (57% versus 49%). Contraceptive use increases substantially with education. Married women with secondary education or higher are more likely to use modern methods of contraception than those with no education (57-58% versus 38%). More than half of modern contraceptive users received their method from public (government) sector sources—hospitals, rural health centers (RHCs), subcenters, and mobile clinics (54%). Three in ten women obtained their methods from sources in the private medical sector (29%). In 2013 Myanmar announced it would increase modern contraceptive use from 41 percent to 50 percent by 2015 and to more than 60 percent by 2020 (MoH, 2021).

3.9 Maternal and Reproductive Health Care Status in Bago Township

Maternal health care services are being delivered by primary health care providers at township level and below, by specialist obstetricians and gynecologists at district, state, and regional level in Myanmar. Midwives are the key persons in providing antenatal, delivery and postnatal services in rural areas (Public Health Statistics, 2017-2019). In Bago Township, there was a fluctuation in pregnant women seeking ANC and it decreased from 84 % in 2014 to 68.3 % in 2021. During the period of 2014 to 2021, the percentage of Skilled Birth Attendance (SBA) was highest (83.3%) in 2020 and then declined to 68.4% in 2021. The institutional delivery

showed a gradual decreasing trend from 2014 to 2017 then sharply increased from 10.9% in 2018 to 50.9 % in 2019 and then gradually declined to 41.1 in 2021. Women who deliver in a health facility are more likely to receive a postnatal check-up than those who deliver elsewhere.

Table (3.11) Maternal and Reproductive Health Indicators in Bago Township

Health Care Utilization	2014	2015	2016	2017	2018	2019	2020	2021
Antenatal Care Coverage (%)	84.0	94.1	91.0	94.9	94.6	90.5	88.7	68.3
ANC visit of 4 or more times (%)	43.3	38.4	42.3	40.6	41.7	44.3	45.2	32.6
Skill Birth Attendance (%)	68.4	76.6	74.7	73.7	77.4	82.5	83.3	68.4
Institutional Delivery (%)	27.7	10.4	11.0	9.9	10.9	50.9	50.3	41.1
Postnatal Care Coverage (%)	74.5	91.7	96.4	56.6	55.1	36.1	39.2	33.2
Contraceptive Prevalence Rate (%)	68.8	66.2	51.4	60.7	62.9	66.1	75.6	70.7

Source: Public Health Department of Bago Township (2022)

In Bago township, 74.5 % of mothers received postnatal check-ups after delivery in 2014 and the percentage received postnatal care has fluctuated and lowest in 2021. The World Health Organization (WHO) recommends that women receive a postnatal checkup within 48 hours after delivery. According to the changed definition for PNC, the percent of receiving PNC within the first 48 hours after giving birth has declined in Bago township. An increasing trend in PNC coverage was observed from 91.7 percent in 2015 to 96.4 percent in 2016. A sudden drop to 36 percent was observed in the year 2019 which was most likely because of the change in data definition for PNC from within 42 days to within 2 days of puerperium. Around 71 % of married women in Bago township were using a modern contraceptive method in 2021 as shown in Table (3.11).

In 2019, antenatal care coverage was higher in Bago Township than in Union, but other healthcare service utilization indicators such as the percentage of skilled birth attendance, institutional delivery, postnatal care coverage, and contraceptive prevalence rate were lower in Bago Township than in Union according to Table (3.5) and Table (3.11). The percentage of all healthcare service utilization declined in 2021 due to Covid-19 and unstable economic and political situation in Myanmar, including Bago Township.

CHAPTER IV

RESEARCH METHODOLOGY

4.1 Survey Area

The survey encompassed both urban and rural areas within Bago Township, Bago Region, Myanmar. Bago Township was chosen as the study area due to its significance as the central township in Bago Region and its relatively high maternal mortality ratio of 316 per 100,000 live births compared to the national average (MDHS, 2015–2016). Bago Region comprises four districts: Bago, Taungoo, Pyay, and Thayawady. Bago Township, situated within Bago District, comprises three towns: Bago, Phaya Gyi, and Inn Ta Kaw. Among these, Bago is the principal town and serves as the administrative hub of Bago Region. The administrative structure of Bago Township includes 40 wards and 66 village tracts, encompassing a total of 211 villages (General Administration Department of Bago Township, 2022).

The township has a total of 116,076 households and a population of 453,328, with 215,047 males and 238,281 females (General Administration Department of Bago Township, 2022). Bago Township is predominantly urban, with Bago City covering 96.53 square miles (250 km²) within its boundaries. The population comprises 88.73% Bamar ethnicity, with notable Karen, Mon, Palaung, and Burmese Indian communities. Approximately 49.8% of the population resides in rural areas. The religious composition is predominantly Buddhist, accounting for 93.58% of the population, while Christianity is the second most prevalent religion at 4.1%. Bago Township is situated along the eastern slopes of the Bago Yoma Mountain range and is characterized by dense natural forests.

The northern region of the township features elevated hills and dense forests, hosting diverse tree species such as Teak, Lebbek, and Champak trees. These forests, particularly in the outskirts of Bago City, serve as protected areas with abundant medicinal herbs and plants of therapeutic significance. The town's primary export commodity is rice, both milled and unmilled, primarily destined for Yangon Region. Rice cultivation occurs mainly during the monsoon season, with a notable off-season

harvest in summer. Peanuts and mung beans are cultivated during the cool season, while corn and bird feed (mainly for poultry) are year-round crops.

Vegetable farming, primarily for subsistence and to a lesser extent for commercial purposes, also contributes to the township's agricultural landscape. Bago also has a small but thriving tourism industry with many tourists from nearby Yangon. The Bago Development Committee supervises 11 markets located around the city. There are two rail lines that pass-through Bago, one going to Mandalay and another south to Mawlamyine. Moreover, Bago has multiple bus hubs on its periphery, offering consistent intercity bus transportation. Bago is accessible by the Yangon-Mandalay Expressway and the older highways leading to Taungoo and Myeik. Bago possesses a total of seven prominent bridges that cross the Bago River, within the city and its surrounding areas.

4.2 Sample Size Determination

The study population consisted of women in the reproductive age group (15-49 years) who had given birth within 5 years before the survey, regardless of the outcome of the delivery. These women were permanent residents or had been in the study area for at least 5 years.

The sample size (n) of the study was determined by the Snedecor and Cochran (1989) sample size formula:

$$\begin{aligned} \text{Sample size (n)} &= \frac{Z^2 pq}{d^2} \\ &= \frac{(1.96 \times 1.96) (0.5) (0.5)}{(0.05)^2} \\ &= 384.16 \end{aligned}$$

where Z = standard normal score corresponding to 95% confidence level = 1.96

p = proportion of women in reproductive age (50%)

$q = 1 - p$

d = degree of precision (margin of error) = 5%

n = desired sample size

$\therefore n = 384.16$

Donald (1967), Hagbert (1968), Johnson (1959), and Miller and Smith (1983) recommend that the researcher take a random sample of 10-20% of non-respondents

to use in non-respondent follow-up analyses. Thus, 20% of desired sample size was used as non- response rate in this study.

Non-response rate = 20 % of n

$$\begin{aligned}
 \text{Sample size} &= \frac{\text{calculated sample size}}{1-\text{non response rate anticipated}} \\
 &= \frac{384.16}{1-0.2} \\
 &= \frac{384.16}{0.8} \\
 &= 480.2 \approx 481
 \end{aligned}$$

Therefore, the required sample size was at least 481 households.

4.3 Sampling Design

The households in the survey area were stratified according to the type of residence (rural or urban) and a two-stage stratified random sampling method was used to select a representative sample size. In the first stage, sample wards and village tracts in Bago Township were randomly selected. 17% of the population size in each stratum was randomly selected. Therefore, 7 wards were selected from urban area and 11 village tracts were selected from rural area in Bago Township as shown in Table (4.1). The sample size was proportional to the population size of the stratum and each stratum had the same sampling fraction.

Table (4.1) Allocation of Sample Households to each Stratum

Strata	N_{wv}	n_{wv}	N_h	a_h	n_h
Urban	40	7	6779	0.4799	231
Rural	66	11	7347	0.5201	250
Total	106	18	14126	1.00	481

Source: Own Calculation

N_{wv} = Total number of wards /village tracts in each stratum

n_{wv} = Number of selected wards /village tracts in each stratum

N_h = Total number of households in selected wards /village tracts

n_h = Number of sample households in selected wards /village tracts

$$a_h = \frac{N_h}{\sum N_h}$$

$$n_h = a_h \times \sum n_h$$

In the second stage, 481 households were allocated to each stratum (urban and rural) with a probability proportional to size as shown in Table (4.1).

Table (4.2) Allocation of Sample Households in Urban Area

Sr.	Selected Wards	Number of Household	P_u	Number of Sample Household
1	Myo Twin	1520	0.2242	52
2	Naung Waing(South)	275	0.0406	10
3	Naung Waing(North)	235	0.0347	8
4	Kyauk Gyi Su	2049	0.3022	69
5	Ywar Thit	670	0.0988	23
6	Zyaing Ga Naing (North)	1820	0.2685	62
7	Zay Paing	210	0.0309	7
Total		6779	1.00	231

Source: Own Calculation

Table (4.3) Allocation of Sample Households in Rural Area

Sr.	Selected Village Tracts	Number of Household	P_u	Number of Sample Household
1	Ka Twin Chan	849	0.1156	29
2	Hmon Taing	266	0.0362	9
3	Ka Mar Nat	1662	0.2262	57
4	Ah Htet Si Dee (West)	258	0.0351	8
5	Ah Htet Si Dee (East)	300	0.0408	10
6	Auk Si Dee (East)	709	0.0965	24
7	Oe Bo	351	0.0478	12
8	Saing Di	370	0.0504	13
9	Moke Ka La	433	0.0589	15
10	Hpa Yar Ka Lay	1939	0.2639	66
11	Zay Nyung Pin	210	0.0286	7
Total		7347	1.00	250

Source: Own Calculation

The 481 households, having a woman who had delivered within the previous 5 years, were selected from the representative 7 wards and 11 village tracts by using random sampling method. If there was no woman who had delivered within the previous 5 years in the selected household, those women who were in the household located beside the selected household were asked. The allocations of sample households for selected wards and village tracts were as shown in Tables (4.2) and (4.3).

4.4 Questionnaire Design

Survey data were collected by using questionnaire that included open-ended, closed-ended and likert scale questions with in-depth interview. The questionnaire has been organized into six parts: the questions for respondent background were included in Part I, the questions for household characteristics were included in Part II, and the questions for maternal and reproductive healthcare service utilization were included in Parts III, IV, V and VI.

This survey used the questionnaire which consisted of 79 questions covering participants' economic factors, social factors, environmental factors and various aspects of health service utilization related to antenatal care (number of attended visits, antenatal care provider), delivery (place of delivery, and health birth provider), postnatal care (services obtained after birth); family planning (use of contraception), and infant mortality. This study used a qualitative approach with face-to-face interviews to capture the depth of participants' understanding and perceptions. Face-to-face interviews are particularly useful for exploring potentially sensitive areas regarding behavior and perception. The questionnaire was created based on the Myanmar Demographic and Health Survey (MDHS) and studies from other low-to-middle-income countries, as well as regional reports and recommendations.

4.5 Model Specification

The study used a multivariate analysis to examine the various factors that influence a mother's decision regarding health care services, as specified by the demand functions for health care services proposed by Grossman (1972). This analysis considers the interplay between these variables. The multivariate model is specified as a generic latent linear probability function as:

$$M_h = X' \beta + \varepsilon$$

Where X' is a vector of all the determinants and β is a vector of how each of the determinants that influence the odds and ε is the random error term that is assumed to be normally distributed. This model will estimate and analyze to draw conclusions about maternal health care utilization.

The study used a regression model in which all the socio-economic determinants were the explanatory variables of maternal healthcare utilization. With the dependent variable measured as a binary variable and multinomial variable, logistic regression model was used.

From Andersen (1995), the determinants of health care service utilization considered in this study were age, sex, family size, education, social status, employment, and occupation etc. The previous studies were concentrated on developed countries in which culture is much more homogeneous, this study augments the previous studies by adding culture to the determinants. Muchabaiwa et al (2012) indicate where people live may determine their decision to access healthcare or not, so type of place of residence (urban and rural) is also included. Based on the literature, this study estimates a model with several vectors of variables based on above equation.

And then the estimated model takes the following form:

$$M_h = \beta_0 + \beta_1 wocc + \beta_2 hhi + \beta_3 fees + \beta_4 age + \beta_5 wedu + \beta_6 hedu + \beta_7 bo + \beta_8 cul + \beta_9 knh + \beta_{10} resi + \beta_{11} dist + \varepsilon$$

Where,

M_h = Maternal Health Care Service Utilization,

β_0 = The intercept terms,

β_i = The coefficient of explanatory variables

wocc = Woman's Occupation,

hhi = Household Income,

fees = Problem with getting money needed for treatment/drug

age = Woman age at last birth,

wedu = Woman's education,

hedu = Husband's Education,

bo = Birth order,

cul = Cultural Practices,

knh = Knowledge of health,

res = Place of Residence,
dist = Problem with distance to health facility,
 ε = An error term

This model was used to estimate the utilization of (i) antenatal care (ii) delivery care (iii) postnatal care and (iv) contraception. In this study, the variables were valued according to MDHS (2015-2016) and the response variables were categorical variables. Multinomial and binary logistic regression models were used in this study.

To estimate the ANC provider from whom the woman received health care during pregnancy, ANC provider was considered as dependent variables and multinomial logistic regression was used to find out the factor affecting on the ANC received from Health care provider. The dependent variable of ANC provider was defined as

- $M_h = 1$, If the woman received ANC from doctors during pregnancy
- $M_h = 2$, If the woman received ANC from Nurse or MW or LHV during pregnancy
- $M_h = 3$, If the woman received ANC from Auxiliary Mid Wife during pregnancy
- $M_h = 4$, If the woman did not receive ANC during pregnancy

In this study, ANC usage was dependent variable to estimate the ANC visit which was measured as the number of antenatal care attendance. The response variable had 3 types, and the 3 types of response could be modeled via a single multinomial model,

- $M_h = 1$, If the woman made ANC visit 4 times and above during pregnancy
- $M_h = 2$, If the woman made ANC visit less than 4 times during pregnancy
- $M_h = 3$, If the woman did not make ANC visit during pregnancy

To estimate the provider who help the woman to deliver, the delivery provider was considered as dependent variable and multinomial logistic regression was used. Measured as delivery conducted by Skilled health provider (2 types) or unskilled health provider (2types). Four types of response variables were

- $M_h = 1$, If the woman had delivered by doctor
- $M_h = 2$, If the woman had delivered by Nurse or Mid Wife or LHV
- $M_h = 3$, If the woman had delivered by Auxiliary Mid Wife
- $M_h = 4$, If the woman had delivered by TBA

To estimate the place of delivery, it was considered as dependent variables and multinomial logistic regression was used to find out the factor affecting the place of delivery. Delivery in public hospital was delivery that took place in public hospitals and clinics. Delivery in private hospital was delivery that took place in private hospitals and clinics while delivery at home includes own home and other home. The dependent variable of place of delivery was defined as

$M_h = 1$, If the woman delivered at private hospital

$M_h = 2$, If the woman delivered at public hospital

$M_h = 3$, If the woman delivered at home

To estimate the utilization of postnatal care, PNC was considered as dependent variable and binomial logistic regression was used. This was measured as a postnatal examination by a skilled health care provider (doctor, nurse/ midwife) within 42 days following childbirth (NPC & ICF Macro, 2009). Two types of response variables were

$M_h = 0$, if the woman did not make PNC visit after birth

$M_h = 1$, If the woman made PNC visit after birth

To estimate the contraceptive use, contraceptive use was considered as dependent variable and binomial logistic regression was used. Contraceptive prevalence means the number of women in married or in union who are on modern contraception methods (UNICEF). Two types of response variables were

$M_h = 0$, if the woman does not use contraceptive method

$M_h = 1$, If the woman uses any method

The outcome variable used in the study was infant mortality. ANC Visit, ANC Provider, Place of Delivery, Health Birth Provider, Postnatal Care Use and Use of Contraceptive Method were used as explanatory variables to estimate this outcome variables.

The estimated model for infant mortality was

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$$

Y = Infant Mortality

β_0 = The intercept terms,

β_i = The coefficient of explanatory variables

X_1 = ANC Provider

X_2 = ANC Visit

- X_3 = Health Birth Provider
- X_4 = Place of Delivery
- X_5 = Postnatal Care Use
- X_6 = Contraceptive Use
- ε = An error term

Infant mortality was outcome variable and binary logistic regression model was used to estimate the infant mortality. Two types of response were

$Y = 0$, If a live born infant did not die within the first year of life

$Y = 1$, If a live born infant died within the first year of life

4.6 Description of the Independent Variables

The description of the independent variables used in the study are presented in the following and shown in the tables below.

Table (4.4) Description and Expected Sign of the Economic Factors

No.	Variables	Description	Expected Sign
1	Woman's Occupation	Woman's Occupation are grouped as follows: "1" for Not Working and "2" for Working.	(+ / -)
2	Household Income	Household Income is the monthly income of the respondent's household.	(+)
3	problem concerned with getting money needed for drug and treatment	Face problems with getting money needed for drug and treatment can be identified as "0" for No, "1" for Yes.	(-)

According to the results of various studies, economic factors such as woman's occupation and household income are expected to be positively associated and facing problems with getting money needed for drug and treatment is expected to be negatively associated with maternal and reproductive health care service utilization in this study as shown in Table (4.4).

Table (4.5) Description and Expected Sign of the Social Factors

No.	Variables	Measurements	Expected Sign
1	Woman's age at last birth	Actual age of the respondent at the time of last delivery.	(+ / -)
2	Woman's Education	Woman's Education is categorized as "1" for Not Educated and "2" for Educated.	(+)
3	Husband's Education	Husband's Education is categorized as "1" for Not Educated and "2" for Educated.	(+)
4	Birth order	The orders of birth of children are ever born by a woman.	(+ / -)
5	Cultural Practices	The variables are measured by the "five-point Likert scale" including 1=Strongly disagree, 2=disagree, 3=neutral, 4=agree and 5= strongly agree	(-)
6	Health Knowledge	The variables are measured by the "five-point Likert scale" including 1=Strongly disagree, 2=disagree, 3=neutral, 4=agree and 5= strongly agree	(+)

According to the results of many studies, social factors such as woman's education, husband's education and health knowledge are expected to be positively associated with maternal and reproductive health care service utilization in this study. Cultural practice is expected to be negatively associated with maternal and reproductive health care service utilization in this study. Woman's age at last birth and birth order are expected to be positively or negatively associated with maternal and reproductive health care service utilization in this study as shown in Table (4.5).

Table (4.6) Description and Expected Sign of the Environmental Factors

No.	Variables	Measurements	Expected Sign
1	Place of residence	Place of residence is organized as "1" for Urban and "2" for Rural	(+ / -)
2	problem with distance to health facility	Face problems concerned with distance to access health care service can be identified as "0" for No, "1" for Yes.	(-)

According to the result of previous studies, place of residence is expected to be positively or negatively associated with maternal and reproductive health care service utilization. Experience problem concerned with distance to health facility is expected to be negatively associated with maternal and reproductive health care service utilization in this study as shown in Table (4.6).

4.7 Variables Used in the Study

The choice of variables used in the study was based on empirical and theoretical literature reviewed.

4.7.1 Independent Variables

The independent variables are selected based on Stokols's social ecological model of health promotion and Andersen's behavioral model of health service use. These independent variables represent economic factors, social factors and environmental factors. These variables are selected by the fact that they are measurable and can have a profound influence on maternal health care seeking behavior.

(I) Economic Factors

Woman's Occupation

Employment is regarded as a crucial factor in enhancing the overall social status of women (Woldemicael and Tenkorang , 2010). A study conducted in Guatemala revealed that women who were engaged in paid job had a greater chance of participating in decision-making processes compared to those who were not compensated for their work (Becker, S., Fonseca-Becker, F., & Schenck-Yglesias, C., 2006). Additionally, the study found that women who received payment for their work were more inclined to engage in health care decision making, home purchasing, and visiting friends or relatives compared to those who did not have paid job (Senarath & Gunawardena, 2009). Conversely, research has shown that in certain parts of the world, unemployed women are more inclined to utilize maternal healthcare facilities compared to women who are employed and generating income (Kamal, 2009).

Household Income

The influence of household income or wealth on decisions to seek maternal health care is widely acknowledged. This variable, however, can indicate financial independence and therefore enhance comprehension of how family income affects a woman's inclination to seek maternal healthcare. Women of higher socioeconomic status were more likely to receive early and sufficient antenatal care (ANC) compared to women of lower socioeconomic status (Matsumura & Gubhaja, 2001 and Sharma, 2004). The rise in household wealth in Mali has a beneficial impact on the utilization of skilled attendants during childbirth, as stated by Gauge (2007). A study conducted in Pakistan revealed that women with a higher household income exhibited a greater propensity to utilize maternal health care services (Nishar & White, 2003).

Problems Concerning Needed Money for Treatment

Higher fees reduce the utilization of maternal health care services among women and prevent millions of women from accessing hospital-based deliveries or seeking care in case of complications. Despite the absence or low level of formal fees, women may still face major obstacles in accessing services due to informal fees or other associated expenditure (Habtom, 2017). The financial constraints faced by women in accessing the necessary funds for consultation and treatment were found to have a detrimental impact on their utilization of antenatal care, institutional delivery, and postnatal care (Machira, 2017; Khaing Zar Lwin, 2022; Ononokpono, 2013). This study used the experience problems with getting money needed for advice/treatment as one of independent variables.

(II) Social Factors

Woman's Age at Last Birth

The age of the mother can also impact her utilization of maternal health services. Empirical research on age yields conflicting results. Age is a significant factor in predicting the utilization of maternal and reproductive health care. Dahiru & Oche (2015) discovered that women who are 30 years old or older are considerably more inclined to utilize antenatal care compared to younger women, often in the teenage years or early twenties. This phenomenon can be contributed to the fact that older women are more likely to use contraceptive services to restrict or terminate childbirth than younger women who may lack awareness of the diverse contraceptive

choices at their disposal. Several studies have shown that women in older reproductive age are less inclined to choose facility births compared to those in lower reproductive age (Thind et al., 2008).

Woman's Education

The educational attainment of the mother is a crucial determinant of the extent to which maternal health services are utilized. Grossman (1972) suggested that education enhances an individual's proficiency in utilizing health services and empowers them to adopt health-conscious behaviors to enhance their well-being. Many studies showed that maternal education and literacy play a significant role in determining the utilization of maternal health care and reproductive health care (Ahmed et al., 2010; Regassa, 2011; Ergano et al., 2012 and Dahiru & Oche, 2015). Many studies identified a direct correlation between the level of education attained by mothers and their utilization of maternal and reproductive health services (Dagne, 2010; Karlsen et al., 2011, and Ergano et al., 2012).

Husband's Education

Several studies have examined the influence of a husband's level of education on the use of health care services and have consistently found it to be a strong predictor of seeking assistance during delivery (Navaneetham and Dharmalingam, 2002). The study by Becker et al. (1993) revealed that women whose husbands had greater levels of education were more inclined to receive antenatal care in Philippines. Senapaty (2011) found that women whose husbands are educated are more inclined to receive antenatal care and give birth assistance by skilled healthcare professionals than women whose husbands have no education in India. The findings of the studies conducted in India and Philippines offer a solid foundation for conducting additional tests to see if men can indeed have a positive impact on a woman's use of maternal health care services.

Birth Order

The utilization of maternal health care services is strongly influenced by birth order (Navaneetham and Dharmalingam, 2002). Elo (1992), and Kamal (2009) have discovered the association between birth order and the utilization of healthcare services. The data regarding birth order suggest that as the birth order increases,

women become confident about motherhood, the chance of utilizing maternal health services decrease. Increasing the number of children may lead to limitations in resources, which can negatively impact the use of healthcare services (Wong et al., 1987).

Cultural Practices

Cultural beliefs and practices often lead to a delay in seeking health care and home remedies (Shaikh, Haran, & Hatcher, 2008). A study conducted in Nicaragua revealed a correlation between traditional practices and the utilization of maternal health care services. Ojanuga and Gilbert (1992) conducted an analysis on women's access to healthcare in developing countries. The findings revealed that socio-cultural factors have a negative impact on women's ability to access healthcare. Additionally, the number of socio-cultural factors plays a significant role in determining whether a woman will utilize delivery care services in India and the rest of South Asia.

Health Knowledge

Maternal health knowledge is crucial in enabling women to receive adequate health services by providing them with sufficient understanding of the importance, timing, and frequency of antenatal care visits, delivery care and postnatal care. There is a positive association between women's knowledge of health and the use of antenatal care services. Health knowledge of women influences receiving health care service during pregnancy (Thandar Aung, 2020).

(III) Environmental Factors

Place of Residence

The utilization of maternal health care services can be influenced by the place of residence (rural/urban) and geographical location (region). In most developing countries, urban residents typically have a greater chance to give birth at health facilities compared to rural residents. Many studies indicated that women residing in rural areas reveal lower utilization of maternal and reproductive health services compared to the urban counterparts (Dagne, 2010; Nonvignon & Novignon, 2014; Dahiru & Oche, 2015). In rural areas, women face the challenge of travelling extreme distances to reach health facilities, which hinders the ability to receive maternal and reproductive health care services (Harris et al., 2011; Silal et al., 2012).

Distance to Health Facility

Insufficient availability of vehicles, particularly in remote area, together with inadequate road conditions, can cause significant challenges for women to access even relatively close facilities. Walking is the primary mode of transportation, including for women who are in the process of giving birth (World Bank, 1994; Williams, Baumslag & Jelliffe, 1985). In rural Tanzania, most of women (84 percent) who planned to give birth at a health facility were unable to do so because of the long distance and lack of transportation (Bicego et al., 1997). The women who face problems with distance to health care facility had negative impact on the utilization of antenatal care (ANC), facility birth, and postnatal care (Machira, 2017; Khaing Zar Lwin ,2022 and Ononokpono, 2013). In this study, the experience problems with distance to health facility is used as one of the independent variables.

4.7.2 Dependent and Outcome Variables

The dependent variables are grouped into four including six variables: 1. antenatal care (antenatal care visit and antenatal care provider), 2. delivery care (place of delivery and health birth provider), 3. postnatal care (postnatal care use) and 4. family planning (use of contraceptive method). These variables form part of the main pillars of the Mother Baby Package and are essential for safe motherhood. The selection of the dependent variables was occasioned by their importance in the prevention of adverse maternal health outcomes. The outcome variable of this study is infant mortality.

Antenatal Care Provider

The study focused on skilled antenatal care as a variable due to its correlation with favorable maternal health outcomes. Many studies have shown the significance of early diagnosis of pregnancy problems. The knowledge informed by healthcare professionals during antenatal care visits is crucial for the effective management of pregnancies and the subsequent welfare of both the mother and the newborn (Kistiana, 2009). Furthermore, a study conducted in Vietnam discovered that antenatal care significantly contributed to the decline in maternal mortality by enhancing the nutritional well-being of women and recognizing pregnancies at high risk (Swenson et al., 1993). The survey does not include traditional birth attendants (TBAs) as being part of skilled assistance.

Antenatal Care Visits

The term "Number of ANC visits" refers to the number of antenatal care that women received during pregnancy. The frequency of antenatal care visit, as indicated in earlier research, plays a significant role in preventing pregnancy problems and negative health outcomes for both the mother and child (Ikamiri, 2004). The pregnant women who visited antenatal clinics at least once or four times, and received care from skilled healthcare professionals (such as doctors, nurses, and midwives) have more chance to give birth at health facility than those who do not (WHO, 2010).

Health Birth Provider

A skilled birth attendant refers to a healthcare provider who conducts deliveries (UNICEF). A skilled health provider refers to a health care professional such as a doctor, nurse, or midwife (UNICEF). Delivery supervised by skilled health provider reduces the risk of complications and infections during childbirth, and thereby decreases maternal mortality. Ensuring the provision of skilled care by health care professionals during pregnancy and childbirth is a crucial intervention for promoting safe motherhood. Skilled birth assistance during delivery pertains to the occurrence of deliveries in the company of healthcare professionals, such as doctors and nurses. So, in this study, TBAs have been excluded in the category of skilled birth provider.

Place of Delivery

Delivery at a health facility with the assistance by skilled provider can reduce maternal mortality (Kruk et al., 2010). There is a correlation between the location of childbirth and a decrease in maternal mortality (Thaddeus and Maine ,1994). Furthermore, it has been recorded that most maternal and newborn fatalities during childbirth can be prevented by selecting the suitable delivery location. Health facility deliveries encompass all deliveries that take place at any facilities, regardless of whether they occur in public or private facilities.

Home Deliveries: Giving birth at homes or places that are not health care facility (UNICEF).

Institutional Deliveries: Giving birth in modern health facilities whether public or private (UNICEF).

Postnatal Care

According to the previous studies, the majority of maternal and newborn deaths happen within the first week after childbirth. Postnatal care is a crucial intervention aimed at decreasing maternal and infant mortality (Titaley, Dibley & Roberts, 2010). Postpartum care utilization refers to the measurement of the timing at which individuals receive postpartum care services following childbirth. The World Health Organization (WHO) recommends both mother and newborn should receive postnatal care within 24 hours after normal vaginal delivery in a health facility. If the delivery is taking place at home, it is necessary for the first postnatal care contact to occur within 24 hours of the birth. Irrespective of the location of childbirth, it is advisable for all mothers and newborns to have further postnatal check-ups on specific days: day 3 (48-72 hours), between 7 and 14 days, and 6 weeks following birth (WHO, 2013).

Family Planning (Contraceptive Method)

Family planning facilitates women to have planned pregnancies and to give birth healthier newborn. Availability of contraception can decrease the probability of women giving birth at a young age (specifically, before the age of 22), enhance the participation of women in paid job, increase the number of hours worked by women each year, and expedite the decline in birth rates by as much as 40%. Jamieson and Buescher discovered that American women who utilized family planning services within two years prior to becoming pregnant had less chance of giving birth the low-birth-weight babies. Contraceptive prevalence refers to the proportion of women who are married or in a union and are using modern methods of contraception. The Contraceptive Prevalence Rate (CPR) serves as an indicator of the effectiveness of an ongoing family planning programme (UNICEF,2018).

Infant Mortality

Many studies indicated evidence of a U-shaped relationship between birth order and infant mortality. Specifically, the likelihood of infant mortality decreases after the first child, but then increases again for children who are fourth-born or higher (Titaley et al., 2008 and Uddin & Hossain, 2008). Many studies showed that a short time between pregnancies can raise the chances of infant death. As a result, the World Health Organisation recommends waiting at least 24 months between giving

birth and getting pregnant again (WHO, 2006b). In addition, other health seeking behavior such as the utilization of private versus public healthcare and antenatal care are specifically associated with pregnancy and childbirth, anticipated to enhance maternal well-being and decrease the likelihood of newborn mortality (Kaldewei, 2010).

CHAPTER V

ANALYSIS ON SURVEY FINDINGS

This chapter has included two main sections. The first section expresses the descriptive statistics of sample women. The second section presents and discuss the econometric result relating to the factors influencing maternal and reproductive health care services use and the effect of maternal and reproductive health care service utilization on infant mortality.

5.1 Descriptive Statistics

The socioeconomic aspect of women, the reasons and places of using maternal and reproductive health care service utilization, providers of maternal and reproductive health care service and pattern of maternal and reproductive health care service utilization are presented by descriptive statistics.

Demographic and Socioeconomic Factors of Women

Demographic and socioeconomic characteristics of respondents such as age, birth order, place of residence, education, occupation and monthly household income are presented in Table (5.1).

Table (5.1) Demographic and Socioeconomic Characteristics of Sample Women

Sr.	Variable Descriptions	No. of Respondents	Percentage
1	Woman's age at last Birth		
	15 - 19	23	4.78
	20 - 34	357	74.22
	35 - 49	101	21.00
2	Birth Order		
	1 st	191	39.71
	2 nd	155	32.22
	3 rd	62	12.89
	Over 3 rd	73	15.18

**Table (5.1) Demographic and Socioeconomic Characteristics of Sample
Women (Continued)**

Sr.	Variable Descriptions	No. of Respondents	Percentage
3	Place of Residence		
	Rural	251	52.18
	Urban	230	47.82
4	Woman's Education		
	Not Educated	34	7.07
	Educated	447	92.93
5	Husband's Education		
	Not Educated	24	4.99
	Educated	457	95.01
6	Woman's Occupation		
	Not Working	261	54.26
	Working	220	45.74
7	Household Monthly Income Quintile		
	Lowest	182	37.84
	Low	23	4.78
	Middle	95	19.75
	High	93	19.33
	Highest	88	18.30

Source: Survey Data (2023)

Nearly three quarter of respondents (74.22%) are aged between 20 and 34. Over one third of the respondents(39.71 %) are 1st birth order, 32.22 % of those are 2nd birth order, 12.89 % and 15.18 % of those are 3rd and more than 3rd birth order respectively. A woman with first pregnancy is more likely to seek maternal health care services for first birth than higher-order births according to the previous studies. Most of the respondents, 47.82 % reside in urban area while 52.18 % in rural area. Residents in urban area are relatively closer to healthcare facilities than those in rural area.

In the study, both the education levels of women and husbands are considered. The education level is categorized into not educated and educated. Not educated refers to the women or husbands who never went to school, and educated refers to the women or husbands in any level of education. Most respondents, 92.93% of women and most of the women's husbands, 95 % are educated. Education of women and their husbands are the most important factors that affect the use of antenatal care, delivery care, postnatal care, and contraceptive methods according to previous studies. Education relates to knowledge level, understanding of the importance of health care, and the ability to filter misinformation.

In the study, occupation of women is considered. 45.74 % of respondents are working and, nearly half of the respondents (54.26 %) are not working. The occupation of respondents is also related to the maternal health outcomes. The monthly household's income of respondents is categorized into 5 groups: Lowest, Low, Middle, High and Highest. The highest percentage household income quintile is Lowest income quintile representing 37.84 % of respondent's household. The last 4 groups are about 4.78 %, 19.75 %, 19.33% and 18.30% of respondent's household respectively. Women who reside in household with high monthly household's income quintile are more likely to receive early and adequate maternal health care than those with low monthly household's income quintile according to previous studies.

5.1.2 Reliability Statistics of Perception on Cultural Practices and Knowledge

Cronbach's alpha is a measure to evaluate the reliability or internal consistency of a collection of scales or test items. The reliability of a measurement is determined by its consistent and precise ability to quantify a perception. Cronbach's alpha is a statistical method used to evaluate the level of consistency in a measurement. It is calculated by determining the correlation between the score of each item on a scale and the overall score for each observation.

Table (5.2) Summary of Cronbach's Alpha Reliability Coefficient

Sr.	Variables	No. of Items	Cronbach's Alpha
1	Cultural practice during pregnancy	7	0.762
2	Cultural practice during delivery	7	0.852
3	Cultural practice during postnatal period	6	0.738
4	Cultural practice on contraceptive use	6	0.979
5	Knowledge received during pregnancy	6	0.691
6	Knowledge received during delivery	6	0.975
7	Knowledge received during postnatal period	7	0.746
8	Knowledge received during contraceptive use	6	0.982

Source: Survey Data (2023)

In the study, the respondents were questioned regarding how they perceived the cultural practices and health knowledge that healthcare providers at health facilities offered during prenatal, delivery, postnatal, and contraceptive use. The respondent is required to answer each question on a 5-item Likert scale, 1 to 5: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. As indicated in Table (5.2), Cronbach's Alpha reliability coefficients of 8 variables in the study are more than 0.6 while each variable includes 6 to 7 items. As a result of this reliability test, all these items can be used to analyze the respondent's perception of knowledge and cultural practice.

5.1.3 Mean Score of Perception on Cultural Practice and Knowledge

The overall mean values of the observed variables identify respondents' perception on cultural practices, and the level of awareness regarding the use of maternal and reproductive health care services throughout pregnancy, delivery, postpartum, and contraceptive usage. Based on the respondents' responses on a 5-item Likert scale, 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree, the overall mean value of each variable is determined as shown in Table (5.3).

Table (5.3) Perception of Respondents on Cultural Practice and Knowledge During Pregnancy, Delivery, Post Delivery and Contraceptive Use

Sr.	Statements	Overall Mean	Standard Deviation
1	Cultural Practice during pregnancy	1.936	.563
2	Cultural Practice during delivery	2.232	.601
3	Cultural Practice during postnatal period	2.457	.631
4	Cultural Practice on contraceptive use	1.786	1.057
5	Knowledge Received during pregnancy	3.946	.402
6	Knowledge Received during delivery	3.193	1.119
7	Knowledge Received during postnatal period	4.033	.392
8	Knowledge received during contraceptive use	3.178	1.326

Source: Survey Data (2023)

Cultural practice during pregnancy is measured by 7 items and the overall mean value of the cultural practice during pregnancy can be considered as a disagreed level since the overall mean value is 1.936.

Cultural practice during delivery is measured by 7 items and the overall mean value of the cultural practice during delivery can be described as a disagreed level since the overall mean value is 2.232.

Cultural practice during postnatal period is measured by 6 items and the overall mean value of the cultural practice during postnatal period can be illustrated as neutral since the overall mean value is nearly 2.5.

Cultural practice on contraceptive use is measured by 7 items and the overall mean value of the cultural practice on contraceptive uses can be considered as an disagreed level since the overall mean value is 1.786.

Knowledge of maternal and reproductive health received during ANC is measured by 6 items. Since the overall mean value is 3.946, that of birth spacing received during ANC at health facility can be considered as an agreed level.

Knowledge of maternal and reproductive health received during delivery is measured by 6 items and the overall mean value of knowledge of birth spacing received during delivery at health facility can be described as an agreed level since the overall mean value is 3.193.

Knowledge of maternal and reproductive health received during postnatal period is measured by 7 items and the overall mean value of knowledge of birth spacing received during PNC at health facility can be illustrated as an agreed level since the overall mean value is 4.033.

Knowledge toward short birth interval by contraceptive use is measured by 6 items and the overall mean value of knowledge toward short birth interval by contraceptive use can be considered as an agreed level since the overall mean value is 3.178.

According to Table (5.3), the highest overall mean value is found in perception of respondents on knowledge received during PNC at health facility. This means that most of the respondents who went to health facility for receiving postnatal health care services and family planning got knowledge of maternal and reproductive health. The lowest overall mean value is found in respondents' perception on cultural practice on contraceptive use because most of the respondents did not believe and adhere to cultural practices for using contraceptive. Overall mean value of these factors show that many respondents did not adhere to cultural practices during pregnancy, delivery, and contraceptive use whereas the respondents accepted that maternal and reproductive health knowledge were obtained from health care providers during these periods.

5.2 Patterns of Maternal and Reproductive Health Care Services Utilization in Bago Township

According to the survey data in Bago Township, healthcare services during pregnancy, childbirth, and after delivery are important for the survival and well-being of both mother and infant. Antenatal care (ANC) can reduce health risks for mothers and their babies through monitoring of pregnancies and screening for complications. Delivery at a health facility, with skilled health provider and hygienic conditions, reduces complications and infections during labor and delivery. Timely postnatal care treats complications arising from delivery and teaches the mother how to care for herself and her infant.

5.2.1 Patterns of Antenatal Care Services Utilization in Bago Township

The patterns of Antenatal Care service use in Bago Township are explained by Antenatal Care provider and Antenatal Care visit.

(i) Antenatal Care Provider

Antenatal care (ANC) provided by skilled health providers refers to the medical attention received during pregnancy from qualified healthcare professionals, such as doctors, nurses/midwives, and lady health visitors.

Table (5.4) Percentage of Women Receiving Antenatal Assistance by Background Characteristics in Bago Township

Background Characteristics	Antenatal care provider				Percentage receiving antenatal care from a skilled provider
	Doctor (%)	Nurse/ midwife/LHV (%)	Auxiliary midwife (%)	No ANC (%)	
Mother's age at birth					
<20	34.78	30.43	0.00	34.79	65.21
20-34	44.82	36.41	2.52	16.25	81.23
35-49	35.64	26.73	3.96	33.67	62.37
Birth order					
1 st	51.31	32.46	1.05	15.18	83.77
2 nd	47.10	36.13	1.29	15.47	83.23
3 rd	33.87	35.48	6.45	24.20	69.35
More than 3 rd	16.44	32.88	6.85	43.83	49.32
Residence					
Rural	25.90	46.22	3.18	24.70	72.12
Urban	60.43	20.87	2.17	16.53	81.30
Woman's Education					
Not Educated	5.88	32.35	2.94	58.83	38.23
Educated	45.19	34.23	2.68	17.90	79.42
Income Quintile					
Lowest	29.12	30.77	2.75	37.36	59.89
Low	34.78	43.48	4.35	17.39	78.26
Middle	46.32	36.84	3.16	13.68	83.16
High	49.46	36.56	2.15	11.83	86.02
Highest	60.23	32.95	2.27	4.55	93.18
Total	42.41	34.10	2.70	20.79	76.51

Sources: Survey Data (2023)

According to survey data, women aged 20–34 are more likely to receive ANC from skilled providers (81.23%) than women aged less than 20 and 35–49 (65.21% versus 62.37%), respectively. Thus, women aged 35–49 are less likely to receive ANC from a skilled provider in Bago Township. Women who have higher-order births are less likely to get ANC from a skilled provider, as shown in Table 5.4. Only 49.32% of women with more than third-order birth received ANC from a skilled provider, while 83.77% of women giving birth to their first child received it. 81.30% of women in urban areas received ANC from a skilled provider, while 72.12% of those in rural areas received it. Thus, the percentage of women received ANC from skilled providers in urban areas is 9.2% higher than those in in rural areas. Women in rural areas are also more likely to receive no ANC than women in urban areas (24.7 versus 16.53%). The percentage of educated women received ANC from skilled providers is two times higher than that of non-educated women as shown in Table (5.4).

The percentage of women who reside in the household with the highest monthly household income quintile is higher than that of women who reside in the household with the lowest monthly household income quintile to receive ANC from a skilled health provider (93.18 % versus 59.89 %). As indicated in Table (5.4), 76.51% of pregnant women in Bago Township received ANC from skilled providers, whereas 20.79% of those did not.

In Bago Township, the percentage of women receiving antenatal care from skilled health providers (76.51%) (according to survey,2023) is lower compared to the national average (80.7%) in Myanmar, as reported in the MDHS (2015-2016). However, recent data from the Public Health Department of Bago Township (2022) and a subsequent survey conducted in the area (2023) indicate a positive trend. According to these data, the percentage of women receiving healthcare from skilled providers during pregnancy has increased from 68.3% in 2021 to 76.51% in 2023. This signifies a notable improvement in access to healthcare services from skilled attendants for pregnant women in Bago Township.

(ii) Antenatal Care Visit

The World Health Organization (WHO) recommends that pregnant women should receive a minimum of four antenatal care visits from skilled providers during pregnancy. Survey data indicates that 61.34% of women between the ages of 20 and

34 receive at least four antenatal care visits (ANC visits). Moreover, the percentage of educated women is higher in receiving at least four ANC visits than that of non-educated women (58.39% versus 23.71%).

Table (5.5) Percentage of Women Receiving Antenatal Visits by Background Characteristics in Bago Township

Background Characteristics	Times of Antenatal Care Visit		
	≥ 4 Times	< 4 Times	No ANC Visit
Mother's age at birth			
<20	34.78	30.43	34.78
20-34	61.34	22.41	16.25
35-49	41.58	24.75	33.66
Birth order			
1 st	63.35	21.47	15.18
2 nd	62.58	21.94	15.48
3 rd	51.61	24.19	24.19
More than 3 rd	26.03	30.14	43.84
Residence			
Rural	47.81	27.49	24.70
Urban	64.78	18.70	16.52
Education			
Not Educated	23.53	17.65	58.82
Educated	58.39	23.71	17.90
Income quintile			
Lowest	42.31	20.33	37.36
Low	30.43	52.17	17.39
Middle	65.26	21.05	13.68
High	60.22	27.96	11.83
Highest	76.14	19.32	4.55
Total	55.93	23.28	20.79

Source: Survey Data (2023)

According to Table (5.5), the percentage of women who have more than third birth order is lower in receiving at least four antenatal care visits than that of women who have first birth order (26.03 % versus 63.35 %) as shown in Table (5.5). Compared to women in urban areas, women in rural areas are less likely (47.81 % versus 64.78 %) to have at least four prenatal care visits. Women who reside in households with the highest income quintile receive at least four antenatal visits with the highest percentage (76.14 %). According to survey data, 55.93 % of pregnant women in Bago Township receive at least four antenatal care visits, as recommended by WHO and about 21 % of pregnant women receive no ANC visits as shown in Table (5.5).

In Bago Township, the proportion of women receiving a minimum of four antenatal visits increased significantly from 32.6% in 2021 to 55.93% in 2023, according to survey in 2023 and Public Health Department of Bago Township (2022). This indicates a notable improvement in the percentage of women accessing the recommended number of antenatal visits in Bago Township over this period.

5.2.2 Patterns of Delivery Care Services Utilization in Bago Township

The patterns of delivery care service use in Bago Township are explained by health birth provider and place of delivery.

(i) Health Birth Provider

Skilled assistance during delivery refers to giving births with the assistance of doctors, nurses/midwives, or lady health visitors. Table (5.6) indicates that skilled providers such as nurses, midwives, lady health visitors, and doctors assist 86.28% of births in Bago Township. Another 6.65 % of births are assisted by auxiliary midwives and 7.07 % of births are assisted by traditional birth attendants. 72.28 % of women aged 35-49 give birth assisted by a doctor which is the highest percentage among other age groups while 52.17% of women aged less than 20 and 68.35% of women aged 20-34 give birth assisted by a doctor. Doctor-assisted births decrease sharply with birth order: Table (5.6) reveals that women who have had first births (76.44%) have had more assistance by doctor than those who have had more than third order

Table (5.6) Percentage of Women Receiving Delivery Assistance by Background Characteristics in Bago Township

Background Characteristic	Health Birth Provider			
	Doctor (%)	Nurse/ midwife/ LHV (%)	Auxiliary midwife (%)	Traditional birth attendant (%)
Mother's age at birth				
<20	52.17	30.43	13.05	4.35
20-34	68.35	17.09	7.00	7.56
35-49	72.28	17.82	3.96	5.94
Birth order				
1 st	76.44	12.57	5.75	5.24
2 nd	72.90	12.90	5.81	8.39
3 rd	62.90	25.81	6.45	4.84
More than 3 rd	42.47	35.62	10.95	10.96
Antenatal care visits				
No Visit	43.00	30.00	13.00	14.00
1-3	67.86	16.96	5.36	9.82
4+	78.07	13.75	4.83	3.35
Place of delivery				
Private Hospital	100.00	0.00	0.00	0.00
Public Hospital	100.00	0.00	0.00	0.00
Home	0.00	56.58	21.05	22.37
Residence				
Rural	59.76	21.91	7.57	10.76
Urban	77.83	13.48	5.65	3.04
Education				
Not Educated	26.47	20.59	11.76	41.18
Educated	71.59	17.67	6.27	4.47
Wealth quintile				
Lowest	48.90	24.18	12.64	14.29
Low	56.52	30.43	4.35	8.70
Middle	69.47	18.95	6.32	5.26
High	80.65	16.13	2.15	1.08
Highest	97.73	2.27	0.00	0.00
Total	68.40	17.88	6.65	7.07

Source: Survey Data (2023)

births (42.47%). While traditional birth attendants assist in 3.04 percent of urban deliveries and 10.76 percent of rural deliveries, doctors assist in two-thirds of urban deliveries (77.83%) and more than half of rural deliveries (59.76%) as shown in Table (5.6).

The percentage of educated women (71.59%) is higher in receiving health assistance by doctor during childbirth than those who are not educated (21.47%). Births in the highest income quintile are more likely than those in the lowest quintile to be assisted by a doctor (97.73 % versus 48.90 %). Among women who delivered at home, 21.05 % of women are assisted by auxiliary midwives, and 22.37 % of women are assisted by traditional birth attendants. 78.07 % of women who received more than 4 ANC visits and 43 % of women who received no ANC visit gave birth assistance to a doctor. Table (5.6) shows the percentage distribution of live births in the 5 years preceding the survey by the person assisting in delivery in Bago Township.

The percentage of women receiving birth assistance from skilled providers in Bago Township (86.28%) (Survey, 2023) surpasses that of women across Myanmar (60%) (MDHS, 2015-2016). Further analysis from the Public Health Department of Bago Township (2022) and recent surveys in the area (2023) reveal a notable increase in the percentage of women opting for skilled birth assistance, rising from 68.4% in 2021 to 86.28% in 2023. This upward trend indicates a significant preference for skilled birth attendants among women in Bago Township.

(ii) Place of Delivery

According to the survey data as shown in Table (5.7), only 68.4 % of births take place in a health facility. Institutional deliveries refer to deliveries that take place in a health facility (including public and private sector). Delivery at a health facility, with skilled medical attention and hygienic conditions, reduces complications and infections during labor and delivery. According to survey data, 31.6 percent of live births in the five years prior to the survey were delivered at home, and 68.4% of live births were delivered in a health facility. Fourth and higher-order births are more likely to be delivered at home (57.53%) than first births (23.56 %). Women aged 35-49 are more likely to be delivered at a health facility compared with women who are less than 20 (72.8% versus 52.17%) as shown in Table (5.7).

Table (5.7) Percentage of Women Delivered in Various Places by Background Characteristics in Bago Township

Background Characteristic	Health Facility		Home
	Public sector	Private sector	
Mother's age at birth			
<20	39.13	13.04	47.83
20-34	58.82	9.52	31.65
35-49	61.39	10.89	27.72
Birth order			
1 st	65.45	10.99	23.56
2 nd	61.94	10.97	27.10
3 rd	54.84	8.06	37.10
More than 3 rd	35.62	6.85	57.53
Antenatal care visits			
No Visit	40.00	3.00	57.00
1-3	57.14	10.71	32.14
4+	65.80	12.27	21.93
Residence			
Rural	56.57	3.19	40.24
Urban	60.43	17.39	22.17
Education			
Not Educated	23.53	2.94	73.53
Educated	61.07	10.51	28.41
Income quintile			
Lowest	48.35	0.55	51.10
Low	52.17	4.35	43.48
Middle	63.16	6.32	30.53
High	68.82	11.83	19.35
Highest	64.77	32.95	2.27
Total	58.42	9.98	31.60

Source: Survey Data (2023)

Compared to 76.44 percent of women with first birth order, only 42.47 percent of women with more than third birth order give birth in a health facility. Among live births in the 5 years preceding the survey, delivery in a private hospital is 17.39 % in urban areas and 3.19 % in rural areas. Institutional deliveries are more common among educated women than non-educated women (71.58 % versus 26.47 %). 78.07 % of women who received more than 4 ANC gave birth at health facility while 43% of women who received no ANC visit give birth there. There is no woman who give birth in other places except health facility and home in Bago Township. According to survey data, the percent distribution of live births in the 5 years preceding the survey by place of delivery and percentage delivered in a health facility based on background characteristics are shown in Table (5.7).

The percentage of women giving birth in health facilities in Bago Township (68.4 %) (according to 2023 survey) surpasses that of women in Myanmar (37%) (based on MDHS, 2015-2016). Additionally, data from the Public Health Department of Bago Township (2022) and the 2023 survey indicate a rise in the proportion of women delivering in healthcare facilities, from 41.1% in 2021 to 68.4% in 2023. This signifies an increasing trend in facility-based deliveries among women in Bago Township.

5.2.3 Patterns of Postnatal Care Services Utilization in Bago Township

In Bago Township, 46.57 % of mothers receive the recommended postnatal checkup within the first 2 days after birth and 11.85 % do not receive any postnatal check-up according to the survey data (2023) as shown in Table (5.8). The likelihood of a postnatal check-up within the first two days after delivery is lower in women under 20 than in women between the ages of 35 and 49 (39.13% versus 52.48%). Women who deliver in public and private hospitals are more likely to receive a postnatal check-up within the first two days after birth than those who deliver at home (52.31 % and 77.08 % versus 26.32 %). 41.83 % of women in rural areas receive a postnatal check-up in the 2 days after delivery while 51.74 % women in urban areas receive it. Within two days after giving birth, the percentage of women in the highest income quantile is two times higher in receiving postnatal checkups than that of women in the lowest income quantile (71.59% versus 30.22%). Women with more than 3rd birth order are four times more likely not to receive any postnatal check-up than those with 1st birth order as shown in Table (5.8).

**Table (5.8) Percentage of Women Receiving Postnatal Care by Background
Characteristics in Bago Township**

Background Characteristic	Time after delivery of mother's first postnatal checkup					
	Within 48 hours (%)	3-14 days (%)	14-42 days (%)	>42 days (%)	Not Remember (%)	No postnatal checkup (%)
Mother's age at birth						
<20	39.13	0.00	0.00	34.78	4.35	21.74
20-34	45.38	9.24	11.48	17.93	5.04	10.92
35-49	52.48	5.94	11.88	13.86	2.97	12.87
Birth order						
1 st	48.69	8.38	11.52	20.94	4.71	5.76
2 nd	47.74	7.74	12.26	16.77	3.87	11.61
3 rd	43.55	8.06	9.68	16.13	4.84	17.74
More than 3 rd	41.10	8.22	8.22	13.70	5.48	23.29
Place of delivery						
Private Hospital	77.08	6.25	6.25	6.25	2.08	2.08
Public Hospital	52.31	8.54	11.74	16.01	4.98	6.41
Home	26.32	7.89	11.18	25.00	4.61	25.00
Residence						
Rural	41.83	9.16	10.76	17.53	5.58	15.14
Urban	51.74	6.96	11.30	18.26	3.48	8.26
Education						
Not Educated	26.47	14.71	0.00	20.59	5.88	32.35
Educated	48.10	7.61	11.86	17.67	4.47	10.29
Income quintile						
Lowest	30.22	9.34	13.74	24.73	6.04	15.93
Low	30.43	8.70	17.39	13.04	8.70	21.74
Middle	50.53	7.37	9.47	17.89	5.26	9.47
High	54.84	8.60	6.45	16.13	2.15	11.83
Highest	71.59	5.68	10.23	6.82	2.27	3.41
Total	46.57	8.11	11.02	17.88	4.57	11.85

Source: Survey Data (2023)

Births to educated women are more likely to receive a postnatal check-up in the first two days after birth than those to women with no education (48.10 % and 26.47 %, respectively). The percent distribution of the mother's first postnatal check-

up for the last live birth by time after birth and the percentage of women with a live birth in the five years prior to the survey who utilized postnatal care in the first two days after giving birth by background characteristics are shown in Table (5.8) based on survey data in Bago Township (2023).

According to MDHS (2015-2016) and 2023 survey in Bago Township, percentage of women receiving postnatal care within two days after giving birth as recommended by WHO in Bago Township (46.57%) is lower than that of women in Myanmar (71.2%). Data from the Public Health Department of Bago Township (2022) and the 2023 survey in Bago Township show an increase in the proportion of women receiving postnatal check-ups within the first two days after giving birth, from 33.2% in 2021 to 46.57% in 2023. This suggests an upward trend in postnatal healthcare utilization among women in Bago Township.

5.2.4 Patterns of Contraceptive Use in Bago Township

In Bago Township, 67.15 % of currently married women use any modern method of family planning, with all of them using a modern method. The percentage of married women aged 35 to 49 who currently use modern contraceptives peaks at 88.12% as shown in Table (5.9). More than half of currently married adolescents (43.48 %) use modern contraceptive methods. All the total demand for family planning is satisfied by modern methods in Bago Township as shown in Table (5.9).

Modern contraceptive use is highest among married women with more than 3 living children (97.87%) and generally increases as the number of living children goes up as shown in Table (5.9). Women in urban areas are somewhat more likely to use modern contraceptives than those in rural areas (69.57 % versus 64.94 %). Contraceptive use increases substantially with education. Married educated women are more likely to use modern methods of contraception than those with no education (69.13 % versus 41.18 %).

The utilization of modern contraceptive methods among women in Bago Township (67.15 %) (according to 2023 survey) is higher than that in Myanmar (51.3%) (based on MDHS, 2015-2016). Additionally, data from the Public Health Department of Bago Township (2022) and the 2023 survey indicate a decline in the percentage of women using any modern method of contraception, dropping from 70.7% in 2021 to 67.15% in 2023. The reasons for this trend in Bago Township

include lack of reproductive health knowledge, financial barriers affecting access to and use of contraception, and the desire for pregnancy among women.

Table (5.9) Percentage of Women using Contraception by Background Characteristics in Bago Township

Background Characteristic	Method of Contraceptive Uses		
	Any modern method	Any traditional method	Not currently using
Mother's age at birth			
< 20	43.48	0.00	56.52
20-34	62.75	0.00	37.25
35-49	88.12	0.00	11.88
Number of living children			
1	47.32	0.00	52.68
2	73.58	0.00	26.42
3	90.00	0.00	10.00
More than 3	97.87	0.00	2.13
Residence			
Rural	64.94	0.00	35.06
Urban	69.57	0.00	30.43
Education			
Not Educated	41.18	0.00	58.82
Educated	69.13	0.00	30.87
Income quintile			
Lowest	39.01	0.00	60.99
Second	56.52	0.00	43.48
Middle	72.63	0.00	27.37
High	92.47	0.00	7.53
Highest	95.45	0.00	4.55
Total	67.15	0.00	32.85

Source: Survey Data (2023)

5.3 Factors Influencing Health Care Services Utilization During Pregnancy

In this study, factors influencing antenatal care provider and times of antenatal care visit are analyzed as factors influencing healthcare service use during pregnancy in Bago Township.

5.3.1 Factors Influencing Antenatal Care Provider

According to Table (5.10), the model for multinomial logistic regression is significant at p-value is 0.0000 and the value of chi-square statistics is 391.88. Pseudo R^2 value indicates that 35.28 % of the variance in ANC provider can be explained by variation of independent variables.

**Table (5.10) Overall Model Evaluation of Multinomial Logistic Regression
Model for ANC Provider with Independent Variables**

Model Fitting Criteria	χ^2 value	DF	P-value
LR chi- square	391.88	39	0.0000
Log likelihood	-359.51496		
Pseudo R^2	0.3528		
Number of Observations	481		

Source: Survey Data (2023)

It identifies that the multinomial logistic regression model is significant at 1 % level and this model can be used to determine the association of dependent variables and independent variables. In this model, not receiving antenatal care services is utilized as a reference category for dependent variables, and the reference categories of each independent variable are as shown in Table (5.11). The detail output tables of multinomial regression can be seen in Appendix (C).

Table (5.11) shows the result of multinomial logistic regression model for ANC provider with independent variables. According to the result of regression, the cultural practice during pregnancy is statistically significant at the 1% level, and its coefficient is negative. It can be said that women who adhere to the cultural practices during pregnancy are less likely to receive antenatal care provided by doctor (OR =0.088) compared to those who do not. Over-third birth order of women is statistically significant at the 1% level, and the coefficient of these birth order is

negative. It indicates that women with over-third birth order are less likely to receive antenatal care provided by a doctor (OR = 0.096) compared to those with a first birth order. The place of residence is 1% statistically significant, and the coefficient of residence is positive (OR = 3.582). This means that women who reside in urban areas are 3.6 times more likely to receive antenatal care provided by a doctor compared to those who reside in rural areas.

The calculated result indicates that occupation of women is statistically significant at the 5% level and is positively associated with receiving antenatal care provided by doctor (OR = 2.803). It shows that women with occupation have 2.8 times more chance to be received antenatal care provided by doctor compared to those who do not have occupation. The problem of getting money for drugs or treatments during pregnancy is statistically significant at the 5% level, and it is negatively associated with receiving antenatal care assistance by doctor. It means that women who have problems concerned with getting money for drugs or treatment during pregnancy are less likely to receive antenatal care provided by doctor (OR = 0.245) compared to those who do not. Education of women is statistically significant at the 5% level, and it has positive effect on receiving antenatal care assistance by doctor (OR = 11.769). It can be said that women at any education level are nearly 12 times more likely to receive antenatal care assistance by a doctor compared to those who never went to school.

The calculated result shows that the log value of monthly household income is statistically significant at the 10% level with receiving antenatal care assistance by doctor, and its coefficient is positive (OR = 2.153). It means that 1% increase in the monthly household income makes women nearly 2% more likely to receive antenatal care assistance by doctor.

When considering the case of receiving health care assistance by lady health visitor, nurse, or midwife during pregnancy, the problem of getting money for drugs or treatments during pregnancy is statistically significant at the 1% level and is negatively associated with receiving antenatal care assistance by lady health visitor, nurse, or midwife. It means that women who have problems concerning with getting money for drugs or treatment during pregnancy are less likely to receive antenatal care assistance by lady health visitor, nurse, or midwife (OR = 0.141) compared to those who do not.

Table (5.11) Multinomial Logistic Regression Analysis of Receiving Antenatal Care Provider in Bago Township

Variables	ANC Provider					
	Doctor		LHV/Nurse/ Midwife		Auxiliary Midwife	
	Coefficient	Odd Ratio	Coefficient	Odd Ratio	Coefficient	Odd Ratio
Woman's Occupation	Not Working (Reference)					
Working	1.031** (.445)	2.803** (1.249)	.759* (.448)	2.136* (.958)	1.398* (.786)	4.047* (3.180)
Log Monthly Household Income	.767* (.421)	2.153* (.907)	.157 (.439)	1.170 (.514)	-.502 (.886)	.605 (.536)
Problem with money needed for ANC	-1.408** (.674)	.245** (.165)	-1.962*** (.707)	.141*** (.099)	-2.752** (1.296)	.064** (.083)
Woman's age at last Birth	.211 (.412)	1.235 (.509)	.073 (.416)	1.075 (.448)	1.016 (.786)	2.763 (2.170)
Woman's Education	Not Educated (Reference)					
Educated	2.465** (1.022)	11.769** (12.023)	.510 (.717)	1.665 (1.194)	1.008 (1.427)	2.739 (3.911)
Husband's Education	Not Educated (Reference)					
Educated	.791 (1.009)	2.206 (2.226)	-.292 (.831)	.746 (.620)	-1.354 (1.122)	.258 (.289)
Birth Order	1 st Birth Order(Reference)					
2 nd	-.406 (.466)	.666 (.311)	.045 (.478)	1.046 (.499)	-.154 (1.143)	.857 (.980)
3 rd	-.333 (.603)	.717 (.432)	.384 (.613)	1.469 (.901)	1.647 (1.109)	5.193 (5.762)
Over 3rd	-2.342*** (.593)	.096*** (.057)	-.981* (.562)	.375* (.211)	.439 (1.053)	1.551 (1.633)
Cultural practice during pregnancy	-2.434*** (.415)	.088*** (.036)	-3.231*** (.434)	.039*** (.017)	-4.408*** (.934)	.012*** (.011)
Knowledge of Health	.561 (.545)	1.752 (.954)	.495 (.549)	1.641 (.901)	2.431** (.998)	11.365** (11.347)
Place of Residence	Rural (Reference)					
Urban	1.276*** (.381)	3.582*** (1.364)	-.337 (.393)	.714 (.280)	.206 (.718)	1.229 (.883)
Problem with distance to HF for ANC	-.929 (.682)	.395 (.269)	-1.012 (.713)	.363 (.259)	-.125 (1.252)	.882 (1.104)

Note: Standard errors are in parentheses

*refers to at 10 % significant level, **refers to at 5 % significant level, ***refers to 1% significant level

Base category is Not receiving ANC

Data Source: Survey in Bago Township (2023)

Cultural practice during pregnancy is statistically significant at the 1% level, and its coefficient is negative. according to this result, women who adhere to the cultural practices during pregnancy are less likely to receive antenatal care assistance by lady health visitor, nurse, or midwife (OR =0.039) compared to those who do not.

Regarding ANC assistance by lady health visitor/nurse/midwife, the occupation of women is statistically significant at 10 % level, and it is positively associated with receiving antenatal care assistance by lady health visitor/nurse/midwife (OR = 2.136). It shows that employed women have about 2 times more chance to receive antenatal care assistance by lady health visitor/nurse/midwife compared to women who do not have an occupation. Women with over third birth order are 10% level statistically significant, and the coefficient of these birth order is negative. It indicates that women with over third birth order are less likely to receive antenatal care assistance by lady health visitor/nurse/midwife (OR = 0.375) compared to those with first birth order.

According to the result of regression, cultural practice during pregnancy is statistically significant at 1% level with receiving antenatal care assistance by auxiliary midwife and its coefficient is negative. Women who adhere to the cultural practice during pregnancy are less likely to receive antenatal care assistance by auxiliary midwife (OR= 0.012) compared to those who do not. The problems concerned with getting money for drugs/treatment during pregnancy is statistically significant at 5% level and it is negatively associated with receiving antenatal care assistance by auxiliary midwife. It means that women who have problems concerned with getting money for drugs/treatment during pregnancy have less chance to be received antenatal care assistance by auxiliary midwife (OR = 0.064) compared to those who do not.

The calculated result also shows that knowledge of health during pregnancy is statistically associated at 5 % significant level with receiving antenatal care assistance by auxiliary midwife and its coefficient is positive (OR = 11.365) .It can be said that women who have knowledge of health during pregnancy are about 11 times more likely to receive antenatal care assistance by auxiliary midwife compared to those who do not. The occupation of women is statistically associated at 10% level with receiving antenatal care service provided by auxiliary midwife is positively associated with receiving antenatal care provided by auxiliary midwife (OR = 4.047). It shows

that women with occupation are 4 times more likely to receive antenatal care assistance by auxiliary midwife compared to those who do not have occupation.

It can be concluded that employed women are more likely to receive ANC assistance from all skilled providers (doctors, lady health visitors, nurses, midwives), as well as auxiliary midwives, compared to unemployed women. Conversely, women encountering financial difficulties accessing antenatal care and those adhering strictly to cultural practices have a reduced likelihood of receiving ANC assistance from skilled providers and auxiliary midwives compared to those not receiving ANC. Moreover, women with over-third birth order have a lower chance of receiving ANC assistance from all skilled providers (doctor, lady health visitor, nurse, midwife) than not receiving ANC. Educated women and women who live in urban areas have a greater chance of receiving antenatal care from doctor than not receiving ANC.

In this model, the most common significant variables are women's occupation, problem with money needed for ANC and cultural practice during pregnancy. The findings indicate that employed women are more capable of affording antenatal care from skilled providers and auxiliary midwives compared to not receiving ANC. Women who have problem with money needed for ANC have lower chance of receiving antenatal care from skilled provider and auxiliary midwife compared to not receiving ANC. In contrast, women with higher incomes are more likely to use maternal health care services, as observed in the results. Working women are financially capable of meeting their own healthcare needs. Uneducated women adhere to cultural practices, while educated women are more likely to seek modern healthcare services. The combination of poverty, low education levels, and limited scientific knowledge often reinforces cultural beliefs and practices that hinder the utilization of maternal healthcare services.

The study also indicates that mothers in first pregnancy are more likely to receive antenatal care compared to subsequent pregnancies, possibly due to financial constraints. There is a clear disparity between urban and rural areas, with urban women having better access to healthcare due to improved availability and social conditions. In contrast, rural areas, characterized by lower income and education levels, face problems in accessing maternal healthcare services. Furthermore, urban areas have more accessible maternal health facilities, contributing to the disparity in healthcare access between urban and rural women.

5.3.2 Factors Influencing Times of Antenatal Care Visit

According to the result of overall model evaluation, the model for multinomial logistic regression is significant at p value is 0.0000 and the value of chi-square statistics is 337.86 as shown in Table (5.12). Pseudo R² value indicates that 35.44 % of the variance in times of ANC visit can be explained by variation of independent variables. It identifies that the multinomial logistic regression model is significant at 1 % level and this model can be used to determine the association of dependent variables and independent variables.

Table (5.12) Overall Model Evaluation of Multinomial Logistic Regression Model for ANC Visit with Independent Variables

Model Fitting Criteria	χ^2 value	DF	P-value
LR chi- square	337.86	26	0.0000
Log likelihood	-307.69393		
Pseudo R ²	0.3544		
Number of Observations	481		

Source: Survey Data (2023)

In this model, not receiving antenatal care service is utilized as a reference category of dependent variables and the reference categories of each independent variable are as shown in Table (5.13). The detail result of multinomial regression can be seen in Appendix (C).

Table (5.13) shows the result of multinomial logistic regression model for ANC visit with independent variables. It can be found that problems concerned with getting money for drug /treatment during pregnancy is statistically significant at 1% level and it is negatively associated with receiving more than four times of antenatal care. It means that women who have problems concerned with getting money for drugs /treatment during pregnancy are less likely to receive more than four times of antenatal care (OR = 0.164) compared to those who do not. Over third birth order of women is 1% level statistically significant effect with receiving more than four times of antenatal care, and the coefficient is negative. It indicates that women with over third birth order are less likely to receive more than four times of antenatal care (OR = 0.116) compared to those who give first birth. Cultural practice during pregnancy is

statistically significant at 1% level and its coefficient is negative. It means that women who adhere to the cultural practices during pregnancy are less likely to receive minimum of four times ANC services (OR= 0.078) compared to those who do not.

Similarly, this study also found that women's occupation is at 5% level statistically significant and its coefficient has positive effect on receiving more than four times of antenatal care (OR = 2.437). It identifies that women with occupation have 2.4 times more chance to receive minimum of four times ANC services compared to those who have not occupation. Log value of monthly household income is statistically significant at 5% level and its coefficient is positive effect on receiving more than four times of antenatal care (OR= 2.198). It can be said that if the household income increases by 1%, the chance of a woman belonging to that household to receive minimum of four times ANC services will increase by nearly 2.2%. Age of women at last birth is 5% level statistically significant and its coefficient has positive effect on receiving more than four times of antenatal care (OR = 1.211). It can be said that women are 1.2 % more likely to receive minimum of four times antenatal care service because of increasing one year age.

It can be found that health knowledge of women is at 5% level statistically significant, and its coefficient is positive effect on receiving more than four times of antenatal care (OR = 3.153). It can be said that women who have health knowledge during pregnancy are about 3 times more likely to receive minimum of four times of antenatal care services compared to those who do not. The place of residence is 5 % level statistically significant, and the coefficient of residence is positively associated with receiving more than four times of antenatal care (OR = 2.200). This mean that women who reside in urban area are 2.2 times more likely to receive minimum of four times antenatal care services compared to those who reside in rural area.

Regarding the case of receiving less than four times of ANC services, cultural practice during pregnancy is statistically significant at 1% level and its coefficient is negative. It means that women who adhere to cultural practice during pregnancy are less likely to receive less than four times of antenatal care (OR= 0.0304) compared to those who do not.

Table (5.13) Multinomial Logistic Regression Analysis of Receiving Antenatal Care Visit in Bago Township

Variables	Number of ANC visits			
	More than Four Times		Less than Four Times	
	Coefficient	Odd Ratio	Coefficient	Odd Ratio
Woman's Occupation	Not Working (Reference)			
Working	.891** (.435)	2.437** (1.061)	.946** (.467)	2.576** (1.203)
Log Monthly Household Income	.787** (.414)	2.198** (.909)	-.036 (.461)	.965 (.445)
Problem with money needed for ANC	-1.806*** (.661)	.164*** (.109)	-1.284* (.731)	.277* (.202)
Woman's age at last Birth	.191** (.397)	1.211** (.481)	.110 (.431)	1.116 (.481)
Woman's Education	Not Educated (Reference)			
Educated	1.228 (.739)	3.415 (2.526)	.831 (.771)	2.296 (1.769)
Husband's Education	Not Educated (Reference)			
Educated	.458 (.855)	1.580 (1.351)	-.465 (.824)	.628 (.518)
Birth Order	1 st Birth Order (Reference)			
2 nd	-.247 (.458)	.781 (.358)	-.124 (.502)	.883 (.443)
3 rd	-.149 (.584)	.861 (.503)	.394 (.645)	1.483 (.957)
Over 3 rd	-2.158*** (.559)	.116*** (.065)	-.645 (.583)	.525 (.306)
Cultural practice in ANC	-2.546*** (.405)	.078*** (.032)	-3.492*** (.460)	.0304*** (.014)
Knowledge of Health	1.148** (.547)	3.153** (1.723)	-.533 (.572)	.587 (.336)
Place of Residence	Rural (Reference)			
Urban	.789** (.368)	2.200** (.809)	.093 (.404)	1.097 (.443)
Problem with distance to HF for ANC	-.756 (.670)	.469 (.315)	-1.431* (.745)	.239* (.178)

Note: Standard errors are in parentheses

*Refers to at 10 % significant level, **refers to at 5 % significant level, ***refers to 1% significant

Base category = Not receiving ANC

Data Source: Survey in Bago Township (2023)

Women's occupation is at 5% level statistically significant, and its coefficient has positive effect on receiving less than four times of antenatal care (OR = 2.576). It identifies that women with occupation have nearly 3 times more chance to receive less than four times of antenatal care compared to those who do not have occupation. Problems concerned with getting money for drugs /treatment during pregnancy is statistically significant at 10% level and it is negatively associated with receiving less than four times of antenatal care. It means that women who have problems concerned with getting money for drugs /treatment during pregnancy are less likely to receive less than four times of antenatal care (OR = 0.277) compared to those who do not. Similarly, problems concerned with distance to health facility during pregnancy is statistically significant at 10% level and it is negatively associated with receiving less than four times of antenatal care. It means that women who have problem concerned with distance to health facility during pregnancy are less likely to receive less than four times of antenatal care (OR = 0.239) compared to those who do not.

It can be concluded that employed women have a greater chance of receiving both less than four ANC visits and more than four ANC visits than not receiving ANC. Moreover, women facing problem concerned with getting money needed for antenatal care and adhering to cultural practices have a lower chance of receiving both less than four ANC visits and more than four ANC visits than not receiving ANC. Women who have knowledge of health, those who live in urban areas and older women have greater opportunities of receiving more than four ANC visits than not receiving ANC. Women with over third birth order have a lower chance of receiving more than four ANC visits than not receiving ANC visits . Women facing problems with the distance to health facility for ANC have a lower capability of receiving less than four ANC visits than not receiving ANC visits.

In this model, women's occupation, problems with money needed for ANC and cultural practices during pregnancy are most common significant variables. It indicates that having a paid job allows women to have control over their own health and enables them to easily obtain high-quality maternal healthcare. It also reflects those individuals with a higher socio-economic status led to have improved health outcomes. It highlights the importance of empowering women through education and economic opportunities. Antenatal care utilization is mainly funded by out-of-pocket expenses, and the main healthcare services are in urban areas, which are far from rural communities. Therefore, monthly household income, problems concerned with

getting money needed for antenatal care, and place of residence are factors that predict the utilization of antenatal care services. Cultural practices often lead to a delay in seeking health care. Most women who adhere to cultural practices are those who come from households with a poor socioeconomic standing. Women who are older and have better knowledge of health are more likely to receive more than four times antenatal care (ANC) visits. This is because they are motivated to prevent maternal complications during pregnancy. An individual's socioeconomic status have significant impact on receiving antenatal care visits.

5.4 Factors Influencing Health Care Services Utilization During Delivery

5.4.1 Factors Influencing Health Birth Provider

According to the Model Fitting Criteria, the model for multinomial logistic regression is significant at P-value is 0.0000 and the value of chi-square statistics is 473.03 as shown in Table (5.14). Pseudo R² value indicates that 52.48 % of the variance in delivery providers can be explained by variation of independent variables. Thus, the multinomial logistic regression model is significant at 1 % level and this model can be used to determine the association of dependent variables and independent variables.

**Table (5.14) Overall Model Evaluation of Multinomial Logistic Regression
Model for Delivery Provider with Independent Variables**

Model Fitting Criteria	χ^2 value	DF	P-value
LR chi- square	473.03	39	0.0000
Log likelihood	-213.29869		
Pseudo R ²	0.5258		
Number of Observations	481		

Source: Survey Data (2023)

In this model, delivery assistance by traditional birth attendant is utilized as reference category of dependent variables and the reference category of each independent variable are as shown in Table (5.15) and detail results of multinomial logistic regression are shown in Appendix (C).

Table (5.15) shows the result of multinomial logistic regression model for delivery provider with independent variables. The result of the regression shows that women who have knowledge of health is at 1% level statistically significant, and its coefficient is positive effect on giving birth assistance by doctor (OR = 10.483). It can be said that women who have health knowledge are about 10 times more likely to give birth assistance by doctor compared to those who do not. Problems concerned with distance to health facility for delivery is statistically significant at 1% level and it is negatively associated with giving birth assistance by doctor. It means that women who have problem concerned with distance to health facility for delivery are less likely to give birth assistance by doctor (OR = 0.035) compared to those who do not.

The calculated result also shows that the log value of monthly household income is statistically significant at 5% level with giving birth assistance by doctor and its coefficient is positive (OR= 9.393). It can be said that 1% increase in the monthly household income leads to the women 9 % more likely to give birth assistance by doctor. Women's education is at 5 % level statistically significant, and the coefficient is positive effect on giving birth assistance by doctor (OR= 6.803). It can be concluded that women in any education level are nearly 7 times more likely to give birth assistance by doctor compared to those who never went to school. The place of residence is 5 % level statistically significant with giving birth assistance by doctor, and the coefficient of residence is positive (OR = 6.888). This mean that women who reside in urban area are nearly 7 times more likely to give birth assistance by doctor compared to those who reside in rural area.

According to the output of the using model, woman's occupation is statistically significant at 10% level and it is positively associated with giving birth assistance by doctor (OR = 6.108). It shows that women with occupation have about 6 times more chance for giving birth assistance by doctor compared to those who do not have occupation. Problems concerned with getting money for drug /treatment during delivery is statistically significant at 10 % level and it is negatively associated with giving birth assistance by doctor. It means that women who have problems concerned with getting money during delivery are less likely to give birth assistance by doctor (OR = 0.118) compared to those who do not. Women with over third birth order is 10% level statistically significant, and the coefficient of these birth order is negative. It indicates that women with over third birth order are less likely to give birth assistance by doctor (OR = 0.162) compared to those who give first birth.

Table (5.15) Multinomial Logistic Regression Analysis of Birth Attendants in Bago Township

Variables	Delivery Provider					
	Doctor		LHV/Nurse/ Midwife		Auxiliary Midwife	
	Coefficient	Odd Ratio	Coefficient	Odd Ratio	Coefficient	Odd Ratio
Woman's Occupation	Not Working (Reference)					
Working	1.809* (.987)	6.108* (6.028)	.958 (.923)	2.605 (2.406)	-.893 (1.327)	.409 (.543)
Log Monthly Household Income	2.239** (1.015)	9.393** (9.537)	2.917*** (.997)	18.489*** (18.441)	1.827* (1.045)	6.213* (6.490)
Problem with money needed for delivery	-2.136* (1.204)	.118* (.142)	.749 (1.197)	2.117 (2.534)	-1.341 (1.262)	.261 (.330)
Woman's age at last birth	.590 (.732)	1.804 (1.320)	-.106 (.656)	.899 (.590)	-.700 (.695)	.496 (.345)
Woman's Education	Not Educated (Reference)					
Educated	1.917** (.949)	6.803** (6.457)	1.387* (.752)	4.004* (3.011)	1.588* (.878)	4.895* (4.299)
Husband's Education	Not Educated (Reference)					
Educated	-.645 (1.264)	.525 (.663)	.374 (1.163)	1.454 (1.691)	-.544 (1.159)	.580 (.672)
Birth Order	1 st Birth Order (Reference)					
2 nd	-.587 (.821)	.556 (.456)	-.134 (.752)	.875 (.658)	-.099 (.787)	.905 (.712)
3 rd	.888 (1.122)	2.431 (2.726)	1.595 (1.053)	4.929 (5.189)	1.058 (1.124)	2.881 (3.238)
Over 3 rd	-1.819* (.973)	.162* (.158)	.489 (.864)	1.631 (1.409)	.383 (.894)	1.467 (1.311)
Cultural practice in delivery care	-.227 (.521)	.798 (.416)	.298 (.469)	1.347 (.632)	-.309 (.506)	.734 (.371)
Knowledge of health	2.349*** (.408)	10.483*** (4.278)	1.758*** (.382)	5.802*** (2.215)	.973** (.393)	2.645** (1.039)
Place of Residence	Rural (Reference)					
Urban	1.929** (.819)	6.888** (5.640)	1.241 (.777)	3.459 (2.688)	1.414* (.801)	4.111* (3.291)
Problem with distance to HF for delivery care	-3.365*** (1.002)	.0346*** (.0346)	-1.651 (.925)	.192 (.177)	-.450 (1.047)	.637 (.667)

Note: Standard errors are in parentheses

*refers to at 10 % significant level, **refers to at 5 % significant level, ***refers to 1% significant level

Base category = Traditional Birth Attendant

Data Source: Survey in Bago Township (2023)

When the case of giving birth assistance by lady health visitor/nurse/midwife is considered, log value of monthly household income is statistically significant at 1% level with giving birth assistance by lady health visitor/nurse/midwife and its coefficient is positive (OR= 18.489). It can be said that 1% increase in the monthly household income leads to the women 18.5% more likely to give birth assistance by lady health visitor/nurse/midwife. Women who have knowledge of health is at 1% level statistically significant, and its coefficient is positive effect on giving birth assistance by lady health visitor/nurse/midwife (OR = 5.802). It can be said that women who have health knowledge are nearly 6 times more likely to give birth assistance by lady health visitor/ nurse/ midwife compared to those who do not. Women's education is at 10 % level statistically significant, and the coefficient is positive effect on giving birth assistance by lady health visitor/nurse/midwife (OR=4.004). It can be concluded that women in any education level are 4 times more likely to give birth assistance by lady health visitor/nurse/midwife compared to those who never went to school.

According to the result of the study, health knowledge of women is at 5% level statistically significant, and its coefficient is positive effect on giving birth assistance by auxiliary midwife (OR = 2.645). It can be said that women who have health knowledge are nearly 3 times more likely to give birth assistance by auxiliary midwife compared to those who do not. Women's education is at 10 % level statistically significant, and the coefficient is positive effect on giving birth assistance by auxiliary midwife (OR= 4.894). It can be concluded that women in any education level are 5 times more likely to give birth by auxiliary midwife compared to those who never went to school. Log value of monthly household income is statistically significant at 1% level with giving birth assistance by auxiliary midwife and its coefficient is positive (OR= 6.213). It can be said that if the household income increases by 1%, the chance of a woman to give birth assistance by auxiliary midwife will increase by 6.2%.

The place of residence is 5 % level statistically significant, and the coefficient of residence is positive (OR = 4.11). This mean that women who reside in urban area are about 4 times more likely to give birth assistance by auxiliary midwife compared to those who reside in rural area.

In this model, the most common significant variables are monthly household income, women's education and knowledge of health. It can be concluded that a high

level of socio-economic development in individual households makes women belonging to these households more likely to give birth by skilled providers and auxiliary midwife. In addition, educated women, women who belong to households with high monthly income and those with knowledge of health have a greater capability of giving birth assistance by all skilled providers (doctor, lady health visitor, nurse, midwife) and auxiliary midwife than assistance by traditional birth attendants. It means that well-educated women with knowledge of health actively receive high-quality healthcare services to ensure their safety during the process of giving birth.

Women who were employed showed the highest rate of delivery led by doctors. A higher propensity for financial independence is a significant factor in the decision to give birth under the care of a doctor. Although some women receive antenatal care but choose to give birth at home or with traditional birth attendants (TBAs) because of the high facility delivery costs and the distance to health facilities. Place of residence is a strong predictor of the type of delivery service use, to different extents. Maternal healthcare facilities are greater availability and accessibility for urban women compared to their rural counterparts. Women who have a higher socioeconomic status have greater awareness of their health during delivery.

5.4.2 Factors Influencing Place of Delivery

According to the result of overall model evaluation, Pseudo R^2 value indicates that 52.03 % of the variance in place of delivery can be explained by variation of independent variables. The multinomial logistic regression model is significant at p value is 0.0000 and the value of chi-square statistics is 454.53 as shown in Table (5.16). It identifies that the multinomial logistic regression model is significant at 1 % level and this model can be used to determine the association of dependent variables and independent variables.

**Table (5.16) Overall Model Evaluation of Multinomial Logistic Regression
Model for Place of Delivery with Independent Variables**

Model Fitting Criteria	χ^2 value	DF	P-value
LR chi- square	454.53	26	0.0000
Log likelihood	-209.5002		
Pseudo R ²	0.5203		
Number of Observations	481		

Source: Survey Data (2023)

In this model, giving birth at home is utilized as reference category of dependent variables and the reference categories of each independent variable are as shown in Table (5.17). The output table of the multinomial logistic regression model can be seen in Appendix (C).

Table (5.17) shows the result of multinomial logistic regression model for place of delivery with independent variables. The result of regression shows that place of residence is statistically associated at 1% significant level and the coefficient of place of residence has positive effect on delivery in private hospital (OR = 7.984). It indicates that women who reside in urban area are nearly 8 times more likely to give birth at private hospital compared to those who reside in rural area. Woman's occupation is statistically significant at 1% level and it is positively associated with giving birth at private hospital (OR = 6.532). It shows that women with occupation have 6.5 times more chance for giving birth at private hospital compared to those who do not. Health knowledge of women is at 1% level statistically significant, and its coefficient has positive effect on giving birth at private hospital (OR = 3.059). It can be said that women who have health knowledge are 3 times more likely to give birth at private hospital compared to those who do not. Log value of monthly household income is statistically significant at 5% level with giving birth at private hospital and its coefficient is positive (OR= 3.826). It can be said that if the household income increases by 1%, the chance of the woman to give birth in a private hospital will increase by nearly 4%.

Table (5.17) Multinomial Logistic Regression Analysis of Delivery Place in Bago Township

Variables	Delivery Place			
	Private Hospital		Public Hospital	
	Coefficient	Odd Ratio	Coefficient	Odd Ratio
Woman's Occupation	Not Working (Reference)			
Working	1.877*** (.661)	6.532*** (4.320)	1.034** (.441)	2.813** (1.239)
Log Monthly Household Income	1.342** (.532)	3.827** (2.034)	-.645 (.425)	.524 (.223)
Problem with money needed for delivery care	-1.574 (1.052)	.207 (.218)	-2.472*** (.468)	.084*** (.039)
Woman's age at last Birth	.204 (.572)	1.226 (.701)	.843** (.419)	2.323** (.975)
Woman's Education	Not Educated (Reference)			
Educated	1.487 (1.377)	4.425 (6.092)	.966 (.680)	2.627 (1.787)
Husband's Education	Not Educated (Reference)			
Educated	-1.483 (1.129)	.227 (.256)	-.739 (.741)	.478 (.354)
Birth Order	1 st Birth Order (Reference)			
2 nd	-.611 (.615)	.543 (.334)	-.401 (.461)	.669 (.308)
3 rd	-.369 (.837)	.691 (.579)	-.489 (.548)	.613 (.336)
Over 3 rd	-1.351 (.852)	.259 (.221)	-2.205*** (.565)	.110*** (.062)
Cultural practice in delivery care	-.489 (.403)	.613 (.247)	-.437 (.299)	.646 (.193)
Knowledge of health	1.118*** (.315)	3.059*** (.964)	.809*** (.173)	2.248*** (.389)
Place of Residence	Rural (Reference)			
Urban	2.077*** (.571)	7.984*** (4.559)	.550 (.367)	1.734 (.636)
Problem with distance to HF for delivery care	-1.869 (1.342)	.154 (.207)	-2.016*** (.498)	.133*** (.066)

Note: Standard errors are in parentheses

*refers to at 10 % significant level, **refers to at 5 % significant level, ***refers to 1% significant

Base category is delivery in public hospital.

Data Source: Survey in Bago Township (2023)

According to the result of the study, problems concerned with getting money for delivery is statistically significant at 1 % level and it is negatively associated with giving birth at public hospital. It means that women who have problems concerned with getting money for delivery are less likely to give birth at public hospital (OR = 0.084) compared to those who do not. Women with over third birth order is 1% level statistically significant, and the coefficient of these birth order is negative. It indicates that women with over third birth order are less likely to give birth at public hospital (OR = 0.110) compared to those who give first birth.

When the case of giving birth at public hospital is considered, health knowledge of women is at 1% level statistically significant, and its coefficient is positive effect on giving birth at public hospital (OR = 2.248). It can be said that women who have health knowledge are about 2 times more likely to give birth at public hospital compared to those who do not. Problems concerned with distance to health facility for delivery is statistically significant at 1% level and it is negatively associated with giving birth at public hospital. It means that women who have problems concerned with distance to health facility for delivery are less likely to give birth at public hospital (OR = 0.133) compared to those who do not. The occupation of women is 5% level statistically associated and its coefficients has positive effect on delivery at public hospital (OR = 2.813). It indicates that women with occupation are nearly 3 times more likely to give birth at public hospital compared to those who do not have occupation. The age of women at last birth is 5 % level statistically associated and its coefficient has positive effect on delivery at public hospital (OR = 2.323). It can be said that women are 2.3% more likely to give birth at public hospital because of increasing one year age.

In this model, the most common significant variables are women's occupation and knowledge of health. It can be concluded that women with occupation and those who have knowledge have a greater chance of giving birth both at public and private hospital than delivering at home. This indicates that most women who depend on their husbands' earnings to support themselves have limited savings that are insufficient to afford expensive hospital delivery services, except they are facing a life-threatening emergency. Furthermore, a lack of knowledge led to home delivery because women accept that giving birth at home provides them with privacy and the support of family members who have a better understanding of their circumstances.

Women who have problems concerned with the distance to a health facility, getting the necessary money for delivery, and those who have given birth three or more times are less likely to give birth at a public hospital compared to home. Due to their desire to minimize the likelihood of maternal complications during childbirth, older women are more likely to give birth at a public hospital rather than at home. Urban women have a greater chance of delivering their babies in private hospitals rather than at home. It signifies that certain women residing in remote areas face difficulties accessing healthcare services that are easily accessible in urban areas due to lack of personal transportation and limited availability or convenience of public transportation.

5.5 Factor Influencing Health Care Services Utilization After Birth

According to the model fitting information, Pseudo R² value indicates that 21.78 % of the variance in receiving postnatal care can be explained by variation of independent variables. The multinomial logistic regression model is significant at p value is 0.0000 and the value of chi-square statistics is 73.60 as shown in Table (5.18). It identifies that the multinomial logistic regression model is significant at 1 % level and this model can be used to determine the association of dependent variable and independent variables.

Table (5.18) Overall Model Evaluation of Binary Logistic Regression Model for Utilization of PNC with Independent Variables

Model Fitting Criteria	χ^2 value	DF	P-value
LR chi- square	73.60	13	0.0000
Log likelihood	-132.14097		
Pseudo R ²	0.2178		
Number of Observations	481		

Source: Survey Data (2023)

In this model, not receiving postnatal care is utilized as reference category of dependent variables and the reference category of each independent variable are as shown in Table (5.19). The detailed binary logistic regression output tables are shown in appendix (C).

Table (5.19) shows the result of binary logistic regression model for utilization of PNC with independent variables. According to the results of regression, all birth orders are statistically significant. Among the various birth order, women with third birth order and over third birth order are 1% and women with second birth order is 5 % level statistically significant. All of them are negatively associated with receiving postnatal care.

Table (5.19) Binary Logistic Regression Model of Postnatal Care Service Utilization in Bago Township

Variables	Receiving Postnatal Care	
	Coefficient	Odd Ratio
Woman's Occupation	Not Working (Reference)	
Working	.602(.389)	1.826(.711)
Log Monthly Household Income	.893*(.491)	2.442*(1.199)
Problem with money needed for PNC	.111(.585)	1.119(.654)
Woman's age at last Birth	.784**(.349)	2.191**(.766)
Woman's Education	Not Educated (Reference)	
Educated	1.219**(.488)	3.387**(.652)
Husband's Education	Not Educated (Reference)	
Educated	.432(.596)	1.540(.918)
Birth Order	1 st Birth Order (Reference)	
2 nd	-1.098**(.448)	.334**(.149)
3 rd	-1.375***(.533)	.253***(.135)
Over 3 rd	-1.791***(.496)	.1667***(.083)
Cultural practice in PNC	-1.075***(.281)	.341***(.096)
Knowledge of Health	1.350***(.447)	3.859***(1.723)
Place of Residence	Rural (Reference)	
Urban	.828**(.353)	2.289**(.809)
Problem with distance to HF for PNC	.060(.541)	1.062(.575)

Note: Standard errors are in parentheses

*Refers to at 10 % significant level, **refers to at 5 % significant level, ***refers to 1% significant level

Base category = Not Receiving Postnatal Care

Data Source: Survey in Bago Township (2023)

The predictive values in odd-ratio are; women with over third birth order (0.167 compared to first birth order), women with third birth order (0.253 compared to first birth order) and women with second birth order (0.334 compared to first birth order). Among them, women with over birth order have the lowest chance to receive health care after birth compared to those who give first birth. Cultural practice after birth is statistically significant at 1% level and its coefficient is negative. It means that women who adhere to the cultural practice during pregnancy are less likely to receive health care after birth (OR= 0.341) compared to those who do not.

The results of the study also show that health knowledge of women is at 1% level statistically significant, and its coefficient is positive. The odd ratio is 3.859 which indicates that women who have health knowledge are nearly 4 times more likely to receive health care after birth compared to those who do not. Place of residence is statistically significant at 5% level and its coefficient is positive. The odd ratio is 2.289 which means that women who reside in urban area are 2.3 times more likely to receive health care after birth compared to those who reside in rural area. The age of women at last birth is 5 % level statistically significant and its coefficient is positive with the odd ratio of 2.191. Thus, the older the mother was at the time of the last birth, the higher the chance of receiving postnatal care. The education of women is at 5 % level statistically significant, and the coefficient is positive with the odd ratio of 3.387. It can be concluded that women in any education level are 3.4 times more likely to receive postnatal care compared to those who never went to school. Log value of monthly household income is statistically significant at 10 % level and its coefficient is positive. The odd ratio is 2.442 which means that if the household income increases by 1%, the chance of a woman to receive postnatal care will increase by 2.4 %.

Women who belong to wealthy households, reside in urban areas, those with better knowledge of health, older women, and those with higher levels of education are more inclined to obtain postnatal care. These findings indicate that women from wealthy households have a higher likelihood of receiving postnatal care compared to those from poor household. Thus, it is imperative to improve the economic welfare of impoverished mothers, as this can positively influence their utilization of postnatal care services. Older women are more inclined to seek postnatal care than younger one because they would like to reduce high risk of maternal complication after childbirth. Women who have attained greater levels of education are more likely to seek

postnatal care. Education promotes female independence and control over decision-making in the household, while also improving their self-confidence and capacity to make well-informed choices about their personal welfare. Women who adhere to cultural practices are less likely to have access to postnatal care because cultural practice hinder their ability to receive healthcare service. Women who have given birth more than once have less access to postnatal care compared to those who have only given birth once. As the number of children a mother has increases, her confidence about motherhood grows, resulting in a reduced probability of seeking postnatal care.

5.6 Factors Influencing Contraceptive Use

According to the result of overall model evaluation, the multinomial logistic regression model is significant at p value is 0.0000 and the value of chi-square statistics is 391.74 as shown in Table (5.20). Pseudo R² value indicates that 64.32 % of the variance in using contraceptive can be explained by variation of independent variables. It identifies that the multinomial logistic regression model is significant at 1 % level and this model can be used to determine the association of dependent variable and independent variables.

Table (5.20) Overall Model Evaluation of Binary Logistic Regression Model for Contraceptive Use with Independent Variables

Model Fitting Criteria	χ^2 value	DF	P-value
LR chi- square	391.74	13	0.0000
Log likelihood	-108.6523		
Pseudo R ²	0.6432		
Number of Observations	481		

Source: Survey Data (2023)

In this model, not using contraceptive is utilized as reference group of dependent variables and the reference category of each independent variable are as shown in Table (5.21). The detailed results of binary logistic regression are shown in appendix (C).

Table (5.21) shows the result of binary logistic regression model of contraceptive use with independent variables. The result of this model shows that third birth order and over third birth order are 1% level statistically significant and positively associated with using modern contraceptive method.

Table (5.21) Binary Logistic Regression Model of Contraceptive Use in Bago Township

Variables	Using Contraceptive Method	
	Coefficient	Odd Ratio
Woman's Occupation	Not Working (Reference)	
Working	.261 (.394)	1.299 (.512)
Log Monthly Household Income	1.129** (.492)	3.091** (1.520)
Problem with money needed for contraceptive	-.425 (.610)	.654 (.399)
Woman's age at last Birth	.596 (.419)	1.815 (.762)
Woman's Education	Not Educated (Reference)	
Educated	1.566** (.697)	4.789** (3.338)
Husband's Education	Not Educated (Reference)	
Educated	.049 (.882)	1.049 (.926)
Birth Order	1 st Birth Order (Reference)	
2 nd	.576 (.419)	1.779 (.747)
3 rd	2.354*** (.728)	10.525*** (7.663)
Over 3 rd	2.581*** (.729)	13.217*** (9.641)
Cultural practice in Contraceptive	-.494*** (.177)	.610*** (.108)
Knowledge of Contraceptive Use	1.249*** (.155)	3.489*** (.539)
Place of Residence	Rural (Reference)	
Urban	.111 (.385)	1.118 (.430)
Problem with distance to access contraceptive method	-1.319** (.602)	.267** (.161)

Note: Standard errors are in parentheses

*Refers to at 10 % significant level,**refers to at 5 % significant level,***refers to 1% significant level

Base category = Not Receiving Postnatal Care

Data Source: Survey in Bago Township (2023)

According to the predictive values in odd-ratio ,women with over third birth order (OR=13.217) and women with third birth order (OR=10.525), women with over third birth order and third birth order have 13.2 times and 10.5 times more chance to use modern contraceptive method compared to those who give first birth. Among them, women with over third birth order have the greatest chance of using modern contraceptive method. Cultural practice after birth is statistically significant at 1% level and its coefficient is negative. It means that women who adhere to the cultural practices are less likely to use modern contraceptive method (OR=0.610) compared to those who do not.

It can be found that health knowledge of women is at 1% level statistically significant, and its coefficient is positive. Since the odd ratio is 3.489, women who have health knowledge are 3.5 times more likely to use modern contraceptive method compared to those who do not. Log value of monthly household income is statistically significant at 5 % level and its coefficient is positive. The odd ratio is 3.091 which means that if the household income increases by 1%, the chance of a woman to use modern contraceptive method will increase by 3 %. The education of women is at 5 % level statistically significant, and the coefficient is positive with the odd ratio of 4.789. It can be concluded that women in any education level are nearly 5 times more likely to use modern contraceptive method compared to those who never went to school. Problem with distance to access contraceptive method is 5 % level statistically significant, and the coefficient is negative. It means that women who have problem with distance to access contraceptive method are less likely to use modern contraceptive method (OR= 0.267) compared to those who do not have.

It can be concluded that the utilization of contraceptives among women in reproductive age is affected by factors such as household income, women's educational level, contraceptive knowledge, and cultural practice. It means that belonging to wealthy households indicates a notable socio-economic status, which is associated with the accessibility and cost of modern contraceptive method. Women who possess a greater knowledge of family planning are more likely to actively prevent unintended pregnancies compared to those who do not have knowledge. Cultural practices are said to be harmful and affect women's decision-making about seeking modern contraceptive method. To address the attitude imbalances resulting from cultural practices in the use of modern contraceptive methods, it is necessary to implement community-based educational programmes and promotions that focus on a

couple-based approach. Women with higher levels of education are more capable of opposing cultural norms and using modern birth spacing methods, such as contraception.

5.7 Effects of Health Care Services Utilization on Infant Mortality

According to the model fitting information, the multinomial logistic regression model is significant at P- value is 0.0000 and the value of chi-square statistics is 76.89 as shown in Table (5.22). Pseudo R² value indicates that 26.54 % of the variance in infant mortality can be explained by variation of independent variables. It identifies that the multinomial logistic regression model is significant at 1 % level and this model can be used to determine the association of dependent variable and independent variables.

Table (5.22) Overall Model Evaluation of Binary Logistic Regression Model for Infant Mortality with Independent Variables

Model Fitting Criteria	χ^2 value	DF	P-value
LR chi- square	76.89	8	0.0000
Log likelihood	-106.4043		
Pseudo R ²	0.2654		
Number of Observations	481		

Source: Survey Data (2023)

This study found that delivery assistance by doctor and receiving postnatal care are statistically associated at 1 % significant level and receiving health care assistance by doctor, receiving health care assistance by lady health visitor/ nurse/ midwife during pregnancy and utilization of any contraceptive method are statistically associated at 5 % significant level with infant mortality as shown in Table (5.23).

Table (5.23) Binary Logistic Regression Model of Infant Mortality in Bago Township

Variables	Infant Mortality	
	Coefficient	Odd Ratio
ANC Provider	Not Receiving ANC (Reference)	
Doctor	-1.362** (.557)	.256** (.143)
LHV/Nurse/Midwife	-.846** (.404)	.429** (.174)
Auxiliary Midwife	-.172 (.924)	.842 (.779)
Delivery Provider	Traditional Birth Attendance (Reference)	
Doctor	-2.009*** (.569)	.134*** (.077)
LHV/Nurse/Midwife	-.283 (.509)	.753 (.384)
Auxiliary Midwife	-.071 (.598)	.931 (.557)
Receiving PNC	-1.293*** (.399)	.275*** (.109)
Using Contraceptive Method	-.773** (.374)	.462** (.172)

Note: Standard errors are in parentheses

*Refers to at 10 % significant level, **refers to at 5 % significant level, ***refers to 1% significant level

Data Source: Survey in Bago Township (2023)

When the case of infant mortality is considered, receiving health care assistance by doctor or lady health visitor/ nurse/ midwife during pregnancy are statistically associated at 5 % significant level and the coefficients are negative. The odd ratios are 0.256 and 0.429 indicating that if the mother receives health care assistance by doctor and lady health visitor/ nurse/ midwife during pregnancy, the child has lower chance to die within the first year of life (OR=0.256 and OR=0.429 respectively) compared to those whose mother does not.

The delivery provider (Doctor) has negative significant statistical association with death of a live born infant within the first year of life. The children born by doctor in a health facility are less likely to die within the first year of life (OR=0.134) compared to those born by traditional birth attendant at home. Postnatal care has negative significant statistical association with death of a live born infant within the first year of life. According to the result of the study, if both the child and mother received health care service within the first 42 days of child life, the child is less likely to die within the first year of life (OR=0.275) compared to those who does not. And then, contraceptive use is at 5 % level statistically significant, and the coefficient has negative effect on death of a live born infant within the first year of life. If the

mother uses any contraceptive method, the child is less likely to die within the first year of life (OR=0.462) compared to those whose mother does not.

It is evident that receiving antenatal care (ANC) from skilled providers like doctors, nurses, or midwives is linked to lower death of liveborn infant within the first year of life. Similarly, giving birth assistance by doctor, receiving postnatal care (PNC), and using contraception are also associated with reducing infant mortality. The socioeconomic status of women significantly influences the quality of maternal and reproductive healthcare they receive. Higher socioeconomic status is correlated with better health outcomes, underscoring the importance of empowering women through education and economic opportunities. Empowered women are better equipped to manage their health and access high-quality maternal and reproductive healthcare, leading to decreased rates of maternal and infant mortality.

CHAPTER VI

CONCLUSION

6.1 Findings

This study explores the utilization patterns of maternal and reproductive healthcare services based on background characteristics in Myanmar, specifically focusing on Bago Township. It uses data from the Myanmar Demographic and Health Survey (MDHS, 2015-2016) and a survey conducted in Bago Township. The study then examines the association of economic factors, social factors and environmental factor with ANC providers, times of ANC, assistance during delivery, place of delivery, utilization of PNC and contraceptive use in Bago Township. Finally, the study investigates the relationship between the association of maternal and reproductive health care service utilization and infant mortality.

Concerning patterns of maternal and reproductive healthcare service utilization, it can be found that in Bago Township, about 56% of pregnant women receive at least four ANC visits, as recommended by WHO while nearly 21% receive no ANC visits. Additionally, 76.51% of pregnant women receive ANC from skilled providers and 2.7% of those receive from auxiliary midwife whereas 20.79 % of those do not. About 31.6% of live births in the five years prior to the survey were delivered at home while 68.4% of live births were delivered in health facility. Skilled providers such as nurses, midwives, lady health visitors, and doctors assist 86.28% of births while another 6.65% of births are assisted by auxiliary midwives and 7.07 % of births are assisted by traditional birth attendants. Furthermore, 46.57% of mothers receive the recommended postnatal checkup within the first 2 days after birth while 11.85 % do not receive any postnatal check-up. Lastly, 67.15 % of currently married women use modern method of contraception in Bago Township.

According to MDHS (2015–2016) and survey in Bago Township (2023), the percentages of women receiving antenatal care from skilled health provider, those receiving healthcare service after giving birth within 2 days and those using modern contraceptive method in Bago Township are lower than that in Myanmar. The

percentages of women giving birth assistance by skilled health provider and those giving birth at health facility in Bago Township are higher than that in Myanmar. In study area, some women who give birth assistance by skilled health provider at health facility have maternal complication during pregnancy.

Concerning patterns of maternal and reproductive healthcare service utilization, it can be concluded that ANC, PNC, and contraceptive non-utilization and giving birth at home are mostly observed in the youngest age group (under 20). Women with no education are least likely to utilize ANC, PNC, and modern contraceptive method and to give birth at health facility with assistance by skilled provider. Rural residence reduces the likelihood of seeking skilled antenatal care, health facility delivery, skilled birth attendance, postnatal care and contraceptive use. Women in rural areas, characterized by lower income and education levels, face problems in accessing maternal healthcare services. Furthermore, urban areas have more accessible maternal health facilities, contributing to the disparity in healthcare access between urban and rural women.

When the factors influencing maternal and reproductive health care service utilization are considered, it has been observed that occupation of women is positively associated with ANC provider (skilled provider and auxiliary midwives), ANC visit (less than 4 ANC visits and 4 or more ANC visits), Delivery Place (private and public hospital) and Birth Assistance (doctor) at 1%, 5% and 10% significant level respectively. This means that employed women have more chance to receive these health care services. It is because women with occupations often have greater financial resources, enabling them to afford quality maternal and reproductive healthcare services. This economic empowerment through employment allows women to prioritize their health needs and access the necessary care more easily.

This study reveals that monthly household income is positively associated with ANC provider (doctor and auxiliary midwives), ANC visit (four or more ANC visits), Birth Attendants (skilled health provider or auxiliary midwife), Delivery Place(private hospital), PNC, and any modern method of contraception at 5% and 10 % significant level respectively. It means that the higher the monthly household income the greater the likelihood of women receiving quality maternal and reproductive health care service. Women belonging to the higher income quintile tend to use these health care services by several folds compared to those in the low-income quintile.

Problems concerned with needed money for drugs/treatment is negatively associated with ANC visit (less than 4 ANC visit and 4 or more ANC visits), ANC provider (skilled provider and auxiliary midwife) and Birth Attendant (doctors) at statistically significant 1%, 5% and 10 % level respectively. It indicates that facing problems concerning needed money for delivery/drugs/ treatments reduce receiving health care services during pregnancy and delivery. Since healthcare service utilization is primarily driven by out-of-pocket expenditure, problem of getting money needed for these services is a strong predictor of their use. The reason is that women who depend solely on their husbands' income for their livelihood have a small saving which is not enough to obtain costly healthcare services except in life-threatening situations.

Moreover, age of women is positively associated and statistically significant at 5% level with ANC visit (4 or more ANC visits), Delivery Place (public hospital), and receiving PNC. It shows that increasing years of age has been shown to have direct influence on increasing the proportion of women who receive these health care services. In the survey area, women who married at an older age are more likely to use these health care services because older women would like to reduce their high risk of maternal complications.

Education of women is positively associated with receiving ANC provider (doctors), Delivery provider (doctor, LHV, nurse, midwife and auxiliary midwife), and receiving PNC at 5% and 10 % significant level respectively. It can be said that educated women are more likely to receive these services. The reason is that education promotes female autonomy and decision-making power within the household, as well as greater confidence and capability to make decisions about their own health.

With the aspect of birth order, women who were pregnant for over third times are found to be less likely to have good practices for skilled ANC attendance, minimum of four ANC visits, delivery assistance by doctor in public hospital and use of PNC because they might tend to rely on the experiences from their previous pregnancies. However, women with second, third or over-third birth order are more likely to use any modern contraceptive method for birth spacing.

This study reveals that cultural practice is negatively associated with receiving ANC provider (doctor, LHV, nurse, midwife, and auxiliary midwife) and receiving PNC and using contraceptive method at 1% significant level. It indicates that women

who adhere to cultural norms have a lower chance of receiving these healthcare services. The reason is that acceptance of cultural practices hinders access to health care and affects women's decision-making about seeking modern health care services.

Knowledge of health is positively associated with ANC visit (4 or more ANC visits), Delivery Place (public and private hospital), Birth Attendants (doctor, LHV, nurse, midwife), receiving PNC and using any method of contraception at 1% and 5% significant level respectively. It indicates that maternal health knowledge plays an important role as women who have knowledge of health have a greater chance of using these health care services, and they can prevent unintended pregnancies.

This study observes that place of residence is positively associated with receiving ANC provider (doctor), ANC visit (4 or more ANC visits), Birth Assistant (doctor and auxiliary midwife), Delivery Place (private hospital), and receiving PNC significant at 1% and 5% level respectively. This result shows that receiving these healthcare services is higher in urban areas than in rural areas. The reason is that maternal healthcare facilities are disproportionately distributed in favor of urban areas, making them more available and accessible to urban women than to rural ones.

It has been found that problem concerned with distance to health facility is negatively associated with receiving ANC visit (4 or more ANC visit), Delivery place (public hospital) and using any method of contraception at 1% ,5% and 10% significant level. It can be concluded that the problem concerning distance to health facility reduces receiving these healthcare services. The reason is that the ability to pay for not only the medical expenses but also the additional costs of transport influence the utilization of health care services. Some women in rural areas cannot access health care services in urban areas because they do not own a vehicle, and public transportation may not be readily available or convenient.

Concerning the effect of maternal and reproductive health care service utilization on infant mortality, this study revealed that skilled antenatal care providers (doctors, LHV, nurses, midwives), doctor-assisted deliveries, postnatal care (PNC), and modern contraceptive use are negatively associated with death of a live born infant within the first year of life at 1% and 5% level respectively. This confirms that infants' chances of survival improve if mothers receive ANC from skilled providers, have doctor-assisted deliveries, undergo postnatal care, or utilize modern contraception. The health and survival of infants and young children are intricately linked to maternal characteristics and the surrounding environment. Initially, mothers

play a crucial role in their child's life and development, gradually sharing this responsibility with other family members or institutions as the child grows. Higher socioeconomic status correlates with better health outcomes, underscoring the importance of empowering women through education and economic means. This empowerment enables women to manage their health effectively and access quality maternal and reproductive healthcare, thereby contributing to the reduction of maternal and infant mortality rates. Hence, the socioeconomic status and health knowledge of women plays a pivotal role in the overall endeavor to reduce infant mortality.

6.2 Suggestions

The suggestions are proposed based on the findings of the study. The study finds that women with occupation are more likely to use maternal health care services, as observed in the results, since working women are more comfortable utilizing their funds for their health needs. In addition, women who reside in households with high monthly income have greater awareness of their health during pregnancy, delivery, after birth, and when using contraception than those from a lower socioeconomic position. Based on this finding, the study suggests that promoting sustainable strategies to address barriers by prioritizing job creation and poverty reduction measures could improve the economic conditions of women and households, thereby empowering them to manage their healthcare needs better. This will also bridge the inequality gap in maternal health service utilization, promote social equity, and aid the overall economic development of these women.

This study reveals that women facing problems with getting money needed for treatment or drugs have less chance to receive antenatal care, to give birth assistance by doctors at public hospitals. Based on these finding, if knowledge of health insurance could be promoted, the problem concerning the money needed for healthcare services would be reduced. In addition, these problems would be reduced if maternal and child health (MCH) voucher scheme and Conditional Cash Transfer (CCT) could be extended especially in high maternal mortality ratio regions for short-term health promotion.

This study indicates that age has a positive relationship with the utilization of antenatal care, institutional delivery services and postnatal care. Based on this finding, younger women, particularly those under 18 years of age, require special attention for

maternal health service utilization because they have a higher risk of pregnancy complications. If sexual and reproductive health issues included in the middle and high school curriculum are effectively shared to the students for proper knowledge, health awareness will increase among adolescents. Furthermore, it is imperative to organize frequent health awareness sessions within the community to address maternal and child health (MCH) focusing on both adolescents and guardians. By engaging in this activity, women who are 35 years old or older would acquire information regarding maternal health and understand higher risk of maternal complications. And then, if community-based reproductive health literacy is developed, all family members' awareness of the importance of maternal health care services will increase for the safety and well-being of mothers and infants.

The finding of this study is that women who adhere to cultural practices during pregnancy and the postnatal period and using contraceptive hinder the utilization of health care services during these periods. In addition, educated women are more likely to use maternal and reproductive health care services compared to uneducated women. Based on these finding, inappropriate beliefs, and practices regarding diet during pregnancy, delivery, and after delivery would be reduced if education and health knowledge of both women and husbands could be promoted because educated women are better able to break away from traditional practices and use modern healthcare services to enhance their health. Moreover, conducting regular awareness-raising sessions on risky pregnancies within the community and through mass media, such as FM radio channels, could significantly enhance families' understanding of the danger signs during pregnancy and delivery.

The study reveals the positive association of urban residents and the negative association of distance factors with the utilization of antenatal care, institutional delivery, and contraceptive methods. Based on this finding, maternal health would be improved more, if skilled health providers could be increased more than before in rural areas of Bago Township. According to WHO, providing maternal health care services with a skilled provider is the ideal approach. However, in very remote areas where access to skilled providers is limited, providing maternal health care with an unskilled provider, such as an auxiliary midwife, is a useful alternative. Regular and comprehensive training on essential newborn care for unskilled providers can maximize the positive impact of maternal health care. Additionally, if unskilled providers collaborate closely with skilled providers, they can identify when and where

to refer to a skilled provider. To improve the availability of health care services, it would be better to open training courses for unskilled providers more effectively than before, especially in remote areas. If auxiliary midwives have incentives to become skilled birth attendants, they will be more active in providing health care in rural areas.

In brief, maternal and reproductive health of women would improve if policy makers focused more on promoting health knowledge, increasing the availability of skilled health providers in rural areas, and transmitting mass media for the safety and well-being of mothers and infants . This is expected to decrease maternal and infant mortality rates, which are key health indicators linked to economic development factors such as economic status, education, and health care. A healthier mother can contribute to the labor force and provide better care for her children, leading to a new generation of exceptional individuals. As a result, healthy and educated generation will participate in skilled labor force which will lead to increased productivity in the country. Reducing maternal and infant mortality rates are expected outcomes of improved maternal and reproductive health care service utilization, which in turn increases productivity and economic development in Myanmar, including Bago Township.

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APPENDIX

Questionnaire

(For mother aged 15-49 years who have delivered within 5 years prior to the survey)

Respondent ID	Respondent Name
Ward/ Village Tract	Township
Village.....	Street/ No of house.....
Interviewer.....	Date.....
Editor.....	Date.....
Supervisor.....	Date.....

Section 1. Respondent's Background

No.	Questions	
101	Ageyears
102	Place of Residence	<ol style="list-style-type: none"> 1. Urban 2. Rural
103	Marital Status	<ol style="list-style-type: none"> 1. Married 2. Widowed 3. Divorced 4. Separated
104	Woman Education	<ol style="list-style-type: none"> 1. Not Educated 2. Educated
105	Husband Education	<ol style="list-style-type: none"> 1. Not Educated 2. Educated
106	Are you working paid cash?	<ol style="list-style-type: none"> 1. Not working 2. Working
107	Woman Occupation	<ol style="list-style-type: none"> 1. Own business 2. Private Employee 3. Government Employee 4. Manual worker 5. Dependent 6. Other (Specify).....

108	Woman monthly income
109	Does your husband have occupation?	1. No 2. Yes
110	Husband Occupation	1. Own business 2. Private Employee 3. Government Employee 4. Manual worker 5. Dependent 6. Other (Specify).....
111	Do you read a newspaper or magazine?	1. At least once a week 2. Less than once a week 3. Not at all
112	Do you listen to the radio?	1. At least once a week 2. Less than once a week 3. Not at all
113	Do you read a journal	4. At least once a week 5. Less than once a week 4. Not at all
114	Do you watch TV?	1. At least once a week 2. Less than once a week 3. Not at all
115	Did you have knowledge on Maternal & reproductive Health?	1. Yes 2. No
116	From whom did you get health knowledge?	1. Health Workers (Doctor, Nurse, MW, LHV, AMW) 2. Traditional Birth Attendance 3. Mass Media (newspaper, radio, magazine, journal, TV, Facebook, Internet) 4. Others(Specify)

117	What is your birth order?	<ol style="list-style-type: none"> 1. 1st 2. 2nd 3. 3rd 4. More than 3rd
118	Is child living at last birth?	<ol style="list-style-type: none"> 1. No 2. Yes
119	Is the child still alive?	<ol style="list-style-type: none"> 1. No 2. Yes
120	If No, Did your child pass away within one year old?	<ol style="list-style-type: none"> 0. No 1. Yes
121	If No, what is the age of the child when he or she died?	<ol style="list-style-type: none"> 1. Under 1 month old 2. Between 1 yr and 5 yrs old
122	Did the child receive treatment before death?	<ol style="list-style-type: none"> 1. No 2. Yes
123	Where did the child receive treatment before death?	<ol style="list-style-type: none"> 1. Public Hospital 2. Health Care Centre/RHC 3. Private Hospital /Clinic 4. Home 5. Others(Specify)

Section 2. Household Characteristics

No.	Questions	
201	Type of household	1. Nuclear Family 2. Extended Family
202	Number of household members
203	What is sex of household head	1. Female 2. Male
204	Household income(monthly)	() Ks
205	Head of household	1. Respondent 2. Husband 3. Other (Specify).....
206	What is monthly household expenditure?	() Ks

Section 3. Questionnaire for Antenatal Care

No.	Questions		
301	Did you receive health care service during pregnancy?	0. No	1. Yes
302	What is your health status during pregnancy?	1.Lack of Knowledge 2. poor transport 3. too far to access ANC 4. Lack of money 5. Absence of complication 6. no time to go 7. others	
303	If yes, Why did you use ANC during pregnancy?	Yes	No
	1.Bleeding	1	0
	2.Feet and face swelling up	1	0
	3.Hypertension	1	0
	4.High fever	1	0
	5.Severe anemia	1	0
	6.Abdominal pain	1	0

	7.Eclampsia	1	0
	8.To safe pregnant	1	0
304	Where did you receive treatment during pregnancy?	1. Public Hospital 2. Private Hospital 3. Home	
305	From whom did you receive ANC?	1. Doctor 2. LHV /Nurse/Midwife 3. Auxiliary Midwife 4. Not Receive ANC	
306	How many times did you receive ANC?	1. 4 times and above 2. Less than 4 times 3. No ANC visit	
307	when did you receive first ANC for this pregnancy?	1. Before 4 months 2. 4-5 months 3. 6-7 months 4. After 8 months 5. Not remember 6. Not at all	
308	How much did you cost to receive antenatal care service, treatment and drugs?	() Ks	
309	Did you have problem to get money needed for treatment / drug?	0. No 1. Yes	
310	Did you have problem concerned with distance to health facility for ANC?	0. No 1. Yes	
311	How many times did you receive TT injection during pregnancy period?	1. one time 2. two times 3. Over two times 4. Not at all	

3(a) Did you adhere to cultural practices during pregnancy?

The respondent is required to answer each of these questions on a 5-Item Likert Scale, 1 to 5; 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree.

Sr.	Statements	SDA	DA	N	A	SA
1	Women should avoid some foods according to traditional belief.					
2	Women should continue to work as usual during pregnancy.					
3	Women should hide the early stage of pregnancy.					
4	Women should receive non-medical services as massage and ritual practice provided by TBA during pregnancy.					
5	Manual positioning of fetal head during pregnancy.					
6	Having turmeric powder and honey during pregnancy.					
7	Pregnant women should use traditional medicine.					

3(b) Did you have knowledge of reproductive health during Pregnancy?

Sr.	Statements	SD A	DA	N	A	SA
1	I had the knowledge of family planning.					
2	I got the information to submit propose letter to be sterilized at public health facility if I have more than two children.					
3	I learned health education regarding the birth spacing.					
4	Maintaining birth spacing methods allows the mother to recover physically and psychologically before she can conceive again.					

5	Maintaining birth spacing methods decrease abortions and unwanted pregnancies, improves children's health, nutrition and development.					
6	Women should not get pregnant before 18 years old.					

Section 4. Questionnaire for Delivery Care

No.	Questions	
401	What is your age at birth of last child?
402	Who is your last delivery provider?	<ol style="list-style-type: none"> 1. Doctor 2. LHV/Nurse/ Midwife 3. Auxiliary Midwife 4. Traditional Birth Attendant
403	What is the place of last delivery?	<ol style="list-style-type: none"> 1. Private Hospital/ Clinic 2. Public Hospital/Clinic /HCC 5. Home
404	Why did you choose to give birth at health facility?	<ol style="list-style-type: none"> 1. Health Problem 2. Lower fee 3. Near Health Facility 4. Qualified Service 5. To safe at birth 6. Others (Specify)
405	Why did you deliver at home?	<ol style="list-style-type: none"> 1. Absence of complication 2. Poor transport 3. Low skill of Health worker 4. Lack of money 5. Prefer home delivery 6. Others()
406	How much did you cost to give birth?	1. () Ks
407	Did you have problem to get money needed for delivery?	<ol style="list-style-type: none"> 0. No 1. Yes
408	Did you have problem concerned with distance to health facility for delivery?	<ol style="list-style-type: none"> 0. No 1. Yes

4(a) Did you adhere to cultural practices during delivery?

The respondent is required to answer each of these questions on a 5-item Likert Scale, 1 to 5; 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree.

Sr.	Statements	SD A	D A	N	A	SA
1	Women should use natural oils and creams or traditional herbs as treatment for labour difficulties.					
2	Umbilical cord should be cut by family member according to traditional belief.					
3	External forceful compression of uterus during labour.					
4	Casting magical spells and conducting ceremonies to placate spirits by traditional birth attendance can ease the birth					
5	Using special medicines prepared from Euphorbiaceous root by traditional healers can ease the birth.					
6	Preferred childbirth to take place at home with the assistance of traditional birth attendants.					
7	Prayer and herbal solutions are used as a primary response to birth complications.					

4(b) Did you have the knowledge of reproductive health while you are giving birth?

Sr.	Statements	SDA	DA	N	A	SA
1	Counseling on both maternal, infant, young child nutrition (MIYCN), family planning information and messages.					
2	I knew the benefit of woman delaying a pregnancy until the age of 18 years.					

3	Getting pregnant may be delayed by doing childcare as well as breast feeding.					
4	Too closed space pregnancy should be avoided by using family planning method.					
5	The women may occur at least one problem when she becomes pregnant at the age of over 34 years.					
6	The women may occur at least one problem if she becomes pregnant while she has four or more children.					

Section 5. Questionnaires for Postnatal Care

Sr.	Questions	
501	Did you receive any health care from clinic or health care provider after birth?	0. No 1. Yes
502	If 501 is No, why?	1.Lack of Knowledge 2. poor transport 3. too far to access PNC 4. Lack of money 5. Absence of complication 6. no time to go 7. others
503	Why Did you receive any health care from clinic or health care provider after birth?	1.Maternal Health Problem 2.Baby related problem 3. follow up visit 4.Other ()
504	Where did you receive any health care after delivery?	1. Public Hospital/Clinic/HCC 2. Private Hospital/ Clinic 3. NGO 4. Home 5. Other (Specify).....

505	How long after delivery did the first check take place?	<ol style="list-style-type: none"> 1. Within 48 hours 2. 3 - 14 days 3. 14 - 42 days 4. More than 42 days 5. Not remember
506	Who checked on your health at that time?	<ol style="list-style-type: none"> 5. Doctor 6. Nurse/Midwife/LH 7. Auxiliary Midwife 8. Traditional Birth Attendance 9. Other ()
507	How many times did you go to clinic/ health providers during the 6 weeks following delivery?	<ol style="list-style-type: none"> 1. Less than 4 times 2. 4 times and above
508	How much did you cost to receive postnatal care service, treatment, and drugs?	() Ks
509	Did you have problem to get money needed for treatment or drug?	<ol style="list-style-type: none"> 0. No 1. Yes
510	Did you have problem concerning the distance to health facility for PNC?	<ol style="list-style-type: none"> 0. No 1. Yes
511	How long did you breastfeed your baby?	<ol style="list-style-type: none"> 1. Less than 6 months 2. 7- 12 months 3. 13- 23 months 4. More than 24 months 5. Not at all

5(a) Did you adhere to cultural practices within 42 days after birth?

The respondent is required to answer each of these questions on a 5-item Likert Scale, 1 to 5; 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree.

Sr.	Statements	SDA	DA	N	A	SA
1	Use blanket and streaming water to perspire after birth.					
2	Avoid using any soap during post-partum period.					
3	Strict home confinement within 7 days after birth.					
4	Use turmeric powder or traditional medicine to get rapid falling out of child's umbilical cord.					
5	Didn't take a bath within 7 days after birth.					
6	Applied the bamboo ashes/betel-nut and Say Tote Phat Gyi after falling off the cord stump.					

5(b) Did you have the knowledge of reproductive health within 42 days after birth?

Sr.	Statements	SDA	DA	N	A	SA
1	During postnatal period, I was told about family planning and contraceptive methods by health worker at health facility.					
2	I knew the sources of contraceptive method.					
3	I knew about long-acting reversible contraceptive (LARC) and permanent method (PM) of contraception.					
4	Woman should wait at least 6 months after a miscarriage or abortion before attempting to become pregnant again.					
5	Woman should wait at least 24 months after she gives birth before attempting to become pregnant again.					

6	Pregnancy should be planned and discussed together between husband and wife.					
7	Women should not take pregnant immediately after birth.					

Section 6. Questionnaire for Contraceptive Use

No.	Questions	
601	How many Children do you have?
602	Do you use any method to delay or avoid pregnancy?	0. No 1. Yes
603	If 602 is No, why?
604	If 602 is Yes, Which method do you use?	1. Modern method 2. Traditional Method 3. Not Use
605	Where did you receive this contraceptive method?	1. Public Hospital/Clinic/HCC 2. Private Hospital/ Clinic 3. NGO 4. Shop 5. Other (Specify).....
606	Did your husband agree to use this contraceptive method?	1. Agree 2. Did not agree 3. Did not tell him about this
607	Did you have problem concerning the distance to access contraceptive method?	0. No 1. Yes
608	How much did you cost to receive contraceptive method?	() Ks
609	Did you have problem to get money needed for contraceptive method?	0. No 1. Yes
610	Why do you use contraception?	1. For birth spacing 2. For limiting birth 3. To avoid pregnancy 4. Other (Specify)
611	Did you have pregnant while you are using contraceptive method?	0. No 1. Yes

612	Why do you get a pregnant while using contraceptive method?	<ol style="list-style-type: none"> 1. forget to use regularly 2. Expired Medicine 3. Cannot afford 4. Other (Specify)
-----	---	---

6 (a) Did you accept the cultural beliefs on contraceptive use?

The respondent is required to answer each of these questions on a 5-item Likert Scale, 1 to 5; 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree.

Sr.	Statements	SDA	DA	N	A	SA
1	A big family is stronger than the small size.					
2	Contraception destroys any potential to produce new life and violates the principal purpose of marriage.					
3	Children are gifts from God.					
4	Parents are obligated to ensure the rights of children.					
5	Children are invaluable jewels for parents.					
6	The women can get pregnant as the fetal is related with her since the past life.					

6 (b) Did you accept attitudes toward short birth interval concerning the contraceptive use?

Sr.	Statements	SDA	DA	N	A	SA
1	Applied optimal birth interval is important.					
2	Having 3 years birth interval is enough.					
3	Many children have physical and psychological problems for the women.					
4	Short birth interval has health problems.					
5	Having many children reduces the quality of care given for them.					
6	A birth spacing which is too close do not allow the mother's body to provide enough nutrition to the fetus.					

APPENDEX - A

Jacobson's Demand Function for Health Care Services

Grossman (1972) model of health care demand was later extended by Jacobson (2000).

The household utility function is given as

$$u = (h, x) \quad (1)$$

Where h denotes health status and x denotes non-health commodities.

Health status depends on health care and other factors and is given as;

$$h = f [\alpha(M_h, \bar{M}_h, t_h, \mu, C, Z)] \quad (2)$$

Where M_h is maternal healthcare \bar{M}_h is non maternal healthcare t_h is the amount of time used in the production of pregnant woman's health, μ is the stock of health of a mother at the time of pregnancy C and Z are respectively exogenous observable and unobservable variables affecting h

Also

$$\alpha = (M_h, \bar{M}_h) \quad (3)$$

Where α is the total medical care separated in maternal M_h and non maternal \bar{M}_h healthcare

$$x = f (b_j, t_x) \quad (4)$$

Where b_j denotes purchasable non health goods and services and t_x is the time associated with the use of non-health goods and services.

A household faces an income constraint of the form

$$Y = \sum_{i=1}^n p_i \alpha_i + \sum_{j=1}^m q_j b_j \quad (5)$$

Where p_i and q_j are prices of α_i and b_j . Potential household income is determined by wage rate and the amount of time available to spouses such that

$$Y = wT \quad (6)$$

But

$$T = t_w + t_x + t_h \quad (7)$$

Where t_w is the time spent to earn wage income, t_x is the time associated with the use of non- health goods and services, t_h is the amount of time used in the production of pregnant woman's health.

Merging the two constraints gives

$$wT = wt_w + \sum_{i=1}^n p_i \alpha_i + wt_h + \sum_{j=1}^m q_j b_j + wt_x \quad (8)$$

From equations (2) and (4), the indirect utility function of the household can be expressed as;

$$u = f [h (M_h, \bar{M}_h, t_h \mu, , Z), x(b_j t_x)] \quad (9)$$

Equation (9) can be used as the basis for a random utility choice model. Given an expectant mother, a household faces j options. Each option differs in terms of its impact on health status and total cost. So for choice j , we can then define V_j as the level of indirect utility associated with that alternative;

$$V_j = U [h (M_h, \bar{M}_h, t_h \mu, , Z), x(b_j t_x)] \quad (10)$$

Rewriting equation (10) as

$$V_j = (h, x) \quad (11)$$

And using equations (8) and (11) the utility maximization problem is

$$V_j = U(h, x)$$

Subject to

$$wT = wt_w + \sum_{i=1}^n p_i \alpha_i + wt_h + \sum_{j=1}^m q_j b_j + wt_x$$

Setting the Lagrange an equation gives

$$L = (h, x) + [- wt_w - \sum_{i=1}^n p_i \alpha_i - wt_h - q_j \sum_{j=1}^m b_j - wt_x] \quad (12)$$

Taking the first order condition (FOC) gives

$$L_{\alpha_i} = u_h \cdot h'(\alpha_i) - \lambda p_i = 0 \quad (13)$$

$$L_{b_j} = u_x \cdot x'(b_j) - \lambda q_j = 0 \quad (14)$$

$$L_{\lambda} = - wt_w - \sum_{i=1}^n p_i \alpha_i - wt_h - q_j \sum_{j=1}^m b_j - wt_x = 0 \quad (15)$$

Dividing (14) by (13) gives

$$\frac{u_x \cdot x'(b_j)}{u_h \cdot h'(\alpha_i)} = \frac{q_j}{p_i}$$

The implication is that

$$q_j = \frac{u_x \cdot x'(b_j)}{u_h \cdot h'(\alpha_i)} = \frac{q_j}{p_i} \quad u'(h) \cdot h'(\alpha_i) \neq 0 \quad (16)$$

Substituting equation (16) to (15) gives

$$wT - wt_w - wt_h - \sum_{i=1}^n p_i \alpha_i - wt_x - \frac{p_i u_x \cdot x'(b_j)}{u_h \cdot h'(\alpha_i)} \sum_{j=1}^m b_j = 0.$$

Rearranging gives

$$u_h \cdot h'(\alpha_i) [wT - wt_w - wt_h - wt_x - p_i \sum_{i=1}^n \alpha_i] = p_i u_x \cdot x' (b_i) \sum_{j=1}^m b_j \quad (17)$$

Hence

$$u_h \cdot h'(\alpha_i) = \frac{p_i u_x \cdot x' (b_i) \sum_{j=1}^m b_j}{wT - wt_w - wt_h - wt_x - p_i \sum_{i=1}^n \alpha_i}$$

Therefore picking maternal health care alone gives

$$u' (M_h) = \frac{p_i u_x \cdot x' (b_i) \sum_{j=1}^m b_j}{wT - wt_w - wt_h - wt_x - p_i \sum_{i=1}^n M_h} \quad (18)$$

It follows that the generic demand for maternal health care M_h is given as

$$M_h = f(\mathbf{p}, \mathbf{x}, \mathbf{Z}, \mathbf{t}) \quad (19)$$

Where M_h is maternal health care, p denotes the price of M_h which is captured by the expectant mothers ownership of health insurance, vector x denotes non-health goods and services, vector Z captures observable and unobservable demographic characteristics of spouses and the household and t denotes time associated with the use of maternal health care.

APPENDIX - B

Table (B-1)

tab hhinc Quintile

<i>5 quintile of /</i>			
household			
monthly income	Freq.	Percent	Cum.
-----+-----			
lowest income	182	37.84	37.84
second lowest	23	4.78	42.62
third lowest	95	19.75	62.37
fourth lowest	93	19.33	81.70
highest income	88	18.30	100.00
-----+-----			
Total	481	100.00	

Table (B-2)

. tab hhincome

household			
income	Freq.	Percent	Cum.
-----+-----			
50000	3	0.62	0.62
70000	1	0.21	0.83
72800	1	0.21	1.04
80000	2	0.42	1.46
90000	9	1.87	3.33
100000	46	9.56	12.89
105000	1	0.21	13.10
120000	16	3.33	16.42
130000	9	1.87	18.30
140000	1	0.21	18.50
144000	1	0.21	18.71
150000	92	19.13	37.84
160000	7	1.46	39.29
170000	16	3.33	42.62
180000	21	4.37	46.99

184000		2	0.42	47.40
198000		1	0.21	47.61
200000		71	14.76	62.37
202000		1	0.21	62.58
240000		1	0.21	62.79
250000		21	4.37	67.15
270000		2	0.42	67.57
280000		2	0.42	67.98
300000		48	9.98	77.96
320000		2	0.42	78.38
324000		1	0.21	78.59
334000		1	0.21	78.79
350000		14	2.91	81.70
370000		1	0.21	81.91
380000		2	0.42	82.33
390000		1	0.21	82.54
400000		27	5.61	88.15
420000		1	0.21	88.36
432000		1	0.21	88.57
450000		4	0.83	89.40
480000		1	0.21	89.60
500000		23	4.78	94.39
510000		1	0.21	94.59
600000		6	1.25	95.84
624000		1	0.21	96.05
700000		7	1.46	97.51
800000		2	0.42	97.92
900000		3	0.62	98.54
1000000		2	0.42	98.96
1300000		1	0.21	99.17
2000000		1	0.21	99.38
3000000		1	0.21	99.58
3300000		1	0.21	99.79
6000000		1	0.21	100.00

-----+-----
Total | 481 100.00

APPENDIX – C

Table (C-1)

Multinomial logistic regression	Number of obs	=	481
	LR chi2(26)	=	337.86
	Prob > chi2	=	0.0000
Log likelihood = -307.69393	Pseudo R2	=	0.3544

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
more_than_four_times						
mo_occ						
Working	.8906999	.4352337	2.05	0.041	.0376577	1.743742
lninc	.78737	.4140051	1.90	0.057	-.0240651	1.598805
problemANCCost	-1.806482	.6609447	-2.73	0.006	-3.10191	-.5110543
mo_age_birth	.191167	.3972915	0.48	0.630	-.5875101	.9698441
mo_edu						
Educated	1.228139	.739786	1.66	0.097	-.2218148	2.678093
fa_edu						
Educated	.4577166	.8545699	0.54	0.592	-1.21721	2.132643
birth_order						
second	-.2471589	.4578582	-0.54	0.589	-1.144544	.6502266
third	-.1496193	.5842248	-0.26	0.798	-1.294679	.9954402
over third	-2.158428	.5591942	-3.86	0.000	-3.254428	-1.062427
ANCCultural	-2.546383	.4051794	-6.28	0.000	-3.34052	-1.752246
ANCKnowledge	1.148215	.546678	2.10	0.036	.0767462	2.219685
resident						
urban	.7885897	.3677724	2.14	0.032	.0677691	1.50941
problemANCDistance	-.7561811	.6701222	-1.13	0.259	-2.069597	.5572344
_cons	-8.475987	5.612831	-1.51	0.131	-19.47693	2.52496
less_than_4_times						
mo_occ						
Working	.9460485	.467022	2.03	0.043	.0307022	1.861395
lninc	-.0360092	.4611953	-0.08	0.938	-.9399354	.867917
problemANCCost	-1.284399	.7307971	-1.76	0.079	-2.716735	.1479367
mo_age_birth	.1100738	.4310967	0.26	0.798	-.7348602	.9550077
mo_edu						
Educated	.8309999	.7707757	1.08	0.281	-.6796927	2.341692
fa_edu						

Educated		-.4654949	.8242768	-0.56	0.572	-2.081048	1.150058
birth_order							
second		-.1241431	.5019852	-0.25	0.805	-1.108016	.8597299
third		.3941929	.6451244	0.61	0.541	-.8702276	1.658613
over third		-.6445006	.5834405	-1.10	0.269	-1.788023	.4990219
ANCcultural		-3.491891	.4602356	-7.59	0.000	-4.393936	-2.589845
ANCknowledge		-.5331739	.5724131	-0.93	0.352	-1.655083	.5887352
resident							
urban		.0927357	.4036638	0.23	0.818	-.6984309	.8839023
problemANCdistance		-1.43111	.745112	-1.92	0.055	-2.891503	.0292822
_cons		10.49121	6.249941	1.68	0.093	-1.758447	22.74087

no_visit		(base outcome)					

Table (C-2)

Multinomial logistic regression	Number of obs	=	481
	LR chi2(26)	=	337.86
	Prob > chi2	=	0.0000
Log likelihood = -307.69393	Pseudo R2	=	0.3544

anc_visit		RRR	Std. Err.	z	P> z	[95% Conf. Interval]
more_than_four_times						
mo_occ						
Working		2.436835	1.060592	2.05	0.041	1.038376 5.718704
lninc		2.197609	.9098215	1.90	0.057	.9762221 4.947118
problemANCcost		.1642309	.1085475	-2.73	0.006	.0449632 .5998628
mo_age_birth		1.210662	.4809856	0.48	0.630	.5557092 2.637533
mo_edu						
Educated		3.414869	2.526272	1.66	0.097	.8010637 14.5573
fa_edu						
Educated		1.580461	1.350614	0.54	0.592	.2960551 8.437135
birth_order						
second		.7810166	.3575948	-0.54	0.589	.3183689 1.915975
third		.8610357	.5030384	-0.26	0.798	.2739859 2.705915
over third		.1155066	.0645906	-3.86	0.000	.0386029 .3456159
ANCcultural		.0783646	.0317517	-6.28	0.000	.0354185 .1733841
ANCknowledge		3.152562	1.723436	2.10	0.036	1.079768 9.204427
resident						
urban		2.200291	.8092063	2.14	0.032	1.070118 4.524062

problemANCdistance		.4694558	.3145928	-1.13	0.259	.1262367	1.745837
_cons		.0002084	.0011698	-1.51	0.131	3.48e-09	12.4904

less_than_4_times							
mo_occ							
Working		2.575512	1.202821	2.03	0.043	1.031178	6.432703
lninc		.9646314	.4448835	-0.08	0.938	.3906531	2.381944
problemANCcost		.2768168	.2022969	-1.76	0.079	.0660902	1.159439
mo_age_birth		1.11636	.4812593	0.26	0.798	.4795725	2.598691
mo_edu							
Educated		2.295613	1.769403	1.08	0.281	.5067727	10.39882
fa_edu							
Educated		.6278243	.517501	-0.56	0.572	.1247994	3.158376
birth_order							
second		.8832534	.4433802	-0.25	0.805	.3302134	2.362522
third		1.483187	.9568398	0.61	0.541	.4188562	5.252024
over third		.5249246	.3062623	-1.10	0.269	.1672906	1.647109
ANCcultural		.0304433	.0140111	-7.59	0.000	.012352	.0750316
ANCknowledge		.5867398	.3358575	-0.93	0.352	.1910762	1.801708
resident							
urban		1.097172	.4428886	0.23	0.818	.4973651	2.420326
problemANCdistance		.2390433	.178114	-1.92	0.055	.0554927	1.029715
_cons		35997.78	224984	1.68	0.093	.1723122	7.52e+09

no_visit		(base outcome)					

Table (C-3)

Multinomial logistic regression	Number of obs	=	481
	LR chi2(39)	=	391.88
	Prob > chi2	=	0.0000
Log likelihood = -359.51496	Pseudo R2	=	0.3528

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]

Doctor					
mo_occ					
Working	1.030543	.4453336	2.31	0.021	.1577056 1.903381
lninc	.7668818	.4213388	1.82	0.069	-.0589271 1.592691
problemANCcost	-1.407932	.6737625	-2.09	0.037	-2.728483 -.0873823
mo_age_birth	.211124	.4116041	0.51	0.608	-.5956051 1.017853

mo_edu							
Educated	2.465453	1.021571	2.41	0.016	.4632112	4.467695	
fa_edu							
Educated	.7911853	1.009198	0.78	0.433	-1.186806	2.769177	
birth_order							
second	-.4060023	.4664147	-0.87	0.384	-1.320158	.5081538	
third	-.3332544	.6032241	-0.55	0.581	-1.515552	.849043	
over third	-2.341863	.5933598	-3.95	0.000	-3.504827	-1.1789	
ANCcultural							
ANCknowledge	-2.434249	.4145692	-5.87	0.000	-3.246789	-1.621708	
	.5605134	.5449305	1.03	0.304	-.5075308	1.628558	
resident							
urban	1.275985	.380901	3.35	0.001	.5294325	2.022537	
problemANCdistance							
_cons	-.9299365	.6823893	-1.36	0.173	-2.267395	.4075219	
	-8.323	5.710265	-1.46	0.145	-19.51491	2.868915	

LHV_Nurse_Midwife							
mo_occ							
Working	.759109	.4483292	1.69	0.090	-.1196	1.637818	
lninc	.1571272	.439244	0.36	0.721	-.7037752	1.01803	
problemANCcost	-1.962087	.7073568	-2.77	0.006	-3.348481	-.5756933	
mo_age_birth	.0726445	.4163532	0.17	0.861	-.7433928	.8886818	
mo_edu							
Educated	.5100249	.7169277	0.71	0.477	-.8951276	1.915177	
fa_edu							
Educated	-.2924314	.8312058	-0.35	0.725	-1.921565	1.336702	
birth_order							
second	.0453326	.4778147	0.09	0.924	-.891167	.9818321	
third	.3843526	.6133192	0.63	0.531	-.817731	1.586436	
over third	-.9809615	.562129	-1.75	0.081	-2.082714	.1207912	
ANCcultural							
ANCknowledge	-3.231232	.4344645	-7.44	0.000	-4.082767	-2.379697	
	.4952087	.5488818	0.90	0.367	-.5805799	1.570997	
resident							
urban	-.3368272	.3928336	-0.86	0.391	-1.106767	.4331125	
problemANCdistance							
_cons	-1.012142	.7131458	-1.42	0.156	-2.409882	.3855979	
	4.59718	5.837333	0.79	0.431	-6.843782	16.03814	

Auxiliary_Midwife							
mo_occ							
Working	1.398099	.7857936	1.78	0.075	-.1420285	2.938226	

lninc		- .5020663	.8861302	-0.57	0.571	-2.23885	1.234717
problemANCcost		-2.75203	1.296316	-2.12	0.034	-5.292764	-.2112966
mo_age_birth		1.016282	.7855373	1.29	0.196	-.5233425	2.555907
mo_edu							
Educated		1.007902	1.427324	0.71	0.480	-1.789602	3.805407
fa_edu							
Educated		-1.35422	1.121985	-1.21	0.227	-3.55327	.8448305
birth_order							
second		-.1539473	1.143262	-0.13	0.893	-2.3947	2.086806
third		1.64728	1.109514	1.48	0.138	-.5273266	3.821887
over third		.4387966	1.053162	0.42	0.677	-1.625364	2.502957
ANCcultural		-4.408071	.9344161	-4.72	0.000	-6.239493	-2.576649
ANCknowledge		2.430575	.9983476	2.43	0.015	.47385	4.387301
resident							
urban		.2063081	.7183822	0.29	0.774	-1.201695	1.614311
problemANCdistance		-.125248	1.25166	-0.10	0.920	-2.578457	2.327961
_cons		1.333643	10.81012	0.12	0.902	-19.8538	22.52108

not_receiving_anc		(base outcome)					

Table (C-4)

Multinomial logistic regression	Number of obs	=	481
	LR chi2(39)	=	391.88
	Prob > chi2	=	0.0000
Log likelihood = -359.51496	Pseudo R2	=	0.3528

ancprovider	RRR	Std. Err.	z	P> z	[95% Conf. Interval]	

Doctor						
mo_occ						
Working	2.802588	1.248087	2.31	0.021	1.170821	6.708538
lninc	2.153042	.9071602	1.82	0.069	.9427755	4.916961
problemANCcost	.2446486	.164835	-2.09	0.037	.0653183	.9163268
mo_age_birth	1.235066	.508358	0.51	0.608	.5512289	2.767248
mo_edu						
Educated	11.76881	12.02268	2.41	0.016	1.589169	87.15559
fa_edu						
Educated	2.20601	2.2263	0.78	0.433	.3051944	15.9455
birth_order						
second	.6663086	.3107762	-0.87	0.384	.267093	1.66222
third	.7165879	.432263	-0.55	0.581	.2196869	2.337409
over third	.0961483	.0570505	-3.95	0.000	.030052	.307617
ANCcultural	.0876636	.0363426	-5.87	0.000	.0388989	.1975609
ANCknowledge	1.751572	.9544848	1.03	0.304	.6019802	5.096518
resident						
urban	3.582228	1.364474	3.35	0.001	1.697968	7.557475
problemANCdistance	.3945788	.2692563	-1.36	0.173	.1035817	1.503088
_cons	.0002429	.0013868	-1.46	0.145	3.35e-09	17.6179

LHV_Nurse_Midwife						
mo_occ						
Working	2.136372	.9577979	1.69	0.090	.8872753	5.143934
lninc	1.170144	.5139789	0.36	0.721	.4947141	2.767736
problemANCcost	.1405647	.0994294	-2.77	0.006	.0351377	.5623149
mo_age_birth	1.075348	.4477247	0.17	0.861	.4754979	2.431922
mo_edu						
Educated	1.665333	1.193923	0.71	0.477	.4085555	6.788142
fa_edu						
Educated	.7464464	.6204506	-0.35	0.725	.1463777	3.806469
birth_order						

second		1.046376	.4999737	0.09	0.924	.4101768	2.669342
third		1.468663	.9007594	0.63	0.531	.4414321	4.886304
over third		.3749504	.2107705	-1.75	0.081	.1245916	1.128389
ANCcultural		.0395088	.0171652	-7.44	0.000	.0168608	.0925786
ANCknowledge		1.640841	.9006276	0.90	0.367	.5595738	4.811444
resident							
urban		.7140322	.2804959	-0.86	0.391	.3306261	1.54205
problemANCdistance		.3634396	.2591854	-1.42	0.156	.0898259	1.470493
_cons		99.20421	579.088	0.79	0.431	.0010661	9231601

Auxiliary_Midwife							
mo_occ							
Working		4.047497	3.180497	1.78	0.075	.8675966	18.88231
lninc		.6052787	.5363557	-0.57	0.571	.106581	3.437406
problemANCcost		.0637982	.0827027	-2.12	0.034	.0050278	.8095339
mo_age_birth		2.762904	2.170364	1.29	0.196	.5925367	12.88298
mo_edu							
Educated		2.739848	3.910652	0.71	0.480	.1670266	44.94354
fa_edu							
Educated		.2581487	.2896389	-1.21	0.227	.0286309	2.327583
birth_order							
second		.8573172	.9801385	-0.13	0.893	.0912	8.059131
third		5.192838	5.761525	1.48	0.138	.5901806	45.69036
over third		1.55084	1.633286	0.42	0.677	.19684	12.21857
ANCcultural		.0121787	.0113799	-4.72	0.000	.0019508	.0760284
ANCknowledge		11.36542	11.34664	2.43	0.015	1.606166	80.42304
resident							
urban		1.229132	.8829864	0.29	0.774	.3006841	5.024426
problemANCdistance		.8822781	1.104312	-0.10	0.920	.075891	10.25701
_cons		3.794841	41.02268	0.12	0.902	2.39e-09	6.04e+09

not_receiving_anc		(base outcome)					

resident							
urban		1.241055	.7771325	1.60	0.110	-.2820971	2.764206
problemDelidistance		-1.650628	.9246933	-1.79	0.074	-3.462993	.1617378
_cons		-38.97306	12.37307	-3.15	0.002	-63.22383	-14.72229

Auxiliary_Midwife							
mo_occ							
Working		-.8932765	1.327365	-0.67	0.501	-3.494864	1.708311
lninc		1.826679	1.044707	1.75	0.080	-.2209103	3.874267
problemDelicost		-1.341413	1.262375	-1.06	0.288	-3.815623	1.132797
mo_age_birth		-.7004891	.6947042	-1.01	0.313	-2.062084	.6611061
mo_edu							
Educated		1.588162	.8782539	1.81	0.071	-.133184	3.309508
fa_edu							
Educated		-.5444171	1.158862	-0.47	0.639	-2.815745	1.726911
birth_order							
second		-.0995336	.7866027	-0.13	0.899	-1.641247	1.442179
third		1.058151	1.123879	0.94	0.346	-1.144611	3.260912
over third		.3831899	.8935565	0.43	0.668	-1.368149	2.134529
DCcultural		-.3097996	.5055845	-0.61	0.540	-1.300727	.6811278
DCknowledge		.9727612	.3929146	2.48	0.013	.2026628	1.74286
resident							
urban		1.413581	.800642	1.77	0.077	-.1556488	2.98281
problemDelidistance		-.4503397	1.046719	-0.43	0.667	-2.501872	1.601193
_cons		-20.74109	12.82999	-1.62	0.106	-45.8874	4.405221

Traditional_Birth_Attendance		(base outcome)					

Table (C-6)

Multinomial logistic regression	Number of obs	=	481
	LR chi2(39)	=	473.03
	Prob > chi2	=	0.0000
Log likelihood = -213.29869	Pseudo R2	=	0.5258

	dli_provider	RRR	Std. Err.	z	P> z	[95% Conf. Interval]

Doctor						
mo_occ						
Working		6.10804	6.027974	1.83	0.067	.8827913 42.26157
lninc		9.393128	9.537213	2.21	0.027	1.283961 68.71772
problemDelicost		.1181785	.1422716	-1.77	0.076	.0111635 1.25105
mo_age_birth		1.804192	1.320479	0.81	0.420	.4298261 7.573084
mo_edu						
Educated		6.803271	6.457219	2.02	0.043	1.058798 43.71419
fa_edu						

Educated		.5245357	.6632736	-0.51	0.610	.0439981	6.253404
birth_order							
second		.5557681	.456011	-0.72	0.474	.1112955	2.775297
third		2.430525	2.726316	0.79	0.429	.2697172	21.90239
over third		.1622184	.1578867	-1.87	0.062	.0240784	1.092879
DCcultural		.7980002	.4158251	-0.43	0.665	.2873794	2.215901
DCknowledge		10.48302	4.277828	5.76	0.000	4.711236	23.32588
resident							
urban		6.887642	5.640121	2.36	0.018	1.383702	34.28456
problemDelidistance		.0345663	.0346385	-3.36	0.001	.0048492	.2463953
_cons		1.92e-13	2.41e-12	-2.33	0.020	3.99e-24	.0092662

Nurse_Lady_health_visitor_Midwi							
mo_occ							
Working		2.605487	2.405764	1.04	0.300	.4265165	15.91629
lninc		18.48904	18.44076	2.92	0.003	2.617796	130.5849
problemDelicost		2.116625	2.534131	0.63	0.531	.2025547	22.11799
mo_age_birth		.8994424	.5901085	-0.16	0.872	.2486079	3.254107
mo_edu							
Educated		4.004318	3.010997	1.85	0.065	.9172297	17.48151
fa_edu							
Educated		1.453619	1.690647	0.32	0.748	.1487481	14.20527
birth_order							
second		.8748489	.658277	-0.18	0.859	.2001932	3.823109
third		4.928818	5.189469	1.51	0.130	.6259317	38.81133
over third		1.630977	1.409295	0.57	0.571	.2998758	8.87063
DCcultural		1.346908	.6324994	0.63	0.526	.5365608	3.38109
DCknowledge		5.80218	2.214993	4.61	0.000	2.745639	12.26137
resident							
urban		3.45926	2.688303	1.60	0.110	.7542004	15.86644
problemDelidistance		.1919294	.1774758	-1.79	0.074	.0313358	1.175552
_cons		1.19e-17	1.47e-16	-3.15	0.002	3.49e-28	4.04e-07

Auxiliary_Midwife							
mo_occ							
Working		.4093124	.543307	-0.67	0.501	.0303529	5.519631
lninc		6.213215	6.490992	1.75	0.080	.8017886	48.14741
problemDelicost		.2614759	.3300806	-1.06	0.288	.022024	3.104326
mo_age_birth		.4963425	.3448112	-1.01	0.313	.1271886	1.936934
mo_edu							
Educated		4.894744	4.298829	1.81	0.071	.875304	27.37166
fa_edu							
Educated		.5801799	.6723486	-0.47	0.639	.0598601	5.623258
birth_order							
second		.9052595	.7120796	-0.13	0.899	.1937384	4.229904

third		2.881038	3.237937	0.94	0.346	.3183477	26.07331
over third		1.466957	1.310809	0.43	0.668	.2545778	8.45306
DCcultural		.7335939	.3708937	-0.61	0.540	.2723337	1.976105
DCknowledge		2.645238	1.039353	2.48	0.013	1.224659	5.713659
resident							
urban		4.110648	3.291157	1.77	0.077	.8558597	19.74322
problemDelidistance		.6374116	.667191	-0.43	0.667	.0819315	4.958943
_cons		9.82e-10	1.26e-08	-1.62	0.106	1.18e-20	81.87721

Traditional_Birth_Attendance		(base outcome)					

Table (C-7)

Multinomial logistic regression	Number of obs	=	481
	LR chi2(26)	=	454.53
	Prob > chi2	=	0.0000
Log likelihood = -209.5002	Pseudo R2	=	0.5203

deli_place		Coef.	Std. Err.	z	P> z	[95% Conf. Interval]

Private_Hospital						
mo_occ						
Working		1.876682	.6614481	2.84	0.005	.5802674 3.173096
lninc		1.342079	.5315269	2.52	0.012	.3003054 2.383852
problemDelicost		-1.57385	1.051921	-1.50	0.135	-3.635578 .487878
mo_age_birth		.2037233	.5720039	0.36	0.722	-.9173838 1.32483
mo_edu						
Educated		1.487352	1.37668	1.08	0.280	-1.210892 4.185595
fa_edu						
Educated		-1.483391	1.129806	-1.31	0.189	-3.697769 .730987
birth_order						
second		-.6111422	.6148734	-0.99	0.320	-1.816272 .5939875
third		-.3697325	.8374478	-0.44	0.659	-2.0111 1.271635
over third		-1.350802	.8518996	-1.59	0.113	-3.020494 .3188906
DCcultural		-.4893382	.4033016	-1.21	0.225	-1.279795 .3011185
DCknowledge		1.118113	.3149934	3.55	0.000	.5007378 1.735489
resident						
urban		2.077416	.5710306	3.64	0.000	.9582168 3.196616
problemDelidistance		-1.869451	1.341649	-1.39	0.163	-4.499035 .7601327
_cons		-21.2696	6.937436	-3.07	0.002	-34.86672 -7.672475

Public_Hospital							
mo_occ							
Working		1.03431	.4405116	2.35	0.019	.1709232	1.897697
lninc		-.6454329	.4247287	-1.52	0.129	-1.477886	.1870201
problemDelicost		-2.471801	.4680362	-5.28	0.000	-3.389135	-1.554467
mo_age_birth		.842854	.4196035	2.01	0.045	.0204464	1.665262
mo_edu							
Educated		.9659029	.6801132	1.42	0.156	-.3670946	2.2989
fa_edu							
Educated		-.7388492	.7413702	-1.00	0.319	-2.191908	.7142095
birth_order							
second		-.4013779	.4605674	-0.87	0.383	-1.304073	.5013177
third		-.4888389	.5480585	-0.89	0.372	-1.563014	.5853361
over third		-2.204872	.5649644	-3.90	0.000	-3.312182	-1.097563
DCcultural		-.4374811	.2987231	-1.46	0.143	-1.022968	.1480054
DCknowledge		.8099391	.173179	4.68	0.000	.4705144	1.149364
resident							
urban		.5504305	.3668907	1.50	0.134	-.1686621	1.269523
problemDelidistance		-2.016007	.4975342	-4.05	0.000	-2.991156	-1.040858
_cons		6.839976	5.422838	1.26	0.207	-3.788591	17.46854

Home		(base outcome)					

Table (C-8)

Multinomial logistic regression	Number of obs	=	481
	LR chi2(26)	=	454.53
	Prob > chi2	=	0.0000
Log likelihood = -209.5002	Pseudo R2	=	0.5203

deli_place		RRR	Std. Err.	z	P> z	[95% Conf. Interval]

Private_Hospital						
mo_occ						
Working		6.531795	4.320443	2.84	0.005	1.786516 23.88131
lninc		3.826991	2.034149	2.52	0.012	1.350271 10.84661
problemDelicost		.2072458	.2180062	-1.50	0.135	.0263687 1.628856
mo_age_birth		1.225959	.7012533	0.36	0.722	.399563 3.761547
mo_edu						
Educated		4.425361	6.092306	1.08	0.280	.2979315 65.73261

fa_edu							
Educated		.226867	.2563156	-1.31	0.189	.0247787	2.07713
birth_order							
second		.5427306	.3337106	-0.99	0.320	.1626309	1.811196
third		.6909191	.5786087	-0.44	0.659	.1338414	3.56668
over third		.2590325	.2206697	-1.59	0.113	.0487771	1.375601
DCcultural		.613032	.2472368	-1.21	0.225	.2780943	1.351369
DCknowledge		3.059078	.9635891	3.55	0.000	1.649938	5.671701
resident							
urban		7.983814	4.559003	3.64	0.000	2.607043	24.44965
problemDelidistance		.1542083	.2068934	-1.39	0.163	.0111197	2.13856
_cons		5.79e-10	4.02e-09	-3.07	0.002	7.20e-16	.0004655

Public_Hospital							
mo_occ							
Working		2.813165	1.239232	2.35	0.019	1.1864	6.670514
lninc		.5244355	.2227428	-1.52	0.129	.2281194	1.205652
problemDelicost		.0844327	.0395175	-5.28	0.000	.0337378	.211302
mo_age_birth		2.322987	.9747335	2.01	0.045	1.020657	5.287057
mo_edu							
Educated		2.627159	1.786765	1.42	0.156	.6927441	9.96322
fa_edu							
Educated		.4776633	.3541253	-1.00	0.319	.1117034	2.042571
birth_order							
second		.6693971	.3083025	-0.87	0.383	.2714239	1.650895
third		.6133381	.3361452	-0.89	0.372	.2095037	1.795594
over third		.1102646	.0622956	-3.90	0.000	.0364366	.3336834
DCcultural		.6456607	.1928738	-1.46	0.143	.3595265	1.159519
DCknowledge		2.247771	.3892668	4.68	0.000	1.600817	3.156184
resident							
urban		1.733999	.6361883	1.50	0.134	.8447943	3.559155
problemDelidistance		.1331862	.0662647	-4.05	0.000	.0502293	.3531515
_cons		934.467	5067.463	1.26	0.207	.0226275	3.86e+07

Home		(base outcome)					

Table (C-9)

```

Logistic regression
Number of obs      =      481
LR chi2(13)       =      391.74
Prob > chi2       =      0.0000
Pseudo R2        =      0.6432

Log likelihood = -108.6523

```

contraceptiveuse	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]

mo_occ					
Working	.261345	.394034	0.66	0.507	-.5109474 1.033637
lninc	1.128619	.4918254	2.29	0.022	.164659 2.092579
problemConcost	-.4249929	.6101335	-0.70	0.486	-1.620833 .7708468
mo_age_birth	.5960016	.419601	1.42	0.155	-.2264013 1.418404
mo_edu					
Educated	1.566435	.6970021	2.25	0.025	.200336 2.932534
fa_edu					
Educated	.0486986	.8822845	0.06	0.956	-1.680547 1.777944
birth_order					
second	.5760418	.4196503	1.37	0.170	-.2464577 1.398541
third	2.353721	.7280967	3.23	0.001	.9266776 3.780764
over third	2.581487	.7294149	3.54	0.000	1.15186 4.011114
Contraceptivecultural	-.4938277	.1770236	-2.79	0.005	-.8407877 -.1468678
Contraceptiveknowledge	1.249506	.1547131	8.08	0.000	.9462741 1.552738
resident					
urban	.1111308	.384857	0.29	0.773	-.643175 .8654366
problemCondistance	-1.318655	.6017735	-2.19	0.028	-2.498109 -.1392006
_cons	-18.63078	6.230367	-2.99	0.003	-30.84207 -6.419483

Table (C-10)

```

Logistic regression
Number of obs      =      481
LR chi2(13)       =      391.74
Prob > chi2       =      0.0000
Pseudo R2        =      0.6432

Log likelihood = -108.6523

```

contraceptiveuse	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]

mo_occ					
Working	1.298676	.5117223	0.66	0.507	.599927 2.811273
lninc	3.091385	1.520422	2.29	0.022	1.178991 8.105795
problemConcost	.6537744	.3988897	-0.70	0.486	.197734 2.161596
mo_age_birth	1.814848	.7615119	1.42	0.155	.797398 4.130525
mo_edu					
Educated	4.789543	3.338322	2.25	0.025	1.221813 18.77515

fa_edu							
Educated	1.049904	.9263139	0.06	0.956	.186272	5.917679	
birth_order							
second	1.778983	.7465507	1.37	0.170	.7815644	4.049289	
third	10.52466	7.662969	3.23	0.001	2.526103	43.84954	
over third	13.21677	9.640511	3.54	0.000	3.164071	55.20832	
Contraceptivecultural	.6102859	.108035	-2.79	0.005	.4313706	.8634081	
Contraceptiveknowledge	3.48862	.5397353	8.08	0.000	2.576094	4.72439	
resident							
urban	1.117541	.4300935	0.29	0.773	.5256209	2.376043	
problemPNCdistance	.2674949	.1609713	-2.19	0.028	.0822403	.8700535	
_cons	8.11e-09	5.05e-08	-2.99	0.003	4.03e-14	.0016295	

Table (C-11)

Logistic regression	Number of obs	=	481
	LR chi2(13)	=	73.60
	Prob > chi2	=	0.0000
Log likelihood = -132.14097	Pseudo R2	=	0.2178

PNCare	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
mo_occ						
Working	.6023025	.3893752	1.55	0.122	-.1608589	1.365464
lninc	.8928038	.4910154	1.82	0.069	-.0695687	1.855176
problemPNCcost	.1113984	.584883	0.19	0.849	-1.034951	1.257748
mo_age_birth	.7842169	.3497	2.24	0.025	.0988174	1.469616
mo_edu						
Educated	1.219897	.487893	2.50	0.012	.2636447	2.17615
fa_edu						
Educated	.4318047	.5958574	0.72	0.469	-.7360544	1.599664
birth_order						
second	-1.097771	.4482446	-2.45	0.014	-1.976314	-.2192275
third	-1.374559	.5329066	-2.58	0.010	-2.419037	-.3300813
over third	-1.791347	.495981	-3.61	0.000	-2.763452	-.8192418
PNCcultural	-1.074839	.2807481	-3.83	0.000	-1.625095	-.5245826
PNCknowledge	1.350328	.4465136	3.02	0.002	.4751778	2.225479
resident						
urban	.8281659	.3534145	2.34	0.019	.1354861	1.520846
problemPNCdistance	.0603136	.5414124	0.11	0.911	-1.000835	1.121462
_cons	-14.12563	6.672197	-2.12	0.034	-27.2029	-1.048363

Table (C-12)

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Logistic regression                               Number of obs   =       481
                                                  LR chi2(13)    =       73.60
                                                  Prob > chi2    =       0.0000
Log likelihood = -132.14097                    Pseudo R2      =       0.2178

```

	PNcare	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	

mo_occ							
Working		1.826319	.7111234	1.55	0.122	.8514122	3.91754
lninc		2.441967	1.199043	1.82	0.069	.932796	6.392826
problemPNCcost		1.11784	.6538057	0.19	0.849	.3552437	3.517491
mo_age_birth		2.190691	.7660846	2.24	0.025	1.103865	4.347567
mo_edu							
Educated		3.38684	1.652416	2.50	0.012	1.301666	8.812314
fa_edu							
Educated		1.540034	.9176409	0.72	0.469	.4790001	4.951367
birth_order							
second		.333614	.1495407	-2.45	0.014	.1385791	.803139
third		.2529511	.1347993	-2.58	0.010	.0890073	.7188653
over third		.1667355	.0826976	-3.61	0.000	.0630737	.4407657
PNCcultural		.3413528	.0958341	-3.83	0.000	.196893	.5918023
PNCknowledge		3.858692	1.722958	3.02	0.002	1.6083	9.257914
resident							
urban		2.289116	.809007	2.34	0.019	1.145093	4.576093
problemPNCdistance		1.06217	.5750717	0.11	0.911	.3675723	3.069339
_cons		7.33e-07	4.89e-06	-2.12	0.034	1.53e-12	.350511

Table (C-13)

```

Logistic regression                               Number of obs   =       481
                                                  LR chi2(8)     =       76.89
                                                  Prob > chi2    =       0.0000
Log likelihood = -106.4043                    Pseudo R2      =       0.2654

```

	childdied	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	

ancprovider							
Doctor		-1.361864	.5565967	-2.45	0.014	-2.452774	-.2709545
LHV/Nurse/Midwife		-.8462391	.4044752	-2.09	0.036	-1.638996	-.0534823
Auxiliary Midwife		-.1717347	.924421	-0.19	0.853	-1.983567	1.640097
dli_provider							
Doctor		-2.009649	.5697362	-3.53	0.000	-3.126311	-.8929863

Nurse/ Lady health visitor/Midwife		-.2830581	.5089995	-0.56	0.578	-1.280679	.7145626
Auxiliary Midwife		-.0712839	.5979447	-0.12	0.905	-1.243234	1.100666
PNcare		-1.292788	.3995045	-3.24	0.001	-2.075802	-.5097734
contraceptiveuse		-.7728847	.3735944	-2.07	0.039	-1.505116	-.0406531
_cons		.7695429	.509341	1.51	0.131	-.2287472	1.767833

Table (C-14)

Logistic regression		Number of obs	=	481
		LR chi2(8)	=	76.89
		Prob > chi2	=	0.0000
Log likelihood = -106.4043		Pseudo R2	=	0.2654

childdied		Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]
ancprovider						
Doctor		.2561828	.1425905	-2.45	0.014	.0860546 .7626512
LHV/Nurse/Midwife		.4290254	.1735301	-2.09	0.036	.1941749 .9479227
Auxiliary Midwife		.8422026	.7785498	-0.19	0.853	.1375777 5.155671
dli_provider						
Doctor		.1340357	.076365	-3.53	0.000	.0438794 .4094313
Nurse/ Lady health visitor/Midwife		.753476	.3835189	-0.56	0.578	.2778486 2.043293
Auxiliary Midwife		.9311975	.5568046	-0.12	0.905	.2884498 3.006168
PNcare		.2745045	.1096658	-3.24	0.001	.1254557 .6006317
contraceptiveuse		.4616793	.1724808	-2.07	0.039	.2219915 .9601621
_cons		2.158779	1.099555	1.51	0.131	.7955296 5.858145