



UNIVERSITY *of*  
RWANDA

**FACTORS ASSOCIATED WITH ANTENATAL CARE VISITS DURING THE FIRST  
TRIMESTER OF PREGNANCY IN RWANDA: A SECONDARY DATA ANALYSIS  
DHS 2014-2015**

A dissertation submitted in partial fulfillment of the requirements for the degree of

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**COLLEGE OF MEDICINE AND HEALTH SCIENCES**

By

**Florien HARINDIMANA**

**Supervisor:** Prof. Cyprien MUNYANSHONGORE

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## EXECUTIVE SUMMARY

**Background:** Antenatal Care during the first trimester of pregnancy is explained as the care provided by skilled health care professionals to pregnant women and adolescent girl starting on the first day of the last period and lasts until the end of 12 week of pregnancy in order to ensure the best health conditions for both mother and baby during pregnancy. According to World Health Organization report 2015, globally, 303 000 women and adolescent girls died from pregnancy and childbirth-related complications due to the lack of antenatal care. In Rwanda, according to the Demographic and Health Survey 2014-2015, 44% of women make the recommended four or more antenatal care visits during their pregnancy and 56% of pregnant women started ANC visits during the first trimester of pregnancy. The aim of this study was to determine the prevalence and risk factors associated with pregnant women attendance to antenatal care during the first trimester of pregnancy in Rwanda.

**Methods:** This was a secondary data analysis of RDHS 2014-2015; a cross-sectional study was used to determine the prevalence and risk factors associated with pregnant women attendance to antenatal care during the first trimester of pregnancy in Rwanda.

**Results:** This study showed that the prevalence of the first ANC visit in women in Rwanda is 56%.

Statistical significant risk factors associated with antenatal care visits during the first trimester of pregnancy were found namely; marital status, age of mother, education level, wealth index (Ubudehe category), knowing the benefits of ANC, number of parity and level of satisfaction about the quality of services offered during the last ANC visit.

**Conclusion:** Considering benefits of early initiation of ANC, Maternal and Child Health programs should sensitize population and create awareness on importance of early ANC attendance.

## RESUME

**Contexte** : Par définition, la consultation prénatale pendant le premier trimestre de la grossesse s'explique comme le premier suivi de la grossesse au cours duquel la femme enceinte entre en contact avec les services de santé et bénéficie de l'ensemble des soins et de surveillance. Le premier trimestre de la grossesse s'étend du premier jour des dernières règles à la 12<sup>ème</sup> semaine d'aménorrhée. Selon le rapport de l'Organisation Mondiale de la Santé (OMS) 2015, globalement 303,000 femmes et jeune filles adolescentes sont mortes des complications liées à la grossesse et à l'accouchement, parce qu'elles n'ont pas consulté la CPN. Selon l'Enquête Démographique et de Santé au Rwanda (RDHS 2014-2015), 99% des femmes qui ont accouché au cours des cinq dernières années précédant l'enquête ont reçu la CPN assistée par un professionnel de santé au moins une fois pour leurs dernières naissances, tandis que 44% d'entre elles ont au moins eu quatre CPN recommandées ; alors que 56% des femmes enceintes ont commencé leur visite CPN pendant le premier trimestre de la grossesse.

**Méthodes** : Il s'agit d'une analyse secondaire des données collectées par l'Enquête Démographique et de Santé au Rwanda en 2014-2015. C'est une étude transversale pour étudier la prévalence et les facteurs associés aux consultations prénatales (CPN) pendant le premier trimestre de la grossesse au Rwanda.

**Résultats** : L'étude a montré que la prévalence de la CPN au cours du premier trimestre de la grossesse au Rwanda est 56%. Une analyse par régression logistique bi variée et multi variée a été réalisée et les facteurs statistiquement associés aux consultations prénatales au cours du premier trimestre de la grossesse ont été identifiés comme suivant : état civil de la femme, âge de la femme, niveau d'éducation, index de richesse (Ubudehe), connaissance des bienfaits de la CPN, nombre de parité, et le niveau de satisfaction de la qualité des services CPN.

**Conclusion** : Considérant les bienfaits des services CPN initiés tôt au cours du premier trimestre de la grossesse, les programmes de santé maternelle et infantile au Rwanda, doivent focaliser sur l'éducation et la sensibilisation de la communauté, pour inciter les femmes enceintes à initier la CPN au cours du premier trimestre de la grossesse.

## **DECLARATION**

I, Florian HARINDIMANA, hereby declare that this dissertation has been composed solely by myself without any unauthorized support, that it has been neither submitted for any other degree or profession qualification to any institution, nor previously published in its entirety or its parts. Any parts, or ideas of this dissertation, however limited, which are quoted from or based on other sources, have been acknowledged as such without exception

Signature.....Date

## **DEDICATION**

I dedicate this work to the Almighty God; my source of inspiration, Knowledge and Understanding; who strengthened me throughout this program. Special dedications to my family: wife and children who have had patience with my limited time. I also extend my gratitude to my colleagues, who have in one or another way supported my studies with technical expertise, knowledge and skills.

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**May God bless you.**

## **ACRONYMES AND ABBREVIATION**

**AIDS:** Acquired Immunodeficiency Disease Syndrome

**ANC:** Antenatal care

**ARVs:** Anti retro viral

**CHW:** Community Health Workers

**CI:** confidence interval

**DHS:** Demographic and Health Survey

**EA:** Enumeration Areas

**EDD:** Estimated Delivery Date

**EDPRSII:** Economic Development and Poverty Reduction Strategy

**HCP:** Health care providers

**HIV:** Human Immuno deficiency Virus

**HMIS:** Health Management Information System

**HSP:** Health sector strategic plan

**IPTp:** Intermittent preventive treatment of malaria in pregnancy

**ITN:** Insecticide treated bed nets

**MNCH:** Maternal Neonatal and Child Health

**NISR:** National Institute of Statistics of Rwanda

**OR:** Odds Ratio

**PMTCM:** Prevention of mother to child transmission of HIV

**PNC:** Postnatal care

**RDHS:** Rwanda Demographic and Health survey

**RPHC4:** Rwanda Population and Housing Census 4

**SP:** Sulfadoxine pyrimethamine

**STIs:** Sexually Transmitted infections

**TBA:** Traditional birth attendant

**TV:** Television

**WHO:** World Health Organization



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## **CHAPTER ONE: INTRODUCTION**

### **Definition of key terms**

**Antenatal care:** Is defined as the care provided by skilled health care professionals to pregnant women and adolescent girl in order to ensure the best health conditions for both mother and baby during pregnancy (1).

**Focused antenatal care:** Is a care which is provided to pregnant women by skilled attendant which emphasizes on the women's overall health, her preparation of childbirth, readiness for complications that may occur in pregnancy, labor, delivery and postpartum (2).

**Pregnancy** is the time during which one or more offspring develop inside a woman (3).

**First trimester of pregnancy:** is the time which begins on the first day of the last period and lasts until the end of 12 week of pregnancy. This means that by the time she knows for sure she is pregnant; she might already be five or six weeks pregnant (4).

### **1.2. BACKGROUND TO THE STUDY**

Antenatal care (ANC), is aimed at ensuring the best health conditions for both mother and baby during pregnancy also is aimed for reducing maternal and perinatal morbidity and mortality both directly, through detection and treatment of pregnancy-related complications, and indirectly. Globally scientific evidence has shown that low utilization of ANC services is influenced by some factors such as low maternal education, teenage pregnancies, multiparty, unplanned pregnancies and cultural factors. Millions of women in developing countries do not receive it. In addition, as indirect causes of maternal morbidity and mortality, such as HIV and malaria infections, contribute to approximately 25% of maternal deaths and near-misses. Around 99% of maternal deaths occur in developing countries and most can be prevented (1). Pregnancy-related deaths and diseases remain unacceptably high. In 2015, an estimated 303 000 women and adolescent girls died from pregnancy and childbirth-related complications due to the lack of antenatal care, about 2.7 million babies died during the first 28 days of life and 2.6 million babies were stillborn(2). In terms of number of visits, in developed countries, 97% of the pregnant women make at least one antenatal visit and 99% of these pregnant women deliver with skilled birth attendants(3). In developed countries the number of

pregnant women who make four or more antenatal care visits are high where nine out of ten in the America, seven out of ten in the South- East Asia(4).

In America, the proportion of women who began ANC late is highest (21.2%) where in France is lowest (4%) this contrasts with the median number of visits which is greater than in Denmark (5).

In low and middle income countries, around 289000 women died during and following pregnancy and childbirth. Between one third and one half of these pregnancy related deaths are due to preventable complications, such as eclampsia and hemorrhage, directly related to inadequate care. Also, nearly three million newborns died during their first month of life, in large part due to insufficient provision of postnatal care (PNC) (6).

In region with the highest rates of maternal mortality, more data from sub-Saharan Africa indicate that women often only initiate ANC after the first trimester and do not achieve the recommended number of ANC visits and most of women attend ANC at least once and their descriptions of ANC are often vague; although 71% of pregnant women attend formal ANC at least once, only 44% attend ANC four or more times. Across sub-Saharan Africa there is wide variation in ANC attendance, more recent Demographic and Health Survey (DHS) data illustrate that the variation in timing of ANC initiation across sub-Saharan African remains notable for example, 11% of women started ANC in the first trimester in Ethiopia (2011); 16% in Nigeria ; 47% in Congo Brazzaville and 55% in Ghana , in Niger Delta 77% of the pregnant women while in Kenya 45% in the third trimester, in Malawi there are only a few studies done on ANC where health management information system (HMIS) reports of 2008 and 2011 indicate that less than 12% of the pregnant women came for antenatal care in the first trimester and often times women only made an average of two visits per pregnancy and 48% of the pregnant women start utilizing ANC in the second trimester(7).

According to Rwanda Demographic and Health Survey 2014-2015, results show that practically all women (99%) who gave birth in the five years preceding the survey received antenatal care from a skilled provider at least once for their last birth while 44% of women make the recommended four or more antenatal care visits during their pregnancy and 56% of pregnant women started ANC visits during the first trimester of pregnancy (9).

The research question of this study is stated as follow: What are the factors associated with low ANC visits during the first trimester of pregnancy in Rwanda?

### **1.3 OBJECTIVES OF THE STUDY**

#### **MAIN OBJECTIVE**

To investigate the risk factors affecting pregnant women attendance to antenatal care during the first trimester of pregnancy in Rwanda

#### **SPECIFIC OBJECTIVES**

1. To determine the prevalence of women attendance to antenatal care service during the first trimester of pregnancy in Rwanda.
2. To identify risk factors hindering pregnant women attendance to Antenatal during the first trimester of pregnancy in Rwanda.

### **1.4. LITERATURE REVIEW**

#### **1.4.1. INTRODUCTION**

Antenatal care is observed to be a necessity for every woman and the newborn baby. This chapter reviews relevant researches done related to my research topic. This information was obtained from several publications including textbooks, reports, journals, and the internet sources.

#### **1.4.2. GENERAL OVERVIEW**

Antenatal Care (ANC) is defined as the care provided to a woman during her pregnancy and is an essential component of reproductive health care for improving maternal and newborn health. ANC can serve a stage for the delivery of highly effective health interventions that can reduce preventable maternal and newborn deaths (6). ANC services offer pregnant women an entry point to the health care system, providing appropriate screening, intervention and treatment throughout pregnant, and encouraging women to seek a skilled birth attendant for their delivery, also enable early identification of pregnancy related risks and complications and ensure access of services including health education, vaccines, diagnostic tests and treatments (4).

In the first antenatal visits the women should visit the care provider soon after pregnancy is diagnosed so that the life style advice, information about tobacco and alcohol, and information about use of drugs can be give and necessary corrections made as early as

Possible. However, some women require more than four visits especially those who develop complications. Although progress has been made globally in terms of increasing access and use of one antenatal visit, the proportion of women who are obtaining the recommended minimum of four visits is too low (11).

#### **1.4.3. ESSENTIAL INTERVENTION IN ANTENATAL CARE VISITS**

**Health promotion:** is an opportunity to educate the women about her health, pregnancy and childbirth, recognizing risk signs, the benefits of good nutrition and exclusive breastfeeding, the harms of alcohol, tobacco and drugs, and others relevant issues.

**Disease prevention** including immunization against tetanus, prophylactic treatment against malaria, and protection against iron-deficiency anemia

**Early detection and treatment for complications and diseases** such as pregnant women can be screened for syphilis, human immunodeficiency virus (HIV) and other sexually transmitted infection. Complications of pregnancy such as pre-eclampsia, anemia, hypertension, diabetes, renal disorders hemorrhage, multiple pregnancy, infection and vaginal bleeding among others.

**Birth preparedness** including the pregnant women counseling on her decision about where to deliver, choice of skilled birth attendant and a caregiver (for herself or her other children at home), also ANC visit may cover planning for transportation to the hospital, costs of care and supplies for delivery

**Complication readiness** where women are encouraged to have an emergency plan for complicated deliveries (12)

#### **1.4.4. GOAL OF ANC PROGRAM**

ANC services is intended to prepare for birth and parenthood as well as prevent, detect, alleviate, or manage the health problems that may arise during pregnancy such as complications of pregnancy, pre-existing conditions that worsen during pregnancy and effects of unhealthy lifestyles(2).



#### **1.4.5. PURPOSE OF ANTENATAL CARE**

ANC was put in place not only to support and encourage psychological change to pregnancy, childbirth, breastfeeding and parenthood but also to promote awareness of the social and psychological components of childbearing and their influences on the family.

Also, it is aimed at monitoring the development of pregnancy and all women for signs of obstetric problems to ensure the health and wellbeing of mother and fetus (13).

Furthermore, ANC is intended to identify deviations from the normal, and treat as required and also recognize the women who develop warning signs may return to normal following treatment and might not necessarily be continued to be regarded or treated as at risk. In addition, ANC build a trusting relationship between the woman and her care givers, provide the woman with information with which she can make informed decisions and involve relevant members of the women's family or friends in the experience of pregnancy in order to acquire encouraging the supportive spirit (13).

#### **1.4.6.INDICATORS FOR ANTENATAL CARE**

Possible indicator for ANC includes the Proportion of pregnancy women who have at least one and four antenatal hospital visit, Tetanus protection at birth ,The percentage of pregnant women who receive IPTp for malaria according to the national protocol of IPTp ,Antiretroviral course for PMTCM of HIV, Prevalence of syphilis in pregnant women .Process indicators should also assess the quality of communication, such as the proportion of pregnant women with a written birth and emergency plan by 37 weeks of pregnancy(1) .

#### **1.4.7. IMPORTANCE OF ANC VISITS**

Antenatal care is necessary to observe maternal health and fetal wellbeing and considered as an important intervention for reducing maternal and newborn mortality, and the achievement of Millennium Development Goals( 14).Attending antenatal care will give pregnant women and her partner an opportunity to ask questions she doesn't always remember at her regular pregnancy check-up and she will meet other expecting parents and make a new friend. ANC provide care givers with an opportunity to vaccinate pregnant women with the recommended two doses of tetanus toxoid vaccination and to explain the importance of proper nutrition during pregnancy and breastfeeding to expecting mothers. **Also** prevent pregnancy related complication such as hypertension, diabetes and manage concurrent diseases through integrated service

delivery(1). Additionally, ANC will help expecting parents to gain insight and get fact based information on pregnancy, birthing option, breastfeeding and caring for new a newborn baby so that they can may informed choices and reduces maternal and perinatal morbidity and mortality both directly, through detection and treatment of pregnancy-related

Complications, and indirectly, through the identification of women and girls at increased risk of developing complications during labor and delivery, thus ensuring referral to an appropriate level of care (1).

#### **1.4.8. PACKAGE OF ANTENATAL CARE AND THEIR RESPECTIVE IMPORTANCE**

Preventing problems for mothers and babies depends on an operational continuum of care with accessible, high quality care before and during pregnancy, childbirth, and the postnatal period. It also depends on the support available to help pregnant women reach services, particularly when complications occur. An important element in this continuum of care is effective ANC. The goal of the ANC package is to prepare for birth and parenthood as well as prevent, detect, alleviate, or manage the three types of health problems during pregnancy that affect mothers and babies: complications of pregnancy itself, pre-existing conditions that worsen during pregnancy and effects of unhealthy lifestyles

ANC also provides women and their families with appropriate information and advice for a healthy pregnancy, safe childbirth, and postnatal recovery, including care of the newborn, promotion of early, exclusive breastfeeding, and assistance with deciding on future pregnancies in order to improve pregnancy outcomes. An effective ANC package depends on competent health care providers in a functioning health system with referral services and adequate supplies and laboratory support. ANC improves the survival and health of babies directly by reducing stillbirths and neonatal deaths and indirectly by providing an entry point for health contacts with the woman at a key point in the continuum of care. Compared with other components of maternal, newborn, and child health (MNCH) packages such as childbirth and postnatal care, the additional lives saved is fewer, partly because ANC already has relatively high coverage and saves many lives already, so the gap between current coverage and full coverage is smaller. However, the benefits of ANC are greater than mortality reduction alone, and given the relatively low cost of ANC, this package is among the most cost effective of any public health package.

ANC indirectly saves the lives of mothers and babies by promoting and establishing good health before childbirth and the early postnatal period - the time periods of highest risk. ANC often presents the first contact opportunity for a woman to connect with health

Services, thus offering an entry point for integrated care, promoting healthy home Practices, influencing care seeking behaviors, and linking women with pregnancy Complications to a referral system (1).

#### 1.4.9. PACKAGE OF ANTENATAL CARE DURING THE FIRST TRIMESTER

- Confirm pregnancy and calculate Estimated Date of Delivery (EDD)
- Identification and surveillance of the pregnant woman and her expected child
- Recognition and management of pregnancy-related complications, particularly pre-eclampsia
- Recognition and treatment of underlying or concurrent illness
- Screening for conditions and diseases such as anaemia, STIs (particularly syphilis), HIV infection, mental health problems, and/or symptoms of stress or domestic violence
- Preventive measures, including tetanus toxoid immunization, de-worming, iron and folic acid, intermittent preventive treatment of malaria in pregnancy (IPTp), insecticide treated bed nets (ITN)
- Advice and support to the woman and her family for developing healthy home behaviors and a birth and emergency preparedness plan to:
  - Increase awareness of maternal and newborn health needs and self-care during pregnancy and the postnatal period, including the need for social support during and after pregnancy
  - Promote healthy behaviors in the home, including healthy lifestyles and diet, safety and injury prevention, and support and care in the home, such as advice and adherence support for preventive interventions like iron supplementation, condom use, and use of insecticide treated bed net (ITN)
  - Support care seeking behavior, including recognition of danger signs for the woman and the newborn as well as transport and funding plans in case of emergencies
  - Help the pregnant woman and her partner prepare emotionally and physically for birth and care of their baby, particularly preparing for early and exclusive breastfeeding and essential newborn care and considering the role of a supportive companion at birth
  - Promote postnatal family planning or birth spacing(1)

#### **1.4.10. FACTORS ASSOCIATED WITH UTILIZATION OF FOUR OR MORE ANTENATAL CARE VISITS (ANC)**

In this study, the factors positively associated with utilization of ANC were higher quality of services indicated by the women receiving information about signs of pregnancy related complications, and higher educational status of the woman. Testing and counseling for HIV during ANC, and receiving two or more doses of SP/Fansidar for preventing malaria during ANC was also positively associated with ANC (14).

#### **1.4.11. BARRIERS AFFECTING PREGNANT WOMEN ATTENDANCE TO ANTENATAL CARE DURING THE FIRST TRIMESTER OF PREGNANCY**

It accepted that all women should seek antenatal care early in pregnancy, but there are many factors that affect pregnant women to attend antenatal care including high rates of teenage pregnancy, low perception of pregnancy related risks, low level of female and male involvement in reproductive health and rights, harmful and negative culture on reproduction, maternal age where mothers aged between 25-29 years were less likely to utilize ANC service than women who were 35 years and older. Long distance to the health facility, family size and household income, husband's and maternal education, marital status (i.e. single vs. living with a partner), women's employment, media exposure and having a history of obstetric complications, number of miscarriage, availability of service, cost of service, parity and culture beliefs, problems with health insurance (i.e. Public, private or armed forces/police), number of children and geographic area of residence(i.e. Urban, peri-urban or rural)(15)(13) (1).

**Limited access to healthcare or long distance to the health facility:** Many studies showed that women who need to travel a far distance or are in need of transportation are less likely to attend ANC or giving birth at a health facility. This was mainly occurring in the rural areas, but some study also showed that women who were in low-income urban residents were not able to seek proper care in places other than their close neighborhoods, unless they had experienced serious complications during pregnancy. One study also stated that access to traditional birth attendants were easier to access and more local, as many health facilities were far away and roads, especially in the rainy season, are impassable (1). Age: number of studies has reported on the association between age at delivery and utilization of ANC. While younger women might prefer to visit often, mainly to be reassured that the baby is growing well and is in proper position, women with higher age

At birth usually have high parity and might rely on their experiences from previous pregnancies and not feel the need for antenatal check-ups (14).

**Parity:** high parity women have less desire to use recommended ANC visits. This could be due to the belief that they do not need services as they have experience with pregnancy and childbirth. Also, structural barriers related to cost and time raised from higher child dependency ratio prevents seeking ANC services for higher parity women (4). **Lack of male involvement,** Lack of male involvement during pregnancy was a barrier for women to attend health facilities during pregnancy. Many women are still dependent on male financing which can be an obstacle to seek help at a health facility. Study indicated that when women had support from other people (e.g. spouse) in making decisions related to the pregnancy and childbirth, she had a greater chance of delivering at a health facility. This can relate to women's reliance on male partners for funds to reach health clinics or the unwillingness of males to give the funds. There are different barriers related to lack of male involvement regarding pregnancy were identified. One was that pregnancy support was considered a female role and the male role were more as a provider. Many men had also experienced a negative attitude from health workers towards their participation. Other barrier was that ANC and delivery clinics were not perceived as couple friendly. Kwambai et al. also noted that male involvement during labor can be culturally disrespectful in some settings, which contributes to the fact that men are less involved in childbirth (1) (16).

**Husband's and Maternal education factors or lack of knowledge** Lack of education or lack of knowledge about the importance of ANC is a major barrier towards a better health seeking behavior among pregnant women. Study concluded that an increased level of education also contributed to an increase in ANC visits where educated women had a greater chance of reaching the WHO recommendation of four ANC visits than non-educated women. Post-primary education was significantly positively associated with increased number of antenatal visits as compared with no education or primary education. Post-primary education significantly increases the mean number of antenatal visits by 18.2% in Kenya. Pregnant women did not comprehend the importance of attending ANC unless they felt ill or experienced complications. Many women had little information with both the timing of ANC visits and the importance of the attending (16) (1).

**Domestic activities:** Because of domestic responsibilities, some women could not arrive at health facilities during the regular time of service delivery and there were concerns about being turned away for arriving too late at health facilities (17). **Culture and believe factors** such as low status of the female in society, limited decision making powers, social immaturity and religion limitations might contribute to poor utilization of ANC services, resulting in an increased incidence of pregnancy and obstetric complications. Bouwer et al added that religious beliefs in certain societies may pose barriers to the utilization of ANC services. Bouwer et al recommended that health workers should understand variations in family composition, social class, health beliefs and behaviors and be able to bridge the gaps between the beliefs and behaviors. In a number of South Asian societies, the mother-in-law dominates decisions on childbirth and care related to pregnancy, particularly in the early stages of marriage. In these circumstances, whether a woman is delivered at home by a family member, by a traditional birth attendant (TBA), or at a health facility, much depends on the beliefs of the mother-in-law. At the community level the TBA is also vital in influencing demand. The HIV-related stigma was also seen as a cultural barrier for women to attend ANC or giving birth at health facilities, women who experienced HIV-related stigma from the community or their male partners were less likely to give birth at a health facility or attend ANC (16).

**Financial barriers:** Lack of money or lack of health insurance is a barrier for pregnant women to attend ANC at health facility. Both poor women in cities and rural part had a greater risk of not attending ANC. Cost in terms of money was associated with ANC such as transport and food were one reason women in the rural districts did not attend all four recommended ANC visits(16). Some health facilities ask pregnant women to pay fees. This can discourage women from attending antenatal care because they don't have money (17).

#### **1.4.12. COMMON HEALTH CONSEQUENCES OF LOWER UTILISATION OF ANTENATAL CARE SERVICES**

Inadequate care during the first antenatal care visits have an effect on both mothers and babies:

**Effects on mothers:** it has been estimated that 25% of maternal deaths occur during pregnancy, with variability between countries depending on the prevalence of unsafe abortion, violence, and diseases in the area.

Between a third and a half of maternal deaths are due to causes such as hypertension (preeclampsia and eclampsia) and antepartum hemorrhage, which are directly related to inadequate care during pregnancy. Malaria, HIV/AIDS, anaemia and malnutrition are associated with increased maternal and newborn complications as well as death where the prevalence of this condition is high (1).

**Effects on babies:** In sub-Saharan Africa, an estimated 900,000 babies die as stillbirths during the last 12 weeks of pregnancy. It is estimated that babies who die before the onset of labor or antepartum stillbirths, account for two-thirds of all stillbirths in countries where the mortality rate is greater than 22 per 1,000 births nearly all African countries. Antepartum stillbirths have a number of causes, including maternal infections particularly syphilis and pregnancy complications, but systematic global estimates for causes of antepartum stillbirth are not available. Newborns are affected by problems during pregnancy including preterm birth and limited fetal growth, as well as other factors affecting the baby's development such as congenital infections and fetal alcohol syndrome (1).

#### **1.4.13. INTERVENTION MEASURES TO THE BARRIERS OR FACTORS AFFECTING THE UTILIZATION OF ANTENATAL CARE SERVICES IN RWANDA DISTRICT**

There are many efforts taken to strengthen ANC in order to achieve better maternal and newborn health are listed below.

##### **1. Establish or strengthen national policies**

A national policy and locally adapted guidelines must be in place to protect the rights of all women, regardless of their socioeconomic status or place of residence, to access ANC services.

##### **2. Reinforce the quality of ANC services**

This includes promoting evidence based guidelines and standards for focused ANC:

- Training should be reviewed to incorporate focused antenatal care protocols and new competences (on-site RPR tests for syphilis, IPTp and ITN, ARVs, counseling skills, setting and auditing standards). Staff should rotate between services. The attitude and motivation of health care providers is crucial.



- Time for service delivery. In some countries where many women attend ANC more than four times, the visits saved by reverting to four visits would allow for longer, high quality content at each visit. In addition, some tasks could be delegated to other cadres, for example, paperwork and weighing could be delegated to more administrative staff, saving the time of more senior staff for skilled, higher impact tasks. Such delegation may require some policy changes. In addition, women's groups and CHW can be valuable in giving this counseling in the community, along with regular input, supervision, and appropriate referral services from skilled care providers at the health care facility level.
- Supplies and logistics are an important aspect of effective ANC, including regular availability of syphilis and HIV testing kits and essential drugs and equipment.
- Quality improvement approaches and tools help identify and overcome local constraints to providing client orientated, effective ANC and ensure that women return after their first ANC visit.

### **3. Improve integration with other programmes**

To maximize opportunities for pregnant women, ANC services should take advantage of existing programmes, especially those with outreach activities targeting women of childbearing age. This is especially important in settings where ANC coverage is low. National strategies for malaria, HIV, syphilis, and nutrition need to be better integrated into ANC.

### **4. Harmonize activities by multiple partners through effective partnership**

A number of regional and national strategies offer opportunities to strengthen programmes in countries. Professional associations and non-governmental organizations involved with women and children should be sensitized on the importance of ANC within the continuum of care.

#### **Reduce barriers to accessing care and reach out to women without access**

Utilization of ANC services should be encouraged by reducing barriers to access, such as user fees, limited opening hours, long travel distances and waiting times, and dehumanization of care. Strategies should be developed for empowering communities to overcome obstacles to care and reach the missing 30 percent of women not receiving ANC.

These may include using community channels to identify pregnant women, targeting those more likely to be nonusers, such as adolescents and women who are poor and single, and making the services more responsive to the needs of women.

Use data effectively to monitor and improve ANC coverage and quality Data do exist, particularly from Demographic and Health Surveys, and health management information systems, but it is not always effectively used by policy makers and programmers to improve quality of care( I).

### **1.5. CONCEPTUAL FRAMEWORK**

The ability to utilize ANC services is affected by a number of factors. According to Andersen and Newman's health behavioral model, individual determinants of health care utilization can be divided into predisposing, enabling and need components. The social -demographic characteristics components refers to age of the pregnant women, her marital status, the education level, the access to and exposure to communication tools channeling specific messages such as radio and TV, and the health conditions of the pregnant women such as disability etc. The social cultural component here refers to unplanned pregnancy, the fear of HIV test during the ANC visit, the limited or unbalanced knowledge on ANC benefits, peer pressure, the men's involvement and the capacity of the woman to make decision with regard to her ANC visits. The obstetric component is meant to the number of gesture, parity and complications related to pregnancy whereas the facility factors are described as distance to the health facility, delays in receiving ANC services, and the quality of care. The economic factors are also considered to refer to the source of income, financial constraints(poverty), domestic income generating activities and the cost of ANC services.

This model will help to conceptualize the factors associated with ANC utilization and also will be used to do the focused literature search in order to find out the factors associated with antenatal care utilization for this study as shown in Figure 1.

Independent variables

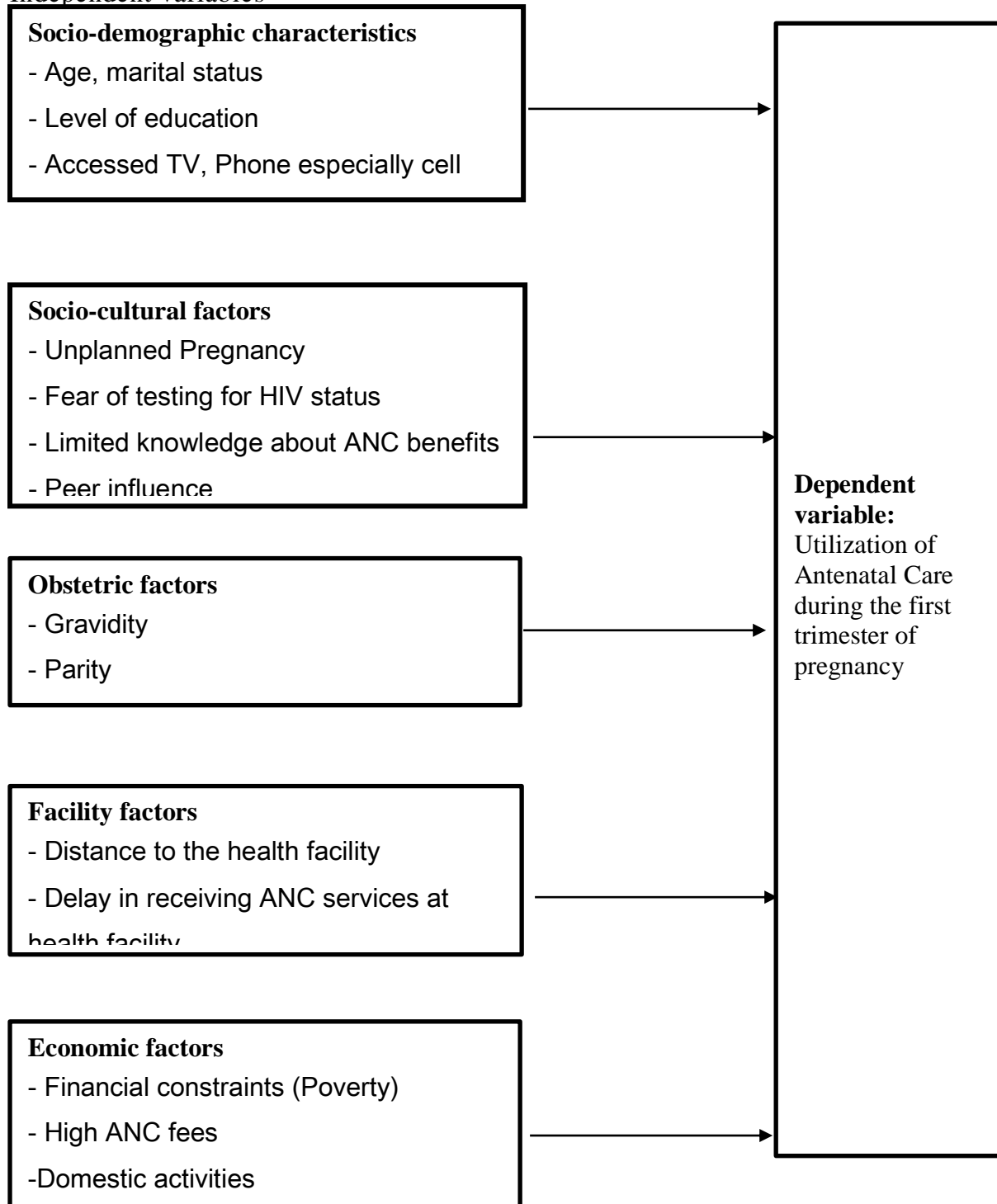


Figure 1: Conceptual model adapted from Anderson and Newman Model (14).

## **CHAPTER TWO: METHODS AND MATERIALS**

### **2.1. Study area description**

Rwanda is located in central Africa, immediately south of the equator between latitude 1°4' and 2°51'S and longitude 28°63' and 30°54' E. It has a surface area of 26,338 square kilometers and is bordered by Uganda on the north, Tanzania on the east, the Democratic Republic of the Congo on the west, and Burundi on the south. The fourth Population and Housing Census (RPHC4) in 2012 showed that the Rwandan population was 10,515,973

From which 5,451,105 (52 percent) of the country's residents were female, and 5,064,867 (48 percent) were male. According to projections, Rwanda's population would grow to 11,274,221 in 2015. The population increased from 4,831,527 in 1978 to 7,157,551 in 1991 and 8,128,553 in 2002 before reaching the 2012 total of 10,515,973 inhabitants. Rwanda's Health Sector Policy translates the Government's overall vision of development in the health sector, as set out in Vision 2020 and the Economic Development and Poverty Reduction Strategy (EDPRS 2, 2013-2018). Since the adoption of the previous Health Sector Policy in 2005, much has changed in terms of national socio-economic development policy and more specifically in the health sector policy. The new Health Sector Policy thus takes into account new orientations in the national development agenda and changes in the socio-economic and epidemiologic situation of the Rwandan population and in the institutional environment of the country and specifically in the health sector (22). The population of this study was taken from the Rwanda Demographic and Health Survey (RDHS) 2014-15.

### **2.2. Study design**

This study was a cross-sectional design from the Rwanda Demographic and Health Surveys 2014-2015.

### **2.3. Specific objectives achievement**

The specific objectives of this study were achieved as follows:

To determine the prevalence of women attendance to antenatal care service during the first trimester of pregnancy in Rwanda: The prevalence rate of ANC visits in Rwanda was calculated using data reported in the Rwanda Demographic and Health Survey 2014-2015. These secondary data were analyzed using Stata 10. 2. Identify category

of risk factors hindering pregnant women attendance to Antenatal Care during the first trimester of pregnancy in Rwanda:

This was done by performing bivariate and multivariate logistic regression analyses using the 2014-2015 Rwanda Demographic and Health Survey.

## **Study variables**

### **Dependent variable**

The main variable of interest was attendance of antenatal care visit during the trimester one of pregnancy.

### **Independent variables**

The explanatory (independent) variables in the study were women's education, age, marital status, calculation, wealth index, residence (urban or rural), exposure to antenatal care messages on radio, television, or newspapers, knowledge on antenatal care, parity and gravidity, women's empowerment, husband's education, husband involvement. In the final model, only variables that passed the multicollinearity test were included.

### **Data analysis plan**

Study started with descriptive analysis of both dependent and independent variables. At the multivariate level, the association between selected variables of interest and the dependent variable was estimated using a multiple logistic regression model. Given that the core analytical strategy in this study focuses on two age groups of women, young and older, age groups ran the models separately within each survey year. Dummy variables were created and used to select socioeconomic and demographic variables in the logistic regression model. Results were accepted at the 95% confidence level. The full and reduced regression model was also tested. The null hypothesis under the goodness fit is that the model is a good fit, implying that probabilities greater than 0.05 using the 95% level of confidence was taken to be a good fit.

## 2.4. Study population

The subjects were all women and men fulfilling the criteria considered by the RDHS 2014-15.

### 2.4.1. Sample size calculation

Once the total sample size was determined and allocated to different survey domains/strata, it was decided how many individuals (sample taken) was interviewed per sample cluster and then convert the domain/stratum sample size to number of clusters.

Since a simple random sampling was not feasible for a DHS, the sample size for a complex survey with clustering such as the DHS could be calculated by inflating the above calculated sample size by using a design effect (Deft). Deft is a measure of efficiency of cluster sampling compared to a direct simple random sampling of individuals, defined as the ratio between the standard error using the given sample design and the standard error that would result if a simple random sample had been used. A Deft value of 1.0 indicated that the sample design is as efficient as a simple random sample, while a value greater than 1.0 indicates the increase in the sampling error due to the use of a more complex and less statistically efficient design. The net sample size needed for a cluster sampling with same relative standard error was given by:

$$n = \text{Deft}^2 \times \frac{(1/P - 1)}{\alpha^2}$$

The formula for calculating the final sample size in terms of the number of households while taking non response into account (the formula used in the templates for sample size calculation as shown in Table 1.1) is given by:

$$n = \text{Deft}^2 \times \frac{(1/P - 1)}{\alpha^2} / (R_i \times R_s \times d)$$

Where:

n: is the sample size in households;

Deft is the design effect (a default value of 1.5 is used for Deft if not specified);

P: is the estimated proportion;

a: is the desired relative standard error;

Ri: is the individual response rate;

Rh: is the household gross response rate; and  
d :is the number of eligible individuals per household.

The sample size for the 2015 RDHS was 7324 women who had had a live birth in the five years preceding the survey.

Frequency statistics were used to calculate the number of women under consideration that was found in the DHS datasets where the Individual Recode (IR) file contains Individual Women's Data (DHS, 2015). The Individual Women's dataset has one record for every eligible woman as defined by the household schedule. It contains all data collected in the women's questionnaire plus some variables from the household. In this file, I can find records of up to 20 births in the birth history for whom pregnancy and postnatal care as well as immunization and health data were collected. The unit of analysis (case) in this file is the woman.

#### **2.4.2. Sampling techniques**

The sample size for the 2014-15 RDHS 6061 women who met the defined criteria. The 2014-15 RDHS followed a two-stage sample design and was intended to allow estimates of key indicators at the national level as well as for urban and rural areas, five provinces, and each of Rwanda's 30 districts (for some limited indicators). The first stage involved selecting sample points (clusters). A total of 492 clusters were selected, 113 in urban areas and 379 in rural areas. The target population for this study is all women and men living in residential households as defined by the DHS Program. Every individual of the target population should have a chance to be selected to prevent bias. A sampling frame was designed by dressing a list of enumeration areas (EA) with measures of size (population and/or households) covering the entire population from which the study sample was drawn. The sampling frame in DHS surveys provides a complete list of clusters. After designing a sampling frame, the next step is to design sample stratification. This was a process of grouping the enumeration areas into homogeneous subgroups.

#### **2.4.3. Data collection procedures**

Data collection procedures for this study follow the ones for the DHS surveys. Each DHS Program survey collects data in four phases:

#### **2.4.4. Survey Preparation and Questionnaire Design:**

This is the first step involving sample design and survey questionnaires development to meet specific host-country needs.

**Training and Fieldwork:** This is the second stage involving training field staff and conducting fieldwork. It is in this stage to identify eligible households and interview individual respondents. Several teams composed of interviewers, field editors and team leaders carried out the fieldwork.

**Data Processing:** This is the third stage involving data processing (editing, coding, and entering and verifying the data) as well as checking them for consistency. Data entry and editing take place at the same time with data collection. Preliminary results are rolled out one month after the end of data collection and the data processing allows for quality control of the data collected.

**Final Report, Data Preparation and Dissemination:** This is the final stage involving the analysis of the data, preparation of the final report, and dissemination of the survey results in country where the survey is conducted, and usually begins following the completion of fieldwork.

#### **2.4. Materials**

Rwanda Demographic and Health Surveys collected data using different tools and techniques, namely questionnaires (Household questionnaires, Woman's questionnaires, and men's questionnaires. In the RDHS-2015, three questionnaires were used namely the Household Questionnaire, the Women's Questionnaire, and the Men's Questionnaire. Their content was based on model questionnaires developed by the MEASURE DHS project. These questionnaires were translated from English into Kinyarwanda (NISR, 2015).

A detailed interviewers' manual was also developed, as well as other instructional manuals including one focusing on biomarkers such as HIV, anemia, and anthropometric measurements. Instruction manuals were available and used during the pretest from August 25 to September 22, 2014; the training for the main survey from October 5 to November 2, 2014; and data collection from November 9 to April 8, 2015.



## **2.5. Policy implication**

The results from this study will be communicated to the Ministry of Health, Development partners and stakeholders to review maternal health programs and redefine specific interventions that focus on the risk factors associated with Antenatal Care visits during the first trimester of pregnancy.

Through the Ministry of Health, communication plan will be developed to ensure the findings are successfully communicated with all stakeholders, and implementation of the study recommendations is available.

## **2.6. Ethical considerations**

The original DHS data were collected with approval from the International's Institutional Review Board and national ethical guidelines. Information about objective of the study, procedures, potential risks and benefits was given to mothers before their children were enrolled to the study. Verbal informed consent was obtained before the household questionnaires were administered, and before blood was collected for anemia testing. An informed consent was read in the local language and a copy given to the household upon request. Those selected to give blood samples were informed of the general purpose, possible risks and benefits of the survey in their language. Participation in the survey was voluntary and participants' full right to refuse participation was explained. The analyses in this paper are based on secondary data obtained with permission from MEASURE DHS Organization and was downloaded from the Demographic and Health Surveys (DHS) online archive.

## CHAPTER THREE: RESULTS

### 3.1. Socio-demographic characteristics of study participants

Results showed that 54.01 % of study participants were married, the majority of study participants (72.97%) were aged between 20 to 34. About religion, 48.78% were Protestants followed by Roman Catholic 35.89%.

The percentage distribution of study participants according to the education level indicates that majority (72.06%) had received primary level education and (13.94%) had no education.

The findings also indicate that majority of the participants 61.51% were farmers as their occupation followed by another proportion 17.25% of civil servants.

Concerning wealth index 23.91% study participants were in Ubudehe category 1 of wealth index while only 17.15% participants were in Ubudehe category 4.

Furthermore, 65.02% of participants had health insurance. Concerning residence, 78.52% of women were from rural areas. Participant's knowledge about the benefits of Antenatal Care a high proportion 78.4% knows the benefits of ANC while a remarkable proportion 85.3% of participants had one and above parity. Regarding the distance between home and near health facility 76.83% of study participants are in between 1 hour and above. A tremendous proportion 79.14% of study participants were told about complications during pregnancy. Lastly, the quality care 64.1% of study participants were satisfied with the quality of services offered during last ANC visits as shown in Table 3.1.

Table 1 :Socio-demographic characteristics of study participants

Characteristics	Frequency (N=7324)	Percentage
<b>Current marital status</b>		
Single	618	8.44
Married	3956	54.01
Cohabitation/Living with partner	2112	28.84
Widowed	144	1.97
Divorced/ separated	494	6.76
<b>Age of participants (in years)</b>		
<20	139	1.90
20-34	5345	72.97
≥35	1840	25.13
<b>Religion</b>		

Roman catholic	2627	35.89
Protestant	3570	48.78
Adventist	875	11.96
Muslim	159	2.17
Other religions	49	0.67
No religion	39	0.53
<b>Education level</b>		
No education	504	13.94
Primary	2605	72.06
Secondary and above	506	14
<b>Occupation</b>		
No occupation	486	6.64
Civil servant	1263	17.25
Farmer	4504	61.51
Business	700	9.56
Others	369	5.07
<b>Wealth index (Ubudehe category)</b>		
Ubudehe Category 1(Poorest)	1751	23.91
Ubudehe Category 2(Poorer)	1545	21.10
Ubudehe Category 3(Middle)	1399	19.10
Ubudehe Category 4(Richer)	1256	17.15
Ubudehe Category 5(Richest)	1373	18.75
<b>Health insurance</b>		
Yes	4736	65.02
No	2546	34.95
Don't know	2	0.03
<b>Residence</b>		
Rural	5751	78.52
Urban	1573	21.48
<b>Knows the benefits of ANC</b>		
Yes	4752	78.4
No	1309	21.6
<b>Parity</b>		0.0

No parity	891	14.7
≥1 parity	5170	85.3

**Distance between home and health facility**

(in minutes)

<30	-	-
30-1 H	1697	23.17
> 1 H	5627	76.83

**Complications during pregnancy**

Yes	4459	79.14
No	1171	20.79
Don't know	4	0.07

**Level of satisfaction about the quality of services offered during the last ANC visit**

Very satisfied
Satisfied
Dissatisfied

3.2. Level of first ANC standard visit

This study revealed the prevalence of 56% of the first ANC visit in women of Rwanda.

**Table 2:Level of first ANC standard visit**

First ANC standard visit prevalence	Overall status	
	Frequency	Percentage
Attended first ANC standard	3207	56
Not attended first ANC standard	2439	44

### 3.3. Bivariate analysis: First ANC visit during the first trimester of pregnancy and socio-demographic characteristics of respondents

A comparison of first standards ANC visits between marital status showed that married and cohabitating 49.8% attended ANC service than others. Nevertheless, a significant proportion (p-value=0.041) was observed between marital status of women and first standard antenatal care visit.

On education level, the first standards ANC visit was high among women with primary education (21.6%) compared to first standards ANC visit among women with no formal education (14.1) There was a significant proportion between education level of women and first standards ANC visit (p=0.035).

A tremendous fraction of women's residence (p=0.018) and first standards ANC visit was detected. More women who attended first standards ANC visit were from urban areas, 31.4%. Regarding number of parity, a remarkable proportion 85.3% of participants had one and above parity (p=0.004). Concerning the distance between home and health facility 55% of study participants are in between 30 minutes and 1 hour (p=0.015) as detailed in Table 3.3.

**Table 3: Bivariate analysis: First ANC visit during the first trimester of pregnancy and socio-demographic characteristics of respondents**

Characteristics	Attended the 1st standard ANC	Did not attend the 1st standard ANC	p-value
	(%)	(%)	
<b>Marital status</b>			0.041
Single	11.4	88.6	
Married	26.1	73.9	
Cohabited	23.7	76.3	
Widowed	14.3	85.7	
Divorced/ Separated	3.8	96.2	
<b>Age (in years)</b>			0.466
<20	10.3	89.7	
20-34	27.3	72.7	
≥35	13.9	86.1	
<b>Religion</b>			0.678
Roman catholic	27.7	72.3	
Protestant	29.1	70.9	

Adventist	32.4	67.6	
Pentecost	14.8	85.2	
Muslim	27.3	72.7	
Other religions	13.1	86.9	
No religion	1.6	98.4	
<b>Education level</b>			0.035
No education	14.1	85.9	
Primary	21.6	78.4	
Secondary and above	19.4	80.6	
<b>Occupation</b>			0.27
No occupation	14.1	85.9	
Civil servant	27.5	72.5	
Farmer	19.8	80.2	
Business	7.3	92.7	
Others	1.1	98.9	
<b>Wealth index (Ubudehe category)</b>			0.167
Ubudehe Category 1	13.7	86.3	
Ubudehe Category 2	24.4	75.6	
Ubudehe Category 3	17.2	82.8	
Do not know	1.5	98.5	
<b>Health insurance</b>			0.203
Yes	20.4	79.6	
No	14.6	85.4	
<b>Residence</b>			0.018
Rural	23.8	76.2	
Urban	31.4	68.6	
<b>Knows the benefits of ANC</b>			0.523
Yes	78.4	59.1	
No	21.6	40.9	
<b>Parity</b>			0.004
No parity	14.7	28.4	
≥1 parity	85.3	71.6	

**Distance between home and health facility(in minutes)**

<30	30.6	12.1	
30-1 H	55	29.9	0.015
> 1 H	14.4	58	

**Complications during pregnancy**

Yes	7.8	36	0.189
No	92.2	64	

**Level of satisfaction about the quality of services offered during the last ANC visit**

Very satisfied	34.4	25.2	0.306
Satisfied	64.1	58	
Dissatisfied	1.5	16.8	

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**3. 4. Multivariate analysis: Attending the ANC during the first trimester of pregnancy and socio-demographic characteristics of respondents**

The multivariate analysis was performed to find out the associated factors with Antenatal Care visits during the first trimester of pregnancy in Rwanda. Logistic regression was used, and full and reduced models were analyzed to reveal the persistent factors associated with Antenatal Care visits during the first trimester of pregnancy in Rwanda. Variables considered in the bivariate analysis were considered in the full and reduced models.

Results from multivariate analysis Table 3.4 showed that single and widowed women were 2.37 times and 1.47 times more likely to attend the first ANC visit than divorced/separated women OR=2.37, 95% CI= [1.41-3.16] [p-value=0.041], and, OR=1.47, 95% CI= [1.44-4.33]) [p-value=0.001].

Women aged 35 years and above were 2.2 times more likely to attend the first ANC visit than women aged below 20 years OR=2.2, 95% CI= [2.07-4.11]) [p-value=0.016].

Women with secondary education and above were 2.14 times more likely to attend the first ANC visit than women with no education OR=2.14, 95% CI= [2.41-5.23] [p-value=0.027].

Women from Ubudehe Category 3 family were 1.46 times more likely to attend the first ANC visit than those from Ubudehe Category 1 family OR=1.46, 95% CI= [1.62-2.32] [p-value=0.01].

About knowledge on ANC, women who did not know the benefits of ANC were 4.11 times more likely to attend the first ANC visit than those who know the benefits of ANC, OR=4.11, 95% CI= [1.57-7.09] [p-value=0.001].

Regarding the number of parity, women who had one parity and above were 2 times more likely to attend the first ANC visit than women with no parity OR=2, 95% CI= [1.06-3.38] [p-value=0.028].

This study results revealed that women who were satisfied with the quality of services offered during last ANC visit were 1.24 times more likely to attend the first ANC visit than women very satisfied with the quality of services offered during last ANC visit (p-value=0.031, OR=1.24, 95% CI= [2.12-4.58]).

**Table 4: Multivariate analysis: Attending the ANC during the first trimester of pregnancy and socio-demographic characteristics of respondents**

Characteristics	ANC attendance during the first trimester of pregnancy			
	Full model		Reduced model	p-value
	OR (CI at 95%)	p-value	OR (CI at 95%)	
<b>Marital status</b>				
Divorced/ Separated	1		1	
Single	3.48(1.66-4.53)	0.071	2.37(1.41-3.16)	0.041
Married	1.63(0.40-1.70)	0.645	0.91(0.30-1.54)	0.319
Cohabited	1.29(0.31-1.65)	0.116	0.65(0.26-1.35)	0.084
Widowed	2.8(1.27-5.30)	0.042	1.47(1.44-4.33)	0.001
<b>Age (in years)</b>				
<20	1		1	
20-34	1.23(0.22-5.69)	0.813	0.11(0.70-1.49)	0.921
≥35	3.74(1.89-6.12)	0.0419	2.2(2.07-4.11)	0.016
<b>Religion</b>				
No religion	1		1	
Protestant	1.94(0.33–7.21)	0.141	0.35(0.06-4.41)	0.459
Adventist	1.23(0.22–5.69)	0.926	0.11(0.70-1.44)	0.292
Pentecost	1.22(1.75–3.41)	0.714	0.04(0.94-2.01 )	0.517
Muslim	1.96(1.75–3.41)	0.197	0.14(0.61-1.90)	0.098



Other religions	2.06(1.91–3.34)	0.331	0.68(1.62-3.11 )	0.213
Roman catholic	2.53(1.72-2.77)	0.397	0.41(0.44-1.49)	0.111
<b>Education level</b>				
No education	1		1	
Secondary and above	3.4(2.73-4.06)	0.169	2.14(2.41-5.23)	0.027
Primary	1.19(0.16-2.21)	0.173	1.09(0.72-1.66)	0.694
<b>Occupation</b>				
No occupation	1		1	
Civil servant	1.23(0.22-5.68)	0.926	1.11(0.70-1.42)	0.38
Farmer	1.22(1.75-3.41)	0.541	1.04(0.93-2.07)	0.137
Business	1.93(0.34-6.22)	0.149	0.35(0.06-4.42)	0.095
<b>Wealth index (Ubudehe category)</b>				
Ubudehe Category 1	1		1	
Ubudehe Category 2	3.09(0.41-2.17)	0.027	1.02(1.62-2.32)	1.704
Ubudehe Category 3	1.64(0.26-3.01)	1.001	1.46(1.37-2.51)	0.001.
Do not know	0.21(0.30-1.19)	0.073	0.08(0.96-2.05)	1.411
<b>Health insurance</b>				
Yes	1		1	
No	1.26 (0.56-2.13)	0.079	0.81(1.04-1.51)	0.072
<b>Residence</b>				
Rural	1		1	
Urban	2.06(0.41-1.80)	0.116	0.8(0.52-1.21)	0.094
<b>Knows the benefits of ANC</b>				
Yes	1		1	
No	9.27(3.49-5.30)	0.023	4.11(1.57-7.09)	0.001
<b>Parity</b>				
No parity	1		1	
≥1 parity	4.78(0.97-3.67)	0.083	2(1.06-3.38)	0.028
<b>Distance between home and health facility (in minutes)</b>				

<30	1		1	
30-1 H	0.98(0.66-2.53)	0.947	0.41(0.93-3.84)	0.072
>1 H	0.64(1.28-3.16)	1.813	0.65(1.61-4.61)	1.019
<b>Complications during pregnancy</b>				
Yes	1		1	
No	1.82(1.21-2.95)	0.179	0.42(1.2-8.17)	0.08
<b>Level of satisfaction about the quality of services offered during the last ANC visit</b>				
Very satisfied	1		1	
Satisfied	1.93(1.20-6.141)	0.047	1.24(2.12-4.58)	0.031
Dissatisfied	0.75(0.41-1.88)	1.503	0.13(1.62-2.91)	1.007

**In summary, factors associated with the attendance of the first standard Antenatal Care visit during first trimester of pregnancy:**

Table 3.5 briefly indicates factors associated with antenatal care visits during the first trimester of pregnancy in Rwanda including; marital status, age of mother, education level, wealth index (Ubudehe category), knowing the benefits of ANC, number of parity; and the level of satisfaction about the quality of services offered during the last ANC visit.

**Table 5: Factors associated with the attendance of the first standard Antenatal Care visit during first trimester of pregnancy**

<b>Characteristics</b>	<b>ANC attendance during the first trimester of pregnancy</b>
<b>Marital status</b>	
Divorced/ Separated	Ref
Single	X
Married	
Cohabited	
Widowed	X
<b>Age (in years)</b>	
<20	Ref
20-34	
≥35	X
<b>Education level</b>	
No education	Ref
Secondary and above	X
Primary	
<b>Wealth index (Ubudehe category)</b>	
Ubudehe Category 1	Ref
Ubudehe Category 2	
Ubudehe Category 3	X
Do not know	
<b>Knows the benefits of ANC</b>	
Yes	Ref
No	X
<b>Parity</b>	
No parity	Ref
≥1 parity	X
<b>Level of satisfaction about the quality of services offered during the last ANC visit</b>	
Very satisfied	Ref
Satisfied	X

Dissatisfied

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**X**=Significance predictor,  $p < 0.05$

**Ref**=Reference value for the logistic regression model.

## 4. DISCUSSION

### 4.1. Prevalence of 1st standard ANC visits among women

This study revealed that the prevalence of 56% of the first ANC visit in women of Rwanda is similar to the one reported in Rwanda Demographic and Health Survey of 2014-15 started ANC visits during the first trimester of pregnancy. Comparably to the East African region and the whole developing countries, these results are higher than that found 11% of women started ANC in the first trimester in Ethiopia (2011); Tanzania in 2005 (14.5%), Kenya in 2015 (45%) and Uganda in 2006 (17.4%), 16% in Nigeria ; 47% in Congo Brazzaville and 55% in Ghana. Many studies done across Sub-Saharan Africa showed there is a wide variation in ANC attendance, more recent Demographic and Health Survey (DHS) data illustrate that the variation in timing of ANC initiation across Sub-Saharan African remains notable (7).

Our study findings are very comparably to results from Ghana where the prevalence of attending the 1<sup>st</sup> ANC visit in the 1<sup>st</sup> quarter was the highest in Sub Saharan Africa (55%). These findings are closely related to the worldwide with the lowest levels use in South Asia, where only 26% of pregnant women have at least attended first antenatal care visit. Surprisingly, in the Middle East and North Africa, use of antenatal care is somewhat higher at 65% of pregnant women (17).

### 4.2. Factors associated with the attendance of the first standard Antenatal Care visit during first trimester of pregnancy

In this study, socio-demographic factors were found to be related to Antenatal care attendance during the first trimester. Results from multivariate analysis table showed that single women, OR=2.37, 95% CI= [1.41-3.16] [p-value=0.041] were 2.37 times more likely to attend first ANC visit. It contrasts to the study done in Ghana showing that single women were found to have significant association with delayed initiation of first ANC visit. Those single mothers were delay 2 times more likely than those who were married (20). It is due to the number of reproductive health services targeting youth and adolescents that have been initiated within the country in collaboration with different development partners.

It was found that women in the age group (35 years and above) were 2.2 times more likely to use the Antenatal Care service during first trimester of pregnancy than women aged below 20 years. There was a trend that old women aged 35 years and above tend to

make more ANC visits compared to young women aged 34 and below. This is similar to the findings done in Malawi which showed that the mother's age at pregnancy was strongly related to use of ANC, except that low parity women are more likely than high parity women to use ANC(7).

Education was found to have an impact on the use of antenatal care services. In fact, women with secondary education status were found positively associated with attending the first ANC than women with no education. It is similar to another study done in Kenya aimed at investigating factors affecting Antenatal Care attendance findings which showed that women with higher education are much more likely to receive ANC services and that the proportion of women who do not get the ANC service declines steadily as education increases. These study findings showed also that one-quarter of women with no education get no ANC services at all (20).

Furthermore, it is also similar to another study done in South Sudan findings which showed that less educated women tend to miss ANC services more compared to educated ones. Less educated women tend to make very small role in decision-making and on perception about the need for ANC, and income on ANC visitation (17).

However it contrasts, the study done in Ghana findings found that there was no statistical difference in utilization of ANC services among women with university level education and those in secondary, primary or none. However, there was a trend that those with secondary education level and above tend to seek ANC services more frequently compared to lower qualified counter parts. This could be due to the effect of awareness and knowledge on importance of ANC services among the respondents, which may not be directly related to education level (20). There could also be other confounding factors such as the new government policy on free maternity services and the media campaigns. The test for association revealed that the wealth index (Ubudehe category) was significantly associated with ANC attendance during the first trimester of pregnancy.

The participants whose wealth index is 3 Ubudehe category have 1.46 times increased chance of attending ANC during the first trimester compared to those who are in the first category of Ubudehe. This is consistent with the study done in Uganda which found that family income and low economic status affects the utilization of antenatal services. The study found that those with higher annual income (mostly in formal employment) tend to

attend ANC services more frequently during the first trimester than those with lower annual income or non-formal or self-employment (15).

Concerning the level of satisfaction about the quality of services offered during the last ANC visit, this study results revealed that women who were satisfied with the quality of services offered during last ANC visit were 1.24 times more likely to attend the first ANC visit than women very satisfied with the quality of services offered during last ANC visit. This scenario could be explained by the fact that the perceptions of the quality of services in such facilities out weights even the distance. There were closer, often less than 30 minutes but women could not seek ANC services in such health facilities because of the perceived poor quality services.

### **STUDY LIMITATION**

Being a secondary data analysis, it was noted that additional variables were needed to enrich the analysis of the factors associated with the ANC visit during the first trimester of pregnancy.

## **CONCLUSION AND RECOMMENDATIONS**

### **CONCLUSION**

This study aimed at determining the prevalence of women attendance to antenatal care service during the first trimester of pregnancy and associated factors with the attendance of the first standard Antenatal Care visit during the first trimester of pregnancy in Rwanda. The prevalence of women attendance to antenatal care service during the first trimester of pregnancy is 56%, which is similar to the one reported in Rwanda Demographic and Health Survey of 2014-15.

Regarding associated factors with the attendance of the first standard Antenatal Care visit during first trimester of pregnancy in Rwanda, this study came up with the following factors: Marital status, age of the mother, education level, wealth index (Ubudehe category), knowing the benefits of Antenatal Care. Furthermore, number of parity and level of satisfaction about the quality of services offered during the last ANC visit were also highlighted among these factors.

### **RECOMMENDATIONS**

Based on the above findings of the study the following recommendations were suggested: According to the findings, the main associated factors with the attendance of the first standard Antenatal Care visit during first trimester of pregnancy in Rwanda were marital status, age of the mother, education level, wealth index (Ubudehe category), knowing the benefits of Antenatal Care, number of parity and level of satisfaction about the quality of services offered during the last ANC visit

Educational level and knowing the benefits being associated factors with Antenatal Care attendance during the first trimester of pregnancy, mothers should be provided with a sequence of comprehensive information on advantage of early attendance of Antenatal care.

Known that socioeconomic status has an impact on Antenatal Care attendance during the first trimester of pregnancy, raising household income is highly recommended so that mothers of first and second category of Ubudehe can shift from their respective categories to category three of four and this could lead to improve early attendance of ANC visits.



Level of satisfaction about the quality of services offered during the last ANC visit has been noted among other contributing factors; different strategies should put in place for better provision of ANC services.

There is a need to conduct another research with more different variables in order to find further factors that should be associated with the 1<sup>st</sup> standard ANC visits.

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