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# A cross-sectional investigation of factors associated with Antenatal Care Utilisation in Namibia

**Heita, Saima Ndapanda**

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# A Cross-Sectional Investigation of Factors Associated with Antenatal Care Utilisation in Namibia

**Saima Ndapanda Heita**

**Student Number: 1789306**

This research report is submitted in partial fulfilment of the Master of Arts in Demography and Population Studies at the University of the Witwatersrand

**Supervisor: Dr Sasha Frade**

**Date: 06 July 2020**

# DECLARATION

I, Saima Ndapanda Heita, hereby declare that this paper is my own original work and any other secondary work used in this research were all acknowledged and referenced using the American Psychological Association (APA) referencing style.

This paper is therefore to be submitted for a Master's Degree in the academic field of Demography and Population Studies as a requirement by the Faculty of Humanities, University of Witwatersrand. I thus proclaim that this paper has not been submitted in part or in full for any degree or examination at any other university before.

Saima Ndapanda Heita

_____

_____day, of _____2020

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# LIST OF ACRONYMS

AIDS - Acquired Immune Deficiency Syndrome

ANC – Antenatal Care

BLG – Binary Logistic Regression Model

CHW – Community Health Workers

CI – Confidence Interval

DHS – Demographic and Health Survey

EA – Enumeration Area

HDP – Hypertensive Disorder of Pregnancy

HIV - Human Immunodeficiency Virus

HZ – Health Zone

JTG – John Taolo Gaetsewe

LGA – Local Government Areas

LMIC – Low-and Middle-Income Countries

MDGs – Millennium Development Goals

MMR – Maternal Mortality Ratio

MoHSS – Ministry of Health and Social Services

NDHS – Namibia Demographic and Health Survey

NIDS – Namibia Inter-Censal Demographic Survey

NIP – National Institute of Pathology

NSA – Namibia Statistics Agency

OR – Odds Ratios

P-value – Probability Value

SDG – Sustainable Development Goals

SMM – Severe Maternal Morbidity

SSA – Sub-Saharan Africa

UHC – Universal Health Care

UK – United Kingdom

UN – United Nations

UNICEF – United Nations International Children's Emergency Fund

UPTH – University of Port Harcourt Teaching Hospital

USA- United States of America

USAID – United States Agency for International Development

VIF – Variance Inflation Factor

WHO – World Health Organisation

# ABSTRACT

**Background:** Many developing countries including Namibia are far below the Sustainable Development Goals (SDG) targets. Developing countries have lower uptake of Antenatal Care (ANC) services, and therefore high rates of maternal, under-five, and neonatal mortalities. In Namibia, women of reproductive age and infants are at high risk of dying, owing to various maternal health complications. This may however be linked to lower and infrequent uptake of ANC services at healthcare facilities. The Namibian government has not adequately addressed the various factors associated with equity and accessibility to primary healthcare. For instance, women living in rural areas lack access due to travelling distances to ANC healthcare facilities, poor road infrastructure as well as poor transportation systems – in comparison to their urban counterparts. This study thus explored the different factors that may influence ANC utilisation amongst pregnant women in Namibia.

**Methodology:** This study utilised secondary data from the 2013 Namibia Demographic and Health Survey (NDHS). A sample of 3,952 (3,819 weighted) women aged 15-49 years who had given birth in the five years prior to the survey and responded to the question on ANC utilisation were included in the study. In this study, the outcome variable was the number of ANC visits taken by women and it was a binary variable with categories "Less than 4 visits and $4^{+}$ visits. The predictor variables were the predisposing and enabling factors as guided by the Anderson Healthcare Utilisation Framework as well as by literature reviewed. The Binary Logistic Regression Model (BLR) was used to explain the effects of the predictor variables on ANC utilisation.

**Results:** More than eighty five percent **(**85.68%) of the sample had made at least four ANC visits and 14.33% had made less than four ANC visits during their last pregnancies. Based on the full adjusted model, predisposing factors such as maternal age, women's parity, women's level of education, husband/partner's level of education, and women's ethnicity were found to be significantly associated with ANC utilisation amongst pregnant women in Namibia. Results indicated that for every additional year of age for women in Namibia, the chances of having at least four ANC visits increased by 5.50% (OR=1.055; 95% CI: 1.027 – 1.083). Another observation was an inverse relationship between ANC utilisation and the number of children born to a woman, indicating that the likelihood of attending at least four ANC sessions reduces by 11.70% (OR=0.883; 95% CI:0.804 - 0.971) as parity increases. As with women's educational attainment, the probability of having at least four ANC visits increased by 101.10% OR =2.011; 95% CI: 1.360 – 2.973) for women with secondary/higher educational levels as

compared to those with no education. Women whose husbands/partners attended up to secondary/higher educational levels were more likely to have at least four ANC visits by 58.80% (OR =1.588; 95% CI: 1.097 – 2.299) than those whose husbands/partners had no education at all. Moreover, when compared with Damara/Nama speaking women, the odds of having at least four ANC visits increased by 85.90% (OR= 1.859; 95% CI: 1.078 – 3.205) amongst Oshiwambo speaking women. However, the lowest rates of ANC utilisation were observed amongst Herero speaking women and those belonging to 'other' ethnic groups with 54.70% (OR= 0.453; 95% CI: 0.280 – 0.732) and 44.90% (OR= 0.551; 95% CI: 0.333 – 0.912) respectively. With regards to the enabling factors as outlined by the full adjusted model, health insurance was found to have a significant influence on the utilisation of ANC services by women in Namibia as women with health insurance were 129.20% (OR=2.292; 95% CI: 1.406 – 3.735) more likely to utilise full ANC services compared to women with no health insurance. Variables such as wealth index, residence, and regions of residence which were found to have an influence on ANC utilisation under the unadjusted, predisposing, or enabling models, were however found not to be significant under the full adjusted model.

**Conclusions:** The overall conclusion made from this study is that ANC utilisation is still a challenge in Namibia, particularly amongst multiparous, younger and uneducated women, and residents of rural areas. In addition, ANC utilisation was observed to be low amongst women whose husbands/partners had no education. Furthermore, the regional, and ethnic differentials in ANC utilisation indicated that lower ANC utilisation was prevalent amongst residents of Central, North-eastern, and Southern regions as well as amongst Hereros and 'other' ethnic groups. The inference drawn from the findings is that even though the country's National Reproductive and Child Health Policy and the National Health Policy Framework were established to address the maternal healthcare burden in the country, better strategies were not put up that would educate all women on the benefits of ANC services utilisation regardless of their socio-economic status. It is thus crucial for policymakers to scale up inclusive strategies that would enable all women in the country to fully utilise ANC services without any hindrances. Such measures should be able to eradicate all physical, economic, and socio-cultural barriers to ANC utilisation in the country.

**Keywords:** Antenatal care, Maternal health, Women, Pregnancy, Namibia

# CHAPTER 1: INTRODUCTION

Chapter 1 of this study presents the background information about the study. This chapter further addresses the research problem and the justification of the study. Objectives and research questions are as well included in this chapter.

## 1.1 Background

Maternal health remains a global challenge, with women and infants being at high risk of dying due to maternal-related complications (Doctor et al., 2018). Annually, 27 million women in the world suffer from direct complications due to their pregnancies (Machiyama et al., 2017). Estimates are that, for every maternal death, there are close to 100 women with Severe Maternal Morbidity (SMM) (Kaye et al., 2011; Tamura et al., 2012; Machiyama et al., 2017). Severe Maternal Morbidity (SMM) include the unexpected outcomes due to pregnancy, labour, and delivery that result in serious short- or long-term consequences to a woman's health such as massive haemorrhage and organ system failure or stroke due to Hypertensive Disorder of Pregnancy (HDP) as well as diabetes (Centers for Disease Control and Prevention, 2017).

Furthermore, in 2015, more than 300,000 women world-wide lost their lives due to maternal related-deaths (WHO, 2016; Doctor et al., 2018). Ninety nine percent (99%) of these deaths occurred in Low-and Middle-Income Countries (LMIC) and more than 60% occurred in Sub-Saharan Africa (SSA) (Roos & von Xylander, 2016; WHO, 2016). In developing countries, a woman's lifetime risk of maternal death is 1 in 180 cases, compared to 1 in 4,900 cases for those in developed countries (WHO, 2016). Additionally, in 2015, the global Maternal Mortality Ratio (MMR) was estimated to be 216 deaths per 100,000 live births, with higher estimates projected in developing countries (239 deaths per 100,000 live births) (WHO, 2018). MMR for Namibia was estimated at 265 deaths per 100,000 live births in 2015, which was higher than the global and developing countries' estimates (WHO, 2015). For every 1,000 live births recorded in the country, six women died due to pregnancy complications (Namibia Statistics Agency, 2011).

Maternal and child health are closely associated (Tunçalp et al., 2017). As such, infant and child mortality are crucial tests of women's health status, their access to healthcare, and the

competency of the healthcare system of the country (WHO, 2016; Tunçalp et al., 2017). Countries with high MMR experience high under-five and neonatal mortalities as well (WHO, 2018). In 2015, the global under-five mortality was estimated at 42.5 deaths per 1,000 live births with 45% of those deaths being new-born babies (WHO, 2016). Of the under-five mortality rates recorded, the majority were reported from developing countries ( WHO, 2018). Furthermore, most countries in SSA such as Namibia are still challenged with high neonatal and under-five mortalities which are still far below SDG 3.2 target (WHO, 2018). SDG 3.2 is aimed at reducing neonatal mortality to less than 12 deaths per 1,000 livebirths and under-five mortality to less than 25 deaths per 1,000 live births by 2030 (WHO, 2018). In 2015, the under-five and neonatal mortalities for Namibia were estimated at 45.4 deaths per 1,000 live births and 19 deaths per 1,000 live births respectively (WHO, 2016).

Several studies indicated that most of the maternal deaths occur during labour, delivery, or immediately after delivery (Fotso et al., 2009; Say et al., 2014; Souza et al., 2014). The observed direct causes of those deaths are haemorrhage, sepsis, Hypertensive Disorder of Pregnancy (HDP), obstructed/prolonged labour and complications due to the practice of unsafe abortions (Fotso et al., 2009; Say et al., 2014; Souza et al., 2014). In Namibia, most of the maternal deaths reported were due to HDP (33%), haemorrhage (25%), and obstructed/prolonged labour (25%) ( WHO, 2009; Namibia Statistics Agency, 2011). All these causes are preventable and manageable through routine check-ups of the mother by healthcare professionals during pregnancy (WHO, 2016).

The World Health Organisation (WHO) identified ANC as a key strategy for a positive pregnancy experience (World Health Organization, 2015a; Doctor et al., 2018). ANC is a term used to describe healthcare procedures provided to pregnant women by skilled healthcare professionals during pregnancy (Lincetto et al., 2006; WHO, 2016). The main objective of providing ANC services to pregnant women is for a safe and healthy pregnancy (Lincetto et al., 2006; Ngxongo, 2018). ANC package includes risk identification; prevention and management of pregnancy-related or co-existing conditions (Amnesty International, 2014; WHO, 2016). Through this package, women and their families should be provided with proper information and guidance for a healthy pregnancy, safe childbirth, and a positive recovery after birth (Lincetto et al., 2006; WHO, 2016). This includes information on healthy diet and nutrition, exercising, tetanus immunisations, weight gain, safe sex, and abstinence from drugs and alcohol abuse (Lincetto et al., 2006; Iiyambo, 2017; Moller et al., 2017). Besides,

information on how to care for the newly born baby, promotion for early exclusive breastfeeding, and family planning are also provided through the ANC package (Lincetto et al., 2006; Moller et al., 2017). ANC thus helps with early detection of abnormalities in both the mother and foetus as well as the prevention and treatment of illnesses (Ram & Singh, 2006; WHO, 2016). If every pregnant woman receives quality and sufficient care during pregnancy, at birth, and after birth, then women and infants' lives can be saved (WHO, 2016). Thus, the WHO recommends a minimum of four ANC visits for every pregnancy (WHO, 2016). Every pregnant woman should start as early as trimester one to ensure the well-being of both the mother and the foetus (WHO, 2016).

Globally, in 2015, three in five (62%) pregnant women attended at least four ANC visits, with lower records observed in regions with the highest rates of maternal, under-five and neonatal mortalities, such as SSA (52%) and South Asia (46%) (WHO, 2016). In Namibia, 70% of pregnant women had at least four ANC visits during 2006-2007 NDHS, with women residing in rural areas being the least utilisers of ANC services (Ministry of Health and Social Services, 2014). The WHO has, however, called on all member states to reduce the inequality in maternal healthcare provision through universal access to free ANC services (WHO, 2015a).

One of the key strategies by the Ministry of Health and Social Services (MoHSS) in Namibia is to accelerate the achievement of maternal health targets (MoHSS, 2010). This commenced with the capacity building of reproductive health service providers at all levels, to ensure that all healthcare facilities have midwives, and all hospitals have obstetricians and gynaecologists (MoHSS, 2010). In 2012, the MoHSS introduced a Community Health Workers (CHW) programme, which targets rural areas (UNICEF, 2015). The aim is to bring healthcare services closer to women in rural areas who live far from healthcare facilities (UNICEF, 2015). Besides, CHW mobilise and sensitise communities on the dangers of pregnancy-and birth-related complications (UNICEF, 2015).

In another context, several factors have been shown to influence women's taking of ANC services (Anderson, 1973; Lincetto et al., 2006; UNICEF, 2018). Factors such as poor transportation systems, low quality of public healthcare services, more centralised healthcare facilities, woman's health status, woman's education level and age, husband's education level, marital status, household income, woman's employment status and cultural beliefs ( Babalola & Fatusi, 2009; Arthur, 2012; Rashid & Antai, 2014). While these factors have been outlined in several studies, they may differ by countries and social setups (Andersen, 1995). Therefore,

this study aims to determine factors associated with ANC utilisation amongst pregnant women in Namibia.

### 1.2 Problem statement

A woman's health does not only affect herself but the entire household and the society at large (Hardee et al., 2012). Women play a major role and have a huge impact on the welfare of their families (Bazile et al., 2015). Thus, a mother's death negatively affects children's lives (Sen, 2008). As such, countries with high MMR have a huge number of children without mothers and vulnerable children to sustain (Bazile et al., 2015). Maternal health is, therefore, a crucial aspect of human health, requiring extra dedication and efforts from both the public and private sectors (Hardee et al., 2012).

Even though ANC has been identified by the WHO, with additional evidence-based support from numerous researchers, as a key strategy to reducing maternal, neonatal and under-five mortalities, the uptake is still way too low in developing countries including Namibia (WHO, 2016). Namibia is still way below achieving the target for the SDGs 3.1 and 3.2 targets, and below the WHO recommended ANC visits (MoHSS, 2010, 2014; WHO, 2016; WHO, 2018). SDG 3.1 is aimed at reducing maternal mortality ratio to less than 70 deaths per 100 000 live births by 2030 (WHO, 2018). Furthermore, variations in ANC uptakes have been observed between urban and rural areas, with more uptakes observed in urban areas than in rural areas (MoHSS, 2014). Studies identified women's demographic characteristics, socio-economic status, cultural norms and values, and the geographic location of residence to be closely associated with the uptake of ANC services (Zere et al., 2010; Rashid & Antai, 2014; Van Rooy et al., 2015).

Furthermore, the WHO recommended that all pregnant women should start their ANC services as early as trimester one (WHO, 2016). Early initiation of ANC is very much crucial as it helps with early detection of any pregnancy complications or infections (Moller et al., 2017). In 2013, only 43% of women in Namibia started their ANC visits during their first trimester as recommended by the WHO, however, 38% and 15% of the women started ANC services in their second and third trimesters respectively (MoHSS, 2014; WHO, 2016).

Despite the call by the WHO for equity and universal accessibility to maternal healthcare services, the Namibian government has not done enough to reduce this burden of high maternal

morbidity and mortality (UNICEF, 2018). Namibia is one of the developing countries with unequally distributed healthcare services (Zere et al., 2010; Rashid & Antai, 2014). Most of the medical facilities and specialists are found in urban areas, where only 40% of the Namibian population lives compared to their counterparts in the rural geographical locations ( Zere et al., 2010; Rashid & Antai, 2014). The country has limited public emergency inter-facility care, which can be barriers for pregnant women to reach their referral hospitals on time (Zere et al., 2010; Rashid & Antai, 2014). Furthermore, the country has a high proportion of households that live under the poverty line (Namibia Statistics Agency, 2017a). The standard measure of inequality, the Gini-coefficient, was estimated at 0.560, which is the second highest in the world after South Africa (Namibia Statistics Agency, 2017a). This shows how unequal the distribution of resources and wealth is in Namibia. Based on the fact that the majority of Namibians live under extreme poverty in the country, as well as the issues of unequal distribution of wealth and healthcare services in the country, uneducated women, those living in rural areas and those from poor households may find it very difficult to access maternal healthcare facilities on time (Rashid & Antai, 2014; Van Rooy et al., 2015).

Although Namibia has initiated good strategies to accelerate the achievement of maternal health targets, no comprehensive monitoring and evaluations are undertaken to assess how relevant and effective some programmes are, and whether they do have an impact on the maternal health targets (UNICEF, 2015).

### 1.3 Justification

Several national policies and intervention frameworks such as the National Reproductive and Child Health Policy and the National Health Policy Framework were established to address the maternal healthcare burden in the country (MoHSS, 2010). However, regardless of these policy interventions, universal access to maternal healthcare services has not received adequate attention from the government (Rashid & Antai, 2014). Thus, Namibia still records high rates of maternal, neonatal, and under-five mortalities in the country (WHO, 2016). Key strategies identified in the National Health Policy Framework are training, deployment of health professionals to district hospitals, awareness creation on maternal health, and routine data collection and research (MoHSS, 2010). Moreover, the Policy has prioritised themes to be researched on, such as youth migration, male involvement in health, male circumcision

practices and attitude, cervical and prostate cancers, teenage abortions and baby dumping, and harmful traditional practices (MoHSS, 2008). Looking at the prioritised themes of research in the policy framework, maternal health, specifically ANC utilisation and its impact on maternal and child health, has not been prioritised in terms of research within the policy framework.

The low uptake of ANC has severe implications on both the mother and the child's health (WHO, 2016). Prevention, early detection, and management of conditions such as HIV, HDP and diabetics during pregnancy may reduce the risk of complications for women and new-borns during and after delivery (WHO, 2018). If these conditions are not detected and managed early, outcomes are devastating such as a permanent disability or even death (WHO, 2016). It is evident from research that ANC utilisation is still a challenge in rural areas of Namibia, this may be due to unmet infrastructural needs - such as roads and transportation network systems to healthcare facilities (UNICEF, 2018). Women walk long distances to access these services (UNICEF, 2018). Given the adverse consequences of low ANC utilisation, a better understanding of what could be the contributing factors to the low uptake of ANC services is needed to address this problem in the country.

Few studies that looked at maternal health and ANC in Namibia. Of these studies, some were either institution-based or qualitative (Nghitanwa, 2012; Iiyambo, 2017). The quantitative studies conducted in the country have used the 2006-2007 NDHS dataset which is very outdated, thus the need to use the current NDHS dataset ( Rashid & Antai, 2014; Iiyambo, 2017). Even though these studies were conducted, Namibia's MMR remains high (WHO, 2018). This may be influenced by the fact that some of these studies only looked at specific healthcare facilities and not on the whole country, which neglects the issue of cultural and ethnic diversity as well as spatial population distribution (Namibia Statistics Agency, 2011). Furthermore, Namibia is one of the countries with the highest income inequality in the world and is diverse in terms of cultures, thus a need to understand this from different cultural and socio-economic perspectives using the latest 2013 NDHS dataset (Namibia Statistics Agency, 2017a).

Therefore, the outcome(s) of this study will be beneficial towards filling in the gaps in the existing policy framework and maternal healthcare interventions put in place in the country. The study aims to provide information that may be used by individuals, academics, scholars, and policymakers to inform existing programs as well as to identify suitable new ones to

improve on service delivery. Based on this, the study intends to identify factors that may influence ANC utilisation amongst pregnant women in Namibia.

### 1.4 Research question

The main question for the study was "What are the predisposing and enabling factors associated with ANC utilisation amongst pregnant women in Namibia?"

**The sub-questions of the study were:**

1. What are the levels of ANC utilisation amongst different subgroups[1] of pregnant women in Namibia?
2. What are the predisposing and enabling factors associated with ANC utilisation amongst pregnant women in Namibia?

### 1.5 Research objective

The main research objective of this study was to identify the predisposing and enabling factors associated with ANC utilisation amongst pregnant women in Namibia.

**The sub-objectives of the study were:**

1. To examine the levels of ANC utilisation amongst different subgroups of pregnant women in Namibia.
2. To identify the predisposing and enabling factors associated with ANC utilisation amongst pregnant women in Namibia.

[1] Women included in the study were grouped by marital status, maternal age, educational level, parity, ethnicity, wealth category, residence, and being in possession of a health insurance or not.

# CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This chapter provides a brief overview of the literature on ANC, with a specific focus on the impact of ANC on maternal health as well as the predisposing and enabling factors associated with ANC utilisation. The chapter further presents the theoretical and conceptual frameworks and the hypotheses of the study.

## 2.1 Overview of ANC

ANC is a term used to describe healthcare procedures provided to pregnant women by skilled healthcare professionals during pregnancy (Lincetto et al., 2006; WHO, 2016). ANC services benefit both the mother and the baby (Ngxongo, 2018). The main objective of providing ANC services to pregnant women is for a safe and healthy pregnancy (Lincetto et al., 2006; Ngxongo, 2018). The WHO introduced the ANC package, which includes risk identification; prevention and management of pregnancy-related or co-existing conditions (Amnesty International, 2014; WHO, 2016). Through this package, women and their families should be provided with proper information and guidance for a healthy pregnancy, safe childbirth, and a positive recovery after birth (Lincetto et al., 2006; WHO, 2016). This includes information on healthy diet and nutrition, exercising, tetanus immunisations, weight gain, safe sex, and abstinence from drugs and alcohol abuse (Lincetto et al., 2006; Iiyambo, 2017; Moller et al., 2017). Besides, information on how to care for the newly born baby, promotion for early exclusive breastfeeding, and family planning are also provided through the ANC package (Lincetto et al., 2006; Moller et al., 2017). ANC thus helps with early detection of abnormalities in both the mother and foetus as well as the prevention and treatment of illnesses (Ram & Singh, 2006; WHO, 2016).

The WHO's recommendations on routine and early initiation of ANC contact has been supported by many studies world-wide (Abou-Zahr & Wardlaw, 2003; Das, 2017; Moller et al., 2017). In the middle of the 19$^{th}$ century, developed countries such as the United Kingdom (UK) and Northern Ireland observed an improvement in maternal health after they introduced routine check-ups to pregnant women (Abou-Zahr & Wardlaw, 2003). Furthermore, a tremendous reduction in maternal mortality due to puerperal sepsis, haemorrhage, and

obstructed labour was observed in the UK during the early years of the 20th century (Abou-Zahr & Wardlaw, 2003). The maternal mortality reduction recorded in the UK was a good example to other developed countries, thus the majority started to implement similar strategies (Abou-Zahr & Wardlaw, 2003). Statistics on ANC utilisation during the late 19th and early 20th centuries indicated that close to 70% of pregnant women world-wide had at least one ANC visit, with very low coverage in developing countries (Abou-Zahr & Wardlaw, 2003; Moller et al., 2017). In 2013, global statistics on ANC utilisation improved significantly and this was due to the introduced WHO Millennium Development Goals (MDGs) in the year 2000 (Haruna et al., 2019). High proportions of ANC utilisation were observed in developed countries with close to 98% of pregnant women that had at least one ANC visit in 2013 (Moller et al., 2017). Developing countries, on the other hand, only reported about 68% of pregnant women that had at least one ANC visit during the same period (Moller et al., 2017). Regions with the lowest ANC uptake were SSA and South Asia, with 68% and 54% of pregnant women who had at least one ANC visit, respectively (Moller et al., 2017).

Even though the global figure on ANC utilisation was observed to be high for women that had at least one ANC visit in 2013, only three in five women (62%) received at least the recommended four ANC visits in 2015 (Tunçalp et al., 2017). The uptake of at least four ANC visits was observed to be very low in regions with high rates of maternal mortality, such as SSA and South Asia, with 52% recorded in SSA and 46% in South Asia (Tunçalp et al., 2017). In Namibia, 70% of pregnant women attended at least four ANC visits in 2007 (MoHSS, 2014).

Early initiation of ANC visits is essential as it provides an opportunity for health education, early screening and testing for things such as sexually transmitted infections (STIs), and genetic or congenital disorders (WHO, 2016, 2018; Moller et al., 2017). Furthermore, the pregnant woman would be provided with supplements to reduce the risk of neural tube defects and iron deficiency (WHO, 2016). Even though high proportions of pregnant women in both developed and developing countries had at least one ANC visit in 2013, early ANC initiation is still a challenge world-wide. (Moller et al., 2017; WHO, 2018). In 2013, only 59% of pregnant women world-wide commenced their first ANC visits during trimester one (Moller et al., 2017; WHO, 2018). Studies indicated that this is, however, good progress when compared to the record of 1990 which was below 41% (Moller et al., 2017; Haruna et al., 2019). This however differs by regions of the world (Abou-Zahr & Wardlaw, 2003). Developed countries have made significant progress when it comes to early initiation of ANC visits, as close to 85% of all

pregnant women in 2013 managed to have their first ANC visit during the first trimester (Moller et al., 2017). Developing countries, however, only managed to achieve 48% of early ANC initiations in 2013 and this figure was mostly affected by regions such as Southern Asia and SSA which recorded the lowest with 39% and 25%, respectively (Moller et al., 2017). Based on the 2013 NDHS report, more than 3,000 women aged 15-49 years of age gave birth in the last five years preceding the survey in Namibia (MoHSS, 2014). Of those, only 43% received ANC services during their first trimester (MoHSS, 2014). However, for ANC to be effective, it also depends on the availability and competency of healthcare professionals rendering the ANC services as well as on the availability of healthcare facilities (Lincetto et al., 2006; WHO, 2016).

Giving birth unattended by skilled healthcare personnel may have serious consequences both to the mother and the baby (Tew, 2013). The presence of a skilled birth attendant during delivery is highly likely to be influenced by ANC utilisation (Koblinsky, Anwar, Mridha, Chowdhury, & Botlero, 2008; Sumankuuro, Crockett, & Wang, 2017; Olakunde et al., 2019). Pregnant women with sufficient ANC utilisation are more likely to deliver in the presence of skilled healthcare personnel (Olakunde et al., 2019). In 2015, more than 90% of all births were attended by trained healthcare professionals in most of the developed countries, whereas, less than 50% of all births in several developing countries were assisted by skilled healthcare personnel (WHO, 2018). In Namibia, birth attendance by trained healthcare personnel stood at 88% in 2013, which increased slightly from 81% during the 2006-2007 NDHS (MoHSS, 2014). However, birth attendance by skilled healthcare professionals in Namibia varied by residence, ANC utilisation and socio-economic statuses of women (MoHSS, 2014). In 2013, only 73% of women from low-income settings, 53% of women with no ANC utilisation and 59% of women with no education managed to deliver with the assistance of trained healthcare personnel (MoHSS, 2014). These are worrisome figures which indicates how slow the progress is in attaining the SDGs and recommendations by the WHO in developing countries such as Namibia.

### 2.2 ANC and its impact on maternal health

Studies have outlined poor perinatal outcomes if ANC is insufficiently utilised (Tuladhar & Dhakal, 2011; Kuhnt & Vollmer, 2017; Wondemagegn et al., 2018). A systematic review by

the WHO on the direct causes of maternal deaths in developing countries indicated that more than 80% of maternal deaths in developing countries were due to perinatal outcomes such as unsafe abortions, haemorrhage, HDP, infections and obstructed labour (Say et al., 2014). Most of these deaths were directly related to inadequate care during pregnancy and are avoidable (Lincetto et al., 2006; Say et al., 2014). Through ANC, women and adolescent girls need to be provided with sufficient information on health behaviours during pregnancy and how to recognise complications that may occur during pregnancy (Al-Ateeq & Al-Rusaiess, 2015). Women and adolescent girls with low levels of awareness on the danger signs of pregnancy complications and labour were found to be at high risk of serious maternal morbidity and mortality (Al-Ateeq & Al-Rusaiess, 2015). Studies identified maternal health education and counselling as one of the critical elements of the ANC package, which are not always fully provided to pregnant women during ANC services in most developing countries (Lincetto et al., 2006; Al-Ateeq & Al-Rusaiess, 2015). This ANC gap however has a negative effect on maternal healthcare outcomes of a country (Al-Ateeq & Al-Rusaiess, 2015).

A systematic review and meta-analysis study conducted on 18 published studies world-wide revealed that ANC visits may reduce the risk of neonatal mortality if sufficiently utilised (Wondemagegn et al., 2018). This indicates further that the risk of neonatal deaths would be reduced by almost 35% amongst new-borns delivered from mothers who had sufficient ANC visits (Wondemagegn et al., 2018). Furthermore, a multiple indicator cluster survey conducted on 44,207 women in Bangladesh in 2013, indicated that ANC utilisation has an influence on maternal health outcomes (Roy & Haque, 2018). Women who received at least four ANC visits have an 18% lower odds of experiencing neonatal mortality as compared to those who did not receive ANC at all (Roy & Haque, 2018). Moreover, a significant relationship between MMR and ANC utilisation was outlined through an ecological study conducted using international databases of over 82 developing countries' health metrics (Girum & Wasie, 2017).

In Nigeria, a study that reviewed the 2017 annual report of the University of Port Harcourt Teaching Hospital (UPTH) indicated that sufficient ANC utilisation has a positive influence on maternal health outcomes (Ogu & Alegbeleye, 2018). The study showed that of the 3,000 deliveries performed in the hospital in 2017, twenty percent (20%) were for mothers with no ANC visits. These mothers had a higher prevalence of haemorrhage, obstructed labour and HDP compared to mothers who had utilised ANC services. Of the 30 maternal deaths recorded in the study, 93% were women who had never utilised ANC services during their last

pregnancy. In terms of the mode of delivery, the study further revealed a higher rate of emergency caesarean sections amongst women without ANC utilisations (Ogu & Alegbeleye, 2018). Another study conducted in Tigray Public Health institutions in Ethiopia in 2017, indicated a higher incidence of neonatal complications amongst women with incomplete adherence to ANC visits (Haftu, Hagos, & Mehari, 2018). The study further highlighted a higher incidence of stillbirths amongst women with incomplete ANC visits which was almost four times higher than women with complete adherence to ANC visits (Haftu et al., 2018).

## 2.3 Factors influencing the utilisation of ANC services amongst pregnant women

Socio-economic, demographic, and biomedical factors, as well as the functionality of a healthcare system, play a major role in influencing ANC utilisation by pregnant women (Iyaniwura & Yussuf, 2009; Babalola, 2014; Nsibu et al., 2016; Kakati, Barua, & Borah, 2016; Wilunda et al., 2017; Akowuah, Agyei-Baffour, & Awunyo-Vitor, 2018; Ekpenyong, Bond, & Matheson, 2019; Kim et al., 2019). This means a woman's chance of surviving maternal mortality and morbidity during her childbearing years is closely associated with her demographic characteristics, her socio-economic status, the cultural norms and values, and the geographic location of her residence (United Nations Population Fund, 2012). For the purpose of this study, the predisposing and enabling factors outlined below were analysed to determine if they had an influence on ANC utilisation amongst pregnant women in Namibia.

### *2.3.1 Maternal age*

One of the very crucial factors in the demographic analysis is age (Rowland, 2003). The risk of any of the important demographic events such as fertility, mortality, and migration occurring varies by age (Rowland, 2003). On ANC utilisation, studies have highlighted an unequal utilisation of healthcare services by women of different age groups (United Nations Population Fund, 2012; Rurangirwa, Mogren, Nyirazinyoye, Ntaganira, & Krantz, 2017). Pregnant adolescent girls were found to have low ANC utilisation levels (Rurangirwa et al., 2017). Sufficient ANC utilisation by pregnant adolescents is very important as maternal health complications were found to be a major cause of deaths amongst girls aged 15–19 in most

developing countries (United Nations Population Fund, 2012). Factors such as cultures and taboos may have an implication on the utilisation of ANC by adolescent girls (United Nations Population Fund, 2012). In many countries of the world, it is culturally wrong for a young girl to fall pregnant before marriage, this however prevents some adolescent girls from utilising ANC services for fear of rejection and discrimination (University of Carolina Population Center, 2015). Furthermore, adolescent girls tend to diagnose their pregnancies a bit late, and this is mostly due to the gap in knowledge about fertility and menstrual cycles (University of Carolina Population Center, 2015).

A cross-sectional study conducted in the Democratic Republic of Congo (DRC) on 500 pregnant women from four Health Zones (HZ) in 2013 identified the age of a woman as a predictor of ANC utilisation (Nsibu et al., 2016). This was further supported by a study conducted in India (Kakati et al., 2016). Similarly, in South Africa, adolescent girls continue to miss out on crucial information provided by healthcare personnel during ANC visits (Worku & Woldesenbet, 2016). This was a conclusion made from a cross-sectional health facility-based study conducted at John Taolo Gaetsewe (JTG) district on 383 mothers who brought their infants for their six-weeks immunisation (Worku & Woldesenbet, 2016). The study further showed that only less than half (49%) of the adolescent mothers had attended at least four ANC visits during their pregnancy. Out of those, 35% managed to have their first ANC visit before 12 weeks of pregnancy (Worku & Woldesenbet, 2016). Through logistic regression analysis, the mother's age was found to be highly associated with the use of ANC services in the study.

In Namibia, in 2009, more than 15% of women aged 15–19 years had begun childbearing, having either their first child or multiple children (WHO, 2009). Adolescent mothers were found to be at high risk of anaemia and the majority experienced preterm delivery and all these were linked to late initiations of ANC amongst adolescent girls in the country (WHO, 2009).

### *2.3.2 Educational level*

Education has been identified as a critical element in determining a woman's ability and willingness to utilise maternal health services (Pillai et al., 2013; Tunçalp et al., 2014). Countries with high maternal and infant mortalities were found to have low female literacy

rates (Pillai et al., 2013). Female literacy was identified by several studies as being significantly associated with maternal and child mortality, outlining that the risk of dying due to maternal mortality is high amongst women who are not educated (Tunçalp et al., 2014; Al-Ateeq & Al-Rusaiess, 2015). An educated woman is an empowered woman (Tekelab et al., 2019). Women who are educated tend to make well-informed decisions when it comes to their health needs (Pillai et al., 2013; Tekelab et al., 2019). Therefore, women empowerment through education increases their decision-making power in terms of sexual and reproductive health which has a positive influence on maternal healthcare utilisation (Prata et al., 2017). Bangladesh has been identified as one of the countries in the world that has made enormous reductions in maternal mortality through investing highly into girls' education (Tunçalp et al., 2014). Bangladesh managed to halve its MMR in less than a decade, from 724 deaths per 100,000 live births in 1990 to 338 per 100,000 in 2008 (Hogan et al., 2010). A study conducted using data from the WHO's Global Survey data on maternal and perinatal health indicated that women with no education were found to be nearly three times as likely to die due to pregnancy complications than women who had finished secondary school (United Nations Population Fund, 2012). Furthermore, a woman's education also plays a remarkable role in her child's survival (United Nations Population Fund, 2012).

A study conducted in India using the 2005-2006 National Family Health Survey identified women's education as significantly associated with ANC utilisation (Singh et al., 2012). Women with formal education were most likely to fully utilise ANC services compared to uneducated women (Singh et al., 2012). Similarly, a study on hospital records of 314,623 pregnant women from 359 healthcare facilities in 29 countries, observed a significant association between low education and severe maternal outcomes (Tunçalp et al., 2014). This, however, was more visible in developing countries with low levels of female literacy (Tunçalp et al., 2014). The study further underlines that uneducated and less educated pregnant women tend to utilise maternal healthcare facilities only when they are severely sick. This, however, puts them at greater risk of severe maternal outcomes (Tunçalp et al., 2014). Women with no education were found to have a 2.7 times higher risk of maternal mortality than women with more than 12 years of education (Sole et al., 2018). This is, however, because uneducated women have less information on the early signs of pregnancy complications due to the low utilisation of ANC services (Pillai et al., 2013).

Lack of power on decisions such as maternal healthcare utilisation, contraceptive use, or birth spacing is one of the challenges faced by uneducated women which places them at high risk of maternal mortality and morbidity (United Nations Population Fund, 2012).

Utilisation of ANC by pregnant women is further associated with gender inequalities (United Nations Population Fund, 2012; Rumaseuw et al., 2018). Patriarchal societies leave women with limited control over decision-making which limits them from accessing healthcare services on time (United Nations Population Fund, 2012). Studies have also shown that a husband's educational level is significantly associated with ANC utilisation (Rumaseuw et al., 2018; Tekelab et al., 2019). In many cultures and societies, husbands are deemed to be decision-makers in households, and their lack of education impacts women's access to maternal healthcare services (Wai et al., 2016; Dickson et al., 2018). Women whose husbands or partners had high school and tertiary education, were most likely to utilise ANC services fully compared to women whose husbands had no formal education (Singh et al., 2012).

There is, however, no universal agreement on the significance of education in ANC utilisation as evident in a number of studies. Rurangirwa et al. (2017) in their cross-sectional hospital-based study of 921 Rwandan women that gave birth at the hospital found no significant associations between ANC utilisation and education level. Another study conducted from five Local Government Areas (LGAs) in Rivers State in Nigeria also found no association between the women's level of education and their utilisation of ANC services (Maduka & Ogu, 2018).

### *2.3.3 Woman's parity*

Parity can be defined as the number of live births to a woman (Rowland, 2003), and it has been shown to be associated with ANC utilisation ( Kawungezi et al., 2015; Gitonga, 2017; Yaya et al., 2017). Some studies observed that the association is inverse, such that an increase in parity reduces the utilisation of ANC (Agus & Horiuchi, 2012; Joshi et al., 2014; Agha & Tappis, 2016; Gitonga, 2017; Yaya et al., 2017; Islam & Masud, 2018), and that women with low parity tend to sufficiently utilise ANC services. Reasons adduced for this include fear of complications with the first pregnancy and or excitement over a first baby (Islam & Masud,

2018). Few studies concluded it differently, indicating an association between low parity and low ANC utilisation (Awusi et al., 2009; Kawungezi et al., 2015).

A cross-sectional study conducted by the Vietnam-Australia Primary Healthcare Project identified women with three or more parity as low utilisers of ANC services (Trinh et al., 2007). The study attributed this to the Vietnamese government's call on families to stick to two or fewer children to avoid penalties. This, the study stated, negatively affected ANC utilisation amongst women expecting their third pregnancies as they opted to hide those pregnancies to avoid penalties (Trinh et al., 2007). Similarly, a study conducted in Indonesia, reported as low as 20%of ANC uptake amongst multiparous compared to nulliparous women (Agus & Horiuchi, 2012).

Even though most of the studies concluded an association between ANC and parity, an institution-based study conducted at Ife Central Local Government Area in Nigeria found no relationship between ANC and parity of a woman (Onasoga et al., 2012).

### *2.3.4 Marital status*

Marital status refers to the civil status of an individual in relation to a specific country's marriage laws (Rowland, 2003). It has been identified as one of the influential factors of ANC utilisation (Gitonga, 2017; Rurangirwa et al., 2017; Kim et al., 2019b). Unmarried women were found to be less likely to attend ANC compared to those that were married (Rurangirwa et al., 2017; Gitonga, 2017; Maduka & Ogu, 2018). In many societies, unmarried women have been found to delay their first ANC visits compared to women who are married (Gitonga, 2017). Studies have supported this outcome as a reflection of the social support married women get from their husbands (Gitonga, 2017; Rurangirwa et al., 2017). In some societies, this association may be influenced by cultural beliefs and taboos (United Nations Population Fund, 2012; Kim et al., 2019b). Societies with taboos that are against pregnancy before marriage may observe low ANC utilisation amongst teenagers and young unmarried mothers (Gitonga, 2017). Adolescent girls and young unmarried mothers would rather delay the initiation of ANC for fear of stigmatisation and rejection the society (Kim et al., 2019b). This situation is however different when it comes to never married or divorced older women (Gitonga, 2017). In a study conducted in Rwanda, Rurangirwa et al. (2017) concluded that women who were

single, divorced, widowed, or separated were at a higher risk of poor utilisation of ANC services as compared to married women.

In contrast, a cross-sectional study conducted in Ethiopia concluded that single and divorced older women were most likely to utilise ANC services compared to married women (Beyamo et al., 2017). Similarly, a study conducted in Nigeria on 2,199 women who never used ANC services during pregnancy found the majority (93%) to be married women (Fagbamigbe & Idemudia, 2015). This may however be due to religious beliefs and practises with some studies identifying Islamic husbands being the one forbidding their wives from utilising ANC services (Fagbamigbe & Idemudia, 2015).

### *2.3.5 Ethnicity*

World-wide, wide disparities in healthcare utilisation exist between women of different ethnicities (Trinh, 2012; McKinn et al., 2019). The prevalence of inadequate receipt of ANC services varies by ethnicity (Bryant et al., 2010). In the UK, women of Asian origin, particularly Pakistani, were more likely to book late for ANC compared to white British women and they made significantly fewer ANC visits compared to white British women (Rowe & Garcia, 2003).

In spite of reductions in maternal and foetal mortalities in America, significant ethnic disparities in accessing maternal healthcare is still a challenge (Bryant et al., 2010). Studies indicate that white and Asian/Pacific Island women are most likely to receive their first ANC services in their first trimester compared to blacks and Hispanics (Bryant et al., 2010). In 2006, 69% of women received their first ANC services in their first trimester, of which 76% were whites compared to 58% who were blacks and Hispanics (Bryant et al., 2010). Studies have identified a lack of education and healthcare insurance coverage as perceived factors influencing such disparities (Bryant et al., 2010). In America, black women are three to four times more likely to die from pregnancy-related complications compared to white women (American College of Obstetricians and Gynecologists, 2015).

Similarly, in Nepal, the odds of having at least four ANC contacts from advantaged ethnic groups were two times higher than the odds of women from disadvantaged ethnic groups (Deo et al., 2015). Based on a cross-sectional study conducted in Sunsari district in Nepal, 84% of

the women who had at least four ANC visits came from advantaged ethnic groups (Deo et al., 2015). Equally, the 2013 NDHS outlined wide disparities in healthcare utilisation amongst ethnic groups in Namibia. Kunene region, a region where one of the marginalised ethnic group – Ovahimba – lives, reported only 73% of deliveries in healthcare facilities as compared to other regions such as Khomas which reported more than 95% (MoHSS, 2014). These disparities may be linked to cultural behaviours, taboos, social environments, and accessibility (Bryant et al., 2010).

### *2.3.6 Wealth index*

Economic disparities amongst families in societies is one of the major contributors to low healthcare utilisation in the world (United Nations Population Fund, 2012; Yaya et al., 2016). Financial constraints may prohibit poor women from utilising facility-based ANC services even when the actual care is free of charge (Adewuyi et al., 2018). Even though ANC services are highly subsidised in most developing countries, some studies indicated that the minimal costs of some services such as consultation, laboratory tests, and booking fees may as well result in low turn-up at ANC services by pregnant women from poor financial backgrounds (Simkhada et al., 2008; United Nations Population Fund, 2012). This is corroborated by researchers who have identified pregnant women from wealthier households as being consistent users of maternal healthcare services compared to pregnant women of low economic status (Fagbamigbe & Idemudia, 2017; Adewuyi et al., 2018; Shibre & Mekonnen, 2019). In general, a poor and marginalised woman is at greater risk of maternal death than a well-off woman and this may be due to their low uptake of ANC services (United Nations Population Fund, 2012).

In a study conducted in India, the utilisation of ANC services was found to increase with the increase in wealth quintile (Singh et al., 2012). Of those that received full ANC services, only 7% belonged to the poorest wealth quintile compared to 33% that belonged to the richest wealth quintile (Singh et al., 2012). The study showed that wealth quintile exerted a significant positive effect on ANC utilisation with women from the richest wealth quintile being nearly two and half times more likely to utilise full ANC services compared to women from the poorest wealth quintile.

In a study conducted in Nigeria, poverty or low socio-economic status was found to have a negative impact on ANC utilisation amongst pregnant women in the country (Fagbamigbe & Idemudia, 2017). In the study, respondents in the wealthiest quintile had a higher likelihood of ANC utilisation and adequate ANC visits than respondents in the poorest wealth quintile. Similar findings were observed by Mekonnem et al. (2019). They showed that the odds of ANC utilisation amongst women from households on the richest wealth quintile were three times higher than the odds of women from households on the poor wealth quintile.

### *2.3.7 Locational accessibility (Place of residence)*

The issue of equity and accessibility to healthcare services, by all, has been identified as a major concern mostly in developing countries by the WHO (WHO, 2016). Consequently, countries were urged to identify key strategies to improve healthcare accessibility for all (Nyathi et al., 2017a). Many countries in SSA and South Asia are still faced with the challenge of inadequate healthcare facilities and personnel and the attendant accessibility issues associated with them (Lincetto et al., 2006; United Nations Population Fund, 2012).

In most developing countries, the lack of adequate skilled healthcare personnel mostly affects rural areas compared to urban areas (Simkhada et al., 2008). Majority of healthcare personnel prefer working in urban areas than in rural areas since rural regions were found to have a negative reputation on their career and are associated with higher workloads and unfavourable working conditions (Pohontsch et al., 2017). This causes women residing in remote areas to incur substantial opportunity costs since ANC would require travelling and long waiting hours (Lincetto et al., 2006). The long-distance to maternal healthcare facilities as well as long hours of waiting may discourage pregnant women from seeking healthcare due to both the time taken and costs involved (Simkhada et al., 2008; Yaya et al., 2016; Mekonnen et al., 2019; Tekelab et al., 2019). Furthermore, pregnant women in rural areas may find it very difficult to travel especially due to lack of transportation services or when conditions of roads are in poor states (Yaya et al., 2016).

In China, maternal healthcare utilisation was lowly utilised by residents of rural areas of western China (Wu et al., 2019). In 2012, only 64% of women in Shaanxi province had their first ANC visit within the first 12 weeks of their pregnancy (Wu et al., 2019). Additionally,

even though, close to 94% of pregnant women in Ningxia province received at least one ANC, only 88% delivered their babies at healthcare facilities (Wu et al., 2019).

On a meta-analysis study conducted in Ethiopia, ANC utilisation was found to be positively associated with urban residence compared to rural residence (Tekelab et al., 2019). In a qualitative study conducted in Zimbabwe, the majority of the women had to travel more than 40 km in order to access ANC services (Nyathi, Tugli, Tshitangano, & Mpofu, 2017). In the study, long-distance and shortage of transportation were the major hindrances to ANC utilisation. Based on the 2013 NDHS, 95% of the total healthcare facility deliveries reported occurred in urban areas compared to 80% that were recorded in rural areas (MoHSS, 2014). Dansou et al. (2017), in their study, however, found no association between place of residence and ANC utilisation. Of the 8,701 women surveyed, 60% made more than four ANC visits, 28% made less than 4 ANC visits and 13% never attended ANC services.

### *2.3.8 Health insurance*

Universal health coverage (UHC) is one of the most critical SDGs, and the call by United Nations (UN) is for all countries to strive for UHC by 2030 (Matsubara et al., 2019). One of the barriers to maternal healthcare utilisation is the lack of affordability and accessibility (Owoo & Lambon-Quayefio, 2013). Enduring financial constraints in accessing healthcare, mostly by vulnerable and marginalised population, is one of the critical issues countries should solve in order to achieve equity in healthcare utilisation (Matsubara et al., 2019). Risks of maternal mortality and morbidity were found to be higher amongst poor, uneducated, and women without health insurances (Owoo & Lambon-Quayefio, 2013). The WHO's statistics show that over 800 million people in the world spend over 10% of their household income on healthcare services (Hogan, Stevens, Hosseinpoor, & Boerma, 2018). This implies that, for some households, one has to choose between health and other basic needs such as food and education (Hogan et al., 2018). Hence, financial protection is a key strategy for achieving UHC (Matsubara et al., 2019).

In countries where maternal health is not highly subsidised by the government, health insured women have better access to ANC services compared to women that are not insured (Wang et al., 2017). This follows from the fact that ANC involves the cost of consultations, laboratory

fees, purchase of some recommended medicines, and treatment of possible pregnancy complications (Wang et al., 2017). As a result, it is less likely for a poor pregnant woman to afford to pay all those healthcare expenses unless they are insured (Horan & Kim, 2017). Moreover, pregnant women with health insurance prefer to utilise private healthcare than public healthcare facilities (Konje et al., 2018). This is because of perceived poor quality of ANC services, absence of healthcare providers, shortage of supplies and drugs, and long hours of waiting at public healthcare facilities (Finlayson & Downe, 2013; Konje et al., 2018).

Studies have shown that access to health insurance plays a critical role in a woman's decision to utilise ANC services (Owoo & Lambon-Quayefio, 2013; Browne et al., 2016; Horan & Kim, 2017). In Vietnam, health insurance coverage was introduced in 1992 with the main aim of covering the vulnerable and marginalised groups such as the poor, ethnic minorities, and children aged below six years (Matsubara et al., 2019). Based on a cross-sectional study conducted in the Luong Son District of Vietnam, Matsubara et al. (2019) reported that of the 73% of women who had health insurance, 31% were poor. As the majority of the poor pregnant women had health insurance, the study found no significant difference in ANC utilisation between the rich and the poor pregnant women. The average number of ANC visits was more than four times for all wealth quintiles, and all quintiles demonstrated more visits to private clinics than public healthcare centres (Matsubara et al., 2019).

Corresponding with the outlined relationships between health insurance and ANC utilisation were studies conducted in Mexico and Ghana, which too concluded a positive association between health insurance coverage and ANC utilisation amongst pregnant women (Browne et al., 2016; Heredia-Pi et al., 2016). Another study conducted in three countries; Ghana, Indonesia, and Rwanda found a significant positive effect of health insurance coverage on ANC utilisation (Wang et al., 2017).

In Namibia, there is no national health insurance scheme. Thus, 82% of the 9,176 women aged 15-49 years who were included in the NDHS were reported to be uninsured and relied only on public healthcare facilities (MoHSS, 2014). However, public healthcare services are highly subsided by the government and only a minimum upfront fee is required from a patient. Furthermore, public maternal healthcare services are free of charge (MoHSS, 2014). Of the 18% of women who were insured, 11%were insured through employee benefits just as 57% of those insured resided in urban areas compared to 43% that resided in rural areas (MoHSS, 2014).

A study conducted in Namibia, using the 2006-2007 NDHS survey, outlined that health insurance also plays a role in determining the delivery status of women (Zere et al., 2011). Mothers with medical insurance were 20% most likely to deliver under the supervision of a healthcare professional compared to women without medical insurance (Zere et al., 2011).

## 2.4 Theoretical framework: Anderson Healthcare Utilisation Model

In order for the study to analyse the factors influencing ANC utilisation amongst pregnant women in Namibia, this study adopted the Anderson Healthcare Utilisation Model developed by Ronald Anderson in the 1960s. The model, illustrated in Figure 2.1, was developed to assist researchers in better explaining factors that either promote or hamper the utilisation of healthcare services (Anderson, 1973; Kim & Lee, 2016). The theoretical model outlines three main determinants of healthcare utilisation which may be influenced by the environment or the society an individual lives in or by individual or family characteristics (Anderson, 1973; Veeder, 1975). Anderson's model identifies the group of determinants of healthcare utilisation as the predisposing characteristics of an individual or family, the enabling factors, and the need-based characteristics.

The predisposing characteristics such as social class, demographic characteristics, and personal beliefs may influence the likelihood of an individual to seek healthcare services. The social, demographic, and personal beliefs characteristics include factors such as the age of an individual, marital status, educational level, ethnicity, culture, and beliefs (Veeder, 1975). The enabling factors refer to resources within the family and community that may hamper or make it easier for an individual to utilise healthcare services (Anderson, 1973; Veeder, 1975). This includes family income and resources, health insurance, price of services, facility availability, and accessibility, residence and region (Veeder, 1975). The need-based characteristics refer to how healthcare utilisation may be influenced by certain individual's needs (Dickson, Darteh, Kumi-Kyereme, &Ahinkorah, 2018). This may however include pre-existing health conditions and or the emerging signs of illness (Anderson, 1973). The model becomes particularly relevant to this study as two of its constructs; the predisposing and enabling factors encapsulate the determinants of ANC utilisation amongst pregnant women in Namibia.

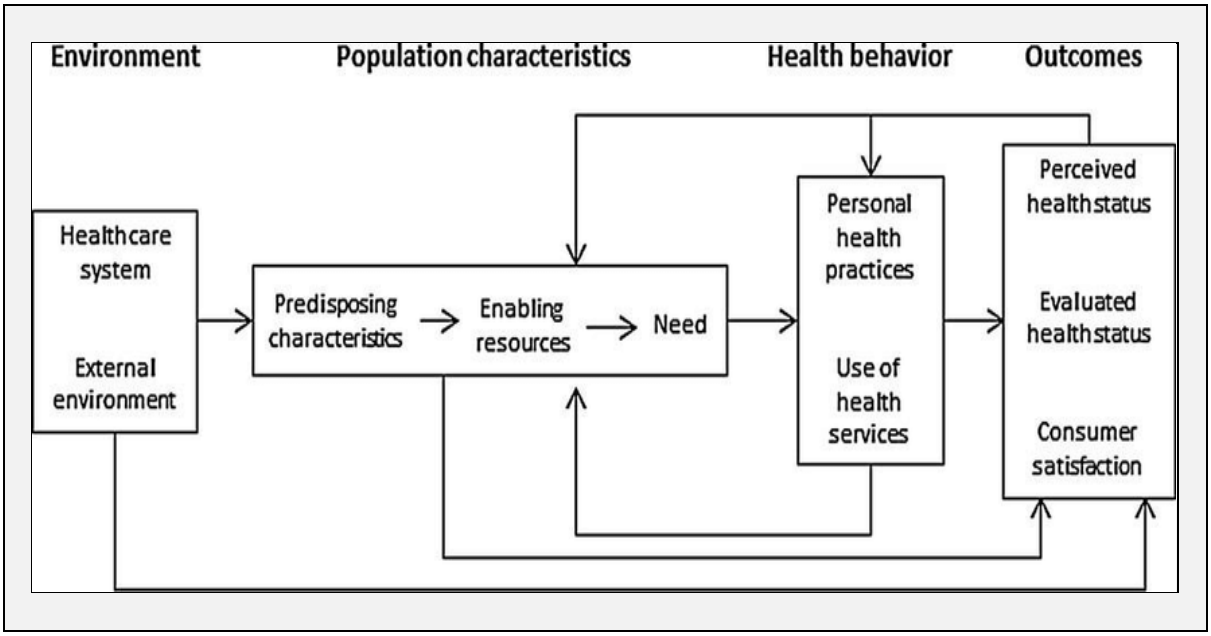



**Figure 2. 1: The Anderson Healthcare Utilisation Model** (Anderson, 1973)

## 2.5 Conceptual framework

This study used the lens of the Anderson Healthcare Utilisation Model to examine the predisposing and enabling factors that may have an influence on ANC utilisation amongst pregnant women in Namibia. It adopted a conceptual framework around the two constructs of predisposing and enabling factors of healthcare utilisation as shown in Figure 2.2. Based on the literature reviewed, the predisposing factors that the study analysed were factors such as the maternal age, the woman and partner's educational level, woman's parity, woman's marital status, and the woman's ethnicity. The enabling factors analysed were the household's income level, woman's place of residence (rural/urban) and region, and whether the woman had a health insurance or not. The predisposing and enabling factors were the predictor variables of this study while ANC visits was the outcome variable.

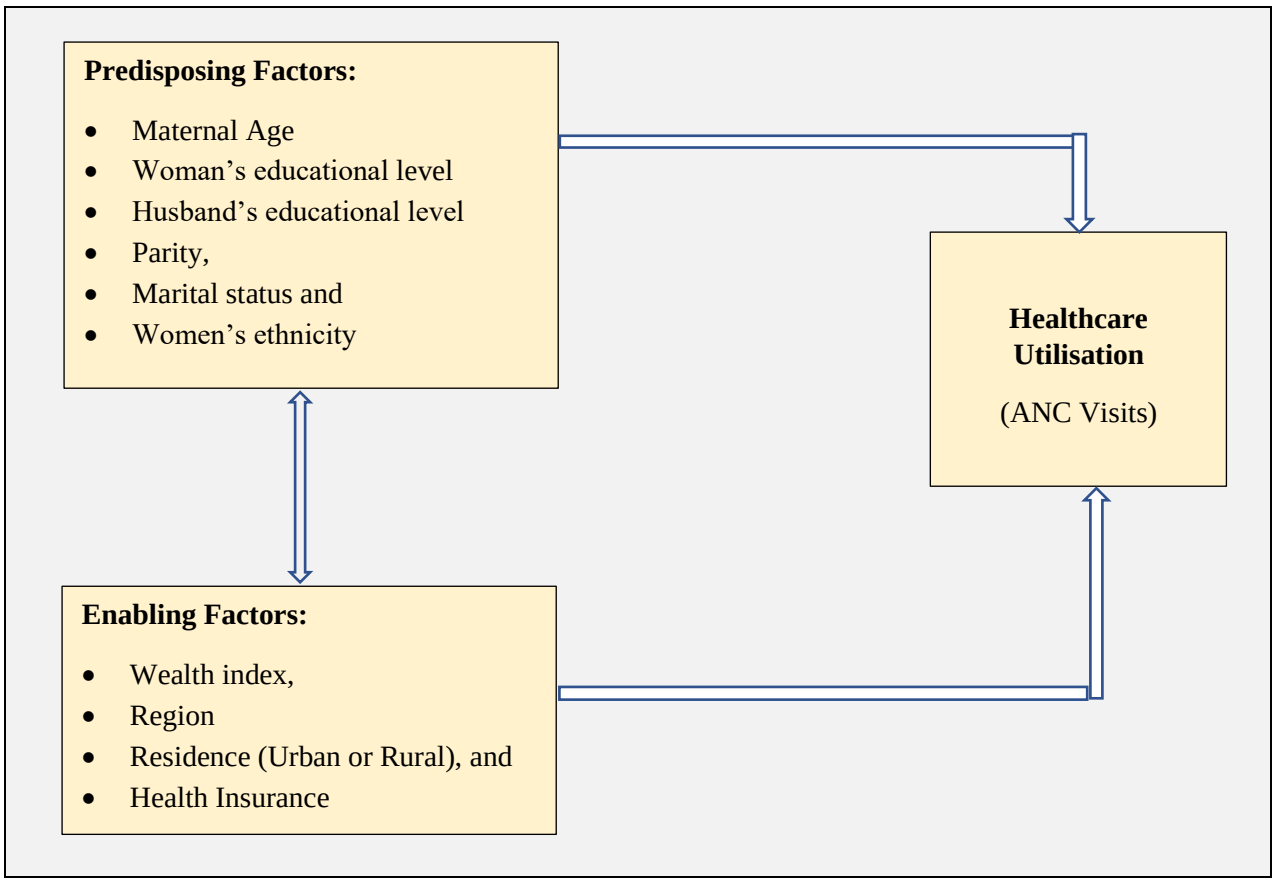



**Figure 2.2: Modified Healthcare Utilisation Model the study utilised**

## 2.6 Research hypothesis

$H_0$: Predisposing and enabling factors are not associated with ANC utilisation amongst pregnant women in Namibia.

$H_1$: Predisposing and enabling factors are associated with ANC utilisation amongst pregnant women in Namibia.

# CHAPTER 3: METHODOLOGY

This chapter explains how the data was collected, and the methods used in the study to analyse the data. It specifically looked at the data source, study population, sample size, questionnaire design, variables used in the study, ethical issues, and how data was analysed in the study.

## 3.1 Study design

This study was retrospective, cross-sectional, and quantitative in nature as secondary data from the 2013 Namibian Demographic and Health Survey (NDHS) dataset was employed. The 2013 NDHS survey is the latest DHS conducted in the country. Data were collected from May to September 2013 and was the fourth survey to be conducted in the country (MoHSS, 2014).

## 3.2 Data source and questionnaire design

This study obtained data from the 2013 NDHS's women recode data file (NMIR61DT), which comprises of the demographic, socioeconomic, and health information from the population at national-level (MoHSS, 2014). In order to allow for planning and comparison over time, NDHS is conducted every five years (MoHSS, 2014). The 2013 survey was executed by the MoHSS together with the Namibia Statistics Agency (NSA) and the National Institute of Pathology (NIP). Technical and financial support was provided by the ICF International, the government of Namibia, the United States Agency for International Development (USAID), and the Global Fund (MoHSS, 2014). The 2013 NDHS was conducted with the aim of providing the country as well as regional estimates, on crucial population and health indicators, such as fertility and mortality rates. Therefore, the sample size was designed to include all 13 administrative regions of the country (MoHSS, 2014). Data were analysed to determine predisposing and enabling factors that may influence the utilisation of ANC services by pregnant women in Namibia.

The 2013 NDHS utilised three questionnaires to collect survey data, namely, the household questionnaire, men's questionnaire, and the women's questionnaire. The women's questionnaire was used to collect information from women aged 15-49 years (MoHSS, 2014). The questionnaire was used to collect information on topics related to women's socio-

economic and demographic characteristics such as age, marital status, residential history, religion, media exposure, education, and wealth index (MoHSS, 2014). Moreover, questions on women's reproductive history and behaviour, knowledge on family planning and methods, antenatal, delivery and postnatal care, breastfeeding, and children's care were as well included in the questionnaire. It further collected data on the sexual behaviours of women, diabetes, anaemia, HIV and AIDS, and awareness on other health issues such as sexually transmitted infections (STIs), tuberculosis, cancer, tobacco use, and alcohol consumption (MoHSS, 2014). Maternal mortality, domestic violence, and partners' background information were as well included.

For this study, responses to questions on the utilisation of ANC services, as well as responses to questions on socio-economic, and demographic characteristics of women and or households such as age, marital status, ethnicity, education, parity, region, residence, wealth index, and health insurance were analysed. The responses to these questions constituted the variables of this study.

### 3.3 Sampling strategy in the 2013 NDHS

The 2013 NDHS used a two-stage stratified cluster sampling design (Craig et al., 2018). The sampling frame used was that of the 2011 Population and Housing Census and comprised of all enumeration areas (EAs) covering all 13 regions. In the first stage, 554 EAs were selected using stratified sampling, 269 in urban and 285 in rural areas (MoHSS, 2014). In rural areas, an EA was classified as a natural village, which could be a subset of a large village or combined group of small villages, while in urban areas, an EA is usually a city block (Namibia Statistics Agency, 2011). Twenty households were selected from each EA using a systematic sampling method. Therefore, the sample obtained only consisted of respondents residing in those households selected at the time of the survey. Residents who were absent from their normal place of residence at the time of the survey were excluded from being sampled (MoHSS, 2014).

### 3.4 Study population and sample size

Namibia is a country with a very small population. According to the Namibia Inter-Censal Demographic Survey (NIDS) of 2016, the population was estimated at less than 2,4 million

persons (Namibia Statistics Agency, 2017b). The population of interest for this study were women of reproductive age, aged 15-49 years. A total of 9,176 women aged 15-49 years were included in the 2013 NDHS. The sample for this study were women who indicated that in the last 5 years prior to the survey they had given birth. Of the 9,176 women surveyed, 3,974 (3,842 weighted) women indicated that they had given birth in the five years prior to the survey. However, of those that gave birth, only 3,952 (3,819 weighted) women responded to the ANC utilisation question (MoHSS, 2014). Therefore, the weighted sample size used by this study was 3,819 women who had responded to the ANC utilisation question. Of the 3,819 women, 3,272 (85.67%) of them made at least four ANC visits, and a total of 547 (14.33%) women had however made less than four ANC visits.

## 3.5 Study variables

### *3.5.1 Outcome variable*

The outcome variable of this study was the number of ANC visits taken by women who had given birth in the five years prior to the 2013 survey. This information was sourced from women of reproductive age who were sampled for the 2013 NDHS. These women were asked "How many times did you receive ANC during the last pregnancy?" (Question 412). This variable was categorised into two categories as indicated in Table 3.1 below. The WHO recommended that every pregnant woman should take routine ANC visits for a positive pregnancy outcome and to avoid pregnancy-related complications (WHO, 2016). Based on the WHO's recommendations, utilisation of ANC services is classified as adequate if at least four ANC visits are taken during every pregnancy. Through routine ANC visits, healthcare professionals are able to diagnose any pregnancy-related complications and diseases which may threaten the lives of the mother or foetus (Tunçalp et al., 2017). Women who have not taken any ANC visit during pregnancy and those with inadequate ANC visits (less than 4 visits) are at a higher risk of maternal related complications compared to women with adequate ($4^+$) ANC visits (Ahmed et al., 2016; Ogu & Alegbeleye, 2018). This study, therefore, categorised ANC visits into two categories; 'Less than 4 visits, and $4^+$ visits'.

**Table 3.1: Description of the outcome variable for this study**

| Outcome variable | Description | Study variable type | NDHS variable name | NDHS coding | Study coding |
|---|---|---|---|---|---|
| ANC visits | Women aged 15-49 years, who gave birth in the last 5 years prior to the survey were asked to indicate the number of ANC visits done in their last birth. | Binary category | M14-1 | Numerical | Less than 4 visits (0)<br>$4^{+}$ visits (1) |

### *3.5.2 Predictor variables*

Studies indicated that the number of ANC visits taken by a pregnant woman can be influenced by numerous factors (Iyaniwura & Yussuf, 2009; Rashid & Antai, 2014). For the purpose of this study, the predictor variables used in this study were the predisposing and enabling factors. The predictor variables were identified and adopted from the Anderson Health Care Utilisation Model, which was supported by existing reviewed literature.

Predisposing and enabling factors are characteristics of an individual, family, or household the woman belongs to (Anderson, 1973; Andersen, 1995). Characteristics such as maternal age, woman and partner's educational level, parity, marital status, and ethnicity were the predisposing variables the study utilised. While, woman's residence, region, household income level, and whether the woman was insured medically or not were the enabling variables. Below is an in-depth description of the predisposing and enabling variables used and how they were analysed in the study:

*Maternal age*

To achieve the first objective which is to examine the levels of ANC utilisation amongst different subgroups of pregnant women in Namibia, the maternal age of a woman was analysed as a categorical variable. It was categorised into two categories: <29 years and ≥ 29 years. The mean age (29 years) was used as a reference age. However, for the second objective which was to identify the predisposing and enabling factors associated with ANC utilisation amongst pregnant women in Namibia, the maternal age of a woman was analysed as a continuous variable.

*Woman's educational level*

In this study, the educational level of women was analysed as a categorial variable for both objectives. The variable was re-categorised into three levels of education, and this was done to increase the values (n) of each category. Three categories created were: 'No education, Primary, and Secondary/Higher'.

*Husband's educational level*

In this study, the husband's educational level referred to the highest-grade husbands/partners of women in the study attained. The variable was re-categorised into three levels of educational attainment, and this was done to increase the values (n) of each category. Categories such as No education, Primary, and Secondary/higher were created. In the 2013 NDHS, some women, however, indicated that they had no husbands/partners at the time of the survey. A fourth category (No husband/partner) was thus created for such types of women.

*Parity*

Similar to the maternal age of a woman, for the first objective, parity of women was analysed as a categorical variable. It was categorised into two categories: $<3$ children and $\geq 3$ children. The mean parity (3 children) was used as a reference. The second objective, however, analysed parity of a woman as a continuous variable.

*Marital status*

In this study, for both objectives, women's marital status was analysed as a categorical variable. It was re-categorised into three categories as 'Never been in a union, Married/living together, and Widowed/divorced/separated'. The variable was re-categorised from six categories in the 2013 NDHS to three, to increase the values (n) of each category.

*Ethnicity*

Namibia is a multi-lingual country, with multiple ethnic groups (MoHSS, 2014). The 2013 NDHS had included a question on the main language spoken at home by those included in the study (MoHSS, 2014). Nine language-categories were identified. In this study, ethnicity was analysed as categorical variable. The nine language-categories in the 2013 NDHS dataset were re-categorised into six ethnic groups such as Damara/Namas, Hereros, Kavangos, Lozis, Aawambo, and others. The re-categorisation was done to increase the values of each category.

*Wealth index*

Information on household assets was used to create an index that represents the wealth of households included in the 2013 NDHS (MoHSS, 2014). In the 2013 NDHS, household wealth was categorised into five categories such as, 'Poorest, Poorer, Middle, Richer, and Richest. In order to increase the values of each category, this study, however, re-categorised the 2013 NDHS wealth index categories into three, which were: Poor, Middle, and Rich. For both objectives, the wealth index variable was analysed as a categorical variable.

*Residence*

In this study, residence referred to where the woman resided at the time of the 2013 NDHS. The variable was binary, with 'Rural and Urban' categories. This means that the 2013 NDHS categories were not re-categorised and were analysed as such.

*Region*

With the region of residence, regions were re-categorised into four main regions, and this was done to increase the values (n) of each category. Four main regions created were North-central regions, which included Oshikoto, Oshana, Ohangwena, Omusati and Kunene regions, North-eastern regions, inclusive of Zambezi, Kavango East, and West regions, Central regions (Erongo, Khomas, Omaheke and Otjozondjupa regions), and Sothern regions, which included Hardap and //Karas regions only.

*Health insurance*

When it comes to health insurance, this study analysed whether pregnant women included in the study were in possession of a health insurance or not. The variable was binary, with 'Yes and No' categories, and the 2013 NDHS categories were not re-categorised. Table 3.2 below gives an in-depth description and coding of all predisposing and enabling variables used in the study. These predictor variables in Table 3.2 were adopted from the Anderson Health Care Model supported by the literature reviewed.

**Table 3.2: Description of predictor variables for this study**

| Predictor Variables | Description | Study variable type | NDHS variable name | NDHS coding | Study variable coding |
|---|---|---|---|---|---|
| **1. Predisposing factors** | | | | | |
| 1. Maternal age | Age of a woman | Continuous | Age in years (V012) | Continuous | Continuous |
| 2.Woman's educational level | Woman's highest educational level | Multiple categories | Highest educational level (V106) | No education (0)<br>Primary (1)<br>Secondary (2)<br>Higher (3) | No education (1)<br>Primary (2)<br>Secondary/Higher (3) |
| 3.Husband's educational level | Partner's highest educational level | Multiple categories | Husband/partner's educational attainment (V729) | No education (0)<br>Incomplete primary (1)<br>Complete primary (2)<br>Incomplete secondary (3)<br>Complete secondary (4)<br>Higher (5) | No education (1)<br>Primary (2)<br>Secondary/higher (3)<br>No husband/partner (4) |
| 4. Parity | Number of children to a woman | Continuous | Children ever born (V201) | Continuous | Continuous |
| 5. Marital status | Marital status of the woman | Multiple categories | Current marital status (V501) | Never in a union (0)<br>Married (1)<br>Living with partner (2)<br>Widowed (3)<br>Divorced (4)<br>No longer living together/Separated (5) | Never in a union (1)<br>Married/living together (2)<br>Widowed/divorced/separated (3) |
| 6. Ethnicity | Ethnic group | Multiple categories | Main language spoken at home (S114) | Afrikaans (1)<br>Damara/Nama (2)<br>English (3)<br>Herero (4)<br>Kwangali (5)<br>Lozi (6)<br>Oshiwambo (7)<br>San (8)<br>others (96) | Damara/Namas (1)<br>Hereros (2)<br>Kavangos (3)<br>Lozis (4)<br>Aawambo (5)<br>others (6) |
| **2. Enabling factors** | | | | | |
| 7. Wealth index | Household's wealth category | Multiple categories | Wealth index (V190) | Poorest (1)<br>Poorer (2)<br>Middle (3)<br>Richer (4)<br>Richest (5) | Poor (1)<br>Middle (2)<br>Rich (3) |
| 8. Residence | Where the woman resides(urban/rural) | Binary | Type of place of residence (V025) | Urban (1)<br>Rural (2) | Urban (1)<br>Rural (2) |
| 9. Region | Woman's region of residence | Multiple categories | Region (V024) | Caprivi (1)<br>Erongo (2)<br>Hardap (3)<br>Karas (4)<br>Kavango (5)<br>Khomas (6)<br>Kunene (7)<br>Ohangwena (8)<br>Omaheke (9)<br>Omusati (10)<br>Oshana (11)<br>Oshikoto (12)<br>Otjozondjupa (13) | North-central regions (1)<br>Central regions (2)<br>Southern regions (3)<br>North-eastern regions (4) |
| 10. Health Insurance | Woman in possession of a health insurance | Binary | Covered by health insurance (V481) | No (0)<br>Yes (1) | No (1)<br>Yes (2) |

### 3.6 Ethical issues

The study used secondary data collected by the 2013 NDHS and no contacts with individuals were made. The dataset was downloaded from the DHS website 'www.dhsprogram.com', and authorisation to use the dataset was provided by the DHS program. Furthermore, individuals' responses were anonymous hence there was no need for individual consent. In addition, the confidentiality of respondents was maintained since the dataset did not reveal the identity of respondents. The ethics waiver was applied and granted from the University, and the school protocol (ethics waver) number was provided (WDEMG2019/07/10), and NDHS guidelines, as well as protocols, were adhered to.

### 3.7 Data analysis

This was a quantitative study on pregnant women aged 15– 49 years. STATA 15 program was used for data management and analysis. Data were analysed by order of study objectives. Before the analyses, data were first cleaned, and missing values were dropped.

*Objective 1: To examine the levels of ANC utilisation amongst different subgroups of pregnant women in Namibia.*

In this study, the levels of ANC utilisation amongst subgroups of pregnant women in Namibia were generated through frequency and percentage distributions of ANC utilisation across all predisposing and enabling factors included in the study. The distributions of ANC utilisation for each variable category were thus compared. In addition, these distributions were determined through descriptive statistics analysis, and results were displayed in tables and graphs.

*Objective 2: To identify the predisposing and enabling factors associated with ANC utilisation amongst pregnant women in Namibia.*

To achieve objective 2, the Binary Logistic Regression Model (BLR) was used. BLR is a statistical method used in estimating the probability of occurrence of an event when the dependent variable has two outcome categories (Schüppert, 2009). The BLR model was used to estimate the net effects of various predictor variables on the outcome variable (ANC visits). Unadjusted and adjusted Odds Ratios (OR), and Probability Values (P-value) were estimated to determine the significance of each predictor variable on the utilisation of ANC services. Furthermore, the net effects were estimated at a 95% confidence interval and the goodness of

fit of each model was evaluated using Pearson's chi-squared ($\chi^2$) probability tests. Furthermore, the study used the Variance Inflation Factor (VIF) to test for multicollinearity of predictor variables, and every predictor variable gave a VIF of less than 3.00 with a mean VIF of 1.65. The adjusted Wald test was used to determine if predictor variables used in the study have a significant effect on the outcome variable. The test gave a p-value of less than 0.05, which indicated that every predictor variable used in adjusted models were significant to the models. The four models produced (unadjusted, predisposing, enabling and the full adjusted) tested relationships between multiple predictor variables and the outcome variable (ANC visits).

**Unadjusted model:** This model explained the effect of each predisposing and enabling factor on the predictor variable (ANC utilisation), and it was done by excluding other predictors from the model.

**Predisposing model:** This model tested all predisposing variables in one block to assess their predictive ability on ANC utilisation while controlling for the effects of other predisposing variables in the model.

**Enabling model:** While controlling for the effects of other enabling variables, **t**his model tested the predictive power of each enabling variables on ANC utilisation in one block.

**Full adjusted model:** This model included all predisposing and enabling variables at once and analysed their effects on ANC utilisation. The effect of every predictor variable was analysed, observed, and interpreted while controlling for the effects of other predictor variables in the model.

The BLG equation by Schüppert, 2009 is as follows:

$$\log\left(\frac{P(Y)}{1-P(Y)}\right) = ß_0 + ß_1X_1 + ß_2X_2 + \ldots + ß_kX_k$$

Where:

i) P (Y): Is the probability of women to utilise $4^+$ ANC visits based on predictor variables Xs.

ii) 1 –P(Y): Is the probability of women to utilise less than $4^+$ ANC visits based on predictor variables Xs

iii) (P(Y) /1- P(Y)): Is the odds that a woman to utilised $4^+$ ANC visits, which is divided by the odds of utilising less than 4 ANC visits based on predictor variables Xs

iv) $ß_0$: Is the constant, which is the value of the log-odds of the outcome variable (ANC visits) when all predictor variables were equal to zero ($X_1$, $X_2$, $X_3 \ldots X_k$)

v) $ß_1$, $ß_2$, . . . $ß_k$: Is the value of the log-odds for each predictor variable (X) which were estimated when holding all other predictor variables constant (Schüppert, 2009).

# CHAPTER 4: RESULTS

This chapter presents the study results and interpretations. The results are presented according to the two specific objectives of the study. The first objective was to examine the levels of ANC utilisation amongst different subgroups of pregant women in Namibia. Descriptive statistics on ANC utilisation are presented in this report indicating the different levels of utilisation by pregnant women in 2013. For the second objective 'to identify the predisposing and enabling factors associated with ANC utilisation amongst pregnant women in Namibia', inferential statistics based on the outcome of the BLR were presented. Associations between ANC utilisation, predisposing, and enabling factors were presented as unadjusted, predisposing, enabling and full adjusted models. Furthermore, 'less than 4 ANC visits' was used as the reference category under the binary logistic regression analysis. It was used as a reference category because the study wanted to compare the factors associated with women who had less than 4 visits to those that had sufficiently utilised ANC services (4+ visits).

## 4.1 Levels of ANC utilisation amongst different subgroups of pregnant women in Namibia

The levels of ANC utilisation amongst pregnant women in Namibia were generated as frequencies and proportions for every predisposing and enabling characteristics of women. These distributions were determined through descriptive statistics analysis and results were displayed in Tables 4.1 and 4.2.

**Table 4.1: Socio-demographic characteristics of pregnant women representing the predisposing and enabling factors in Namibia**

| Predisposing factors | | Enabling factors | |
|---|---|---|---|
| **Characteristics** | **Frequency (%)** | **Characteristics** | **Frequency (%)** |
| **Age (in years)** | | **Wealth index** | |
| < 29 years | 1,980 (51.85) | Poor | 1,569 (41.10) |
| ≥ 29 years | 1,839 (48.15) | Middle | 802 (21.00) |
| **Total** | **3,819 (100.00)** | Rich | 1,448 (37.91) |
| Mean age | 29 years | **Total** | **3,819 (100.00)** |
| Standard deviation | 7.15 | **Residence** | |
| Minimum value | 15 years | Urban | 1,955 (51.18) |
| Maximum value | 49 years | Rural | 1,864 (48.82) |
| **Parity (children ever born)** | | **Total** | **3,819 (100.00)** |
| < 3 children | 2,242 (58.72) | **Region** | |
| ≥ 3 children | 1,576 (41.28) | North-central regions | 1,464 (38.33) |
| **Total** | **3,819 (100.00)** | North-eastern regions | 687 (17.98) |
| Mean parity | 3 children | Central regions | 1,399 (36.64) |
| Standard deviation | 1.87 | Southern regions | 269 (7.04) |
| Minimum value | 1 child | **Total** | **3,819 (100.00)** |
| Maximum value | 13 children | **Health insurance** | |
| **Education level** | | No | 3,282 (85.95) |
| No education | 218 (5.71) | Yes | 537 (14.05) |
| Primary | 834 (21.82) | **Total** | **3,819 (100.00)** |
| Secondary/higher | 2,767 (72.46) | | |
| **Total** | **3,819 (100.00)** | | |
| **Husband/partner's education level** | | | |
| No education | 312 (8.18) | | |
| Primary | 379 (9.92) | | |
| Secondary/higher | 1,233 (32.30) | | |
| No husband/partner | 1,894 (49.60) | | |
| **Total** | **3,819 (100.00)** | | |
| **Marital status** | | | |
| Never in union | 1,862 (48.76) | | |
| Married/living together | 1,759 (46.06) | | |
| Widowed/separated/divorced | 198 (5.19) | | |
| **Total** | **3,819 (100.00)** | | |
| **Ethnicity** | | | |
| Damara/Namas | 432 (11.30) | | |
| Hereros | 306 (8.01) | | |
| Kavangos | 440 (11.52) | | |
| Lozi | 231 (6.06) | | |
| Aawambo | 1,912 (50.08) | | |
| others | 498 (13.03) | | |
| **Total** | **3,819 (100.00)** | | |

Source: NDHS, 2013

Table 4.1 above illustrates the socio-demographic characteristics representing the predisposing and enabling factors of women in Namibia who were included in the study. For the women's age as related to ANC utilisation in 2013, the average age of women who were included in the study was found to be 29.01 years, rounded off to 29 years of age, with a standard deviation of 7.15. The minimum age was 15 years, and the maximum was 49 years. The results further indicate that about 51.85% of the 3,819 women were aged between 15 and 28 years, which is

below the mean age (29 years). Women aged between 29 and 49 years in the study constituted 48.15%. The average number of children ever born to women included in the study was 2.67 children with a standard deviation of 1.87. Table 4.1 further highlights that, of the 3,819 women studied, 58.72% had one to two children while 41.28% had given birth to more than three children. The minimum value for children ever born by these women was 1 child while the maximum was 13 children.

As for the educational level of women, 5.71% of the 3,819 women included in the study had no education, 21.82% were reported to have attained primary school only, and 72.46% had secondary school or higher as their highest educational attainment. With regards to the educational level of women's husbands/partners, a high percentage of 49.60 women included in the study had no husbands/partners at the time of the survey. Of those that had husbands/partners, 8.18% indicated that their husbands/partners had no formal education, 9.92% indicated that their husbands/partners had attained primary school, and 32.30% reported that their husbands/partners had secondary/higher as their highest educational level.

More than forty-eight percent (48.76%) of women indicated to had never been in a union, 46.06% were either married or living together with their partners at the time of the survey, and women who were either widowed, divorced or separated, represented 5.19% in total.

About 11.30% of the respondents reported that they were Damara/Namas in ethnicity, 8.01% were Hereros, 11.52% were Kavangos, 6.06% were Lozi women, and 50.08% represented Aawambo ethnic group. Those that belonged to other ethnic groups, such as, Germans, English, Indians, San, and Tswanas, represented 13.03% in total. As of place of residence, the majority (51.18%) of women resided in urban areas, compared to 48.82% of their counterparts who resided in rural areas at the time of the survey. With regards to the region of residence, about 38.33% of women were residents of North-central regions, 36.64% were in Central regions, 17.98% resided in North-eastern regions, and 7.04% of women lived in Southern regions.

In terms of household wealth, 41.10% of the women were from poor households, 21.00% were from households with middle income, and 37.91% of the women were from rich families. With regards to health insurance in Namibia, the majority of the women included in the study had no health insurance at the time of the survey, representing 85.95%, only a few were however insured (14.05%).

**Table 4.2: ANC utilisation and associations with predisposing and enabling factors**

| Characteristics | Less than 4 visits (%) | $4^+$ visits (%) | Total (%) | $\chi^2$ (P-value) |
|---|---|---|---|---|
| **Predisposing factors** | | | | |
| **Age (Mean age: 29 years)** | | | | |
| < 29 years | 333 (60.84) | 1,647 (50.35) | 1,980 (51.85) | 21.376 (0.000) |
| ≥ 29 years | 214 (39.16) | 1,624 (49.65) | 1,839 (48.15) | |
| **Parity (Average parity: 3 children)** | | | | |
| < 3 children | 312 (56.99) | 1,931 (59.01) | 2,242 (58.72) | 0.820 (0.421) |
| ≥ 3 children | 235 (43.01) | 1,341 (40.99) | 1,576 (41.28) | |
| **Educational level** | | | | |
| No education | 64 (11.63) | 154 (4.72) | 218 (5.71) | 94.254 (0.000) |
| Primary | 174 (31.86) | 659 (20.15) | 833 (21.82) | |
| Secondary/higher | 309 (56.51) | 2,458 (75.13) | 2,767 (72.46) | |
| **Husband/partner's education level** | | | | |
| No education | 70 (12.73) | 243 (7.41) | 312 (8.18) | 39.822 (0.000) |
| Primary | 78 (14.32) | 301 (9.19) | 379 (9.92) | |
| Secondary/ higher | 139 (25.45) | 1,094 (33.44) | 1,233 (32.30) | |
| No husband/partner | 260 (47.50) | 1,634 (49.96) | 1,894 (49.60) | |
| **Marital status** | | | | |
| Never been in a union | 254 (46.38) | 1,608 (49.15) | 1,862 (48.76) | 1.498 (0.558) |
| Married/living together | 263 (48.14) | 1,495 (45.71) | 1,759 (46.06) | |
| Widowed/divorced/separated | 30 (5.48) | 168 (5.14) | 198 (5.19) | |
| **Women's ethnicity** | | | | |
| Damara/Namas | 63 (11.61) | 368 (11.25) | 432 (11.30) | 171.035 (0.000) |
| Hereros | 79 (14.51) | 226 (6.92) | 306 (8.01) | |
| Kavangos | 111 (20.38) | 329 (10.04) | 440 (11.52) | |
| Lozi | 44 (8.02) | 188 (5.73) | 231 (6.06) | |
| Aawambo | 147 (26.86) | 1,765 (53.96) | 1,912 (50.08) | |
| others | 102 (18.62) | 396 (12.10) | 498 (13.03) | |
| **Enabling factors** | | | | |
| **Wealth index** | | | | |
| Poor | 269 (49.13) | 1,301 (39.75) | 1,569 (41.10) | 21.192 (0.000) |
| Middle | 114 (20.83) | 688 (21.02) | 802 (21.00) | |
| Rich | 164 (30.04) | 1,283 (39.22) | 1,448 (37.91) | |
| **Residence** | | | | |
| Urban | 247 (45.14) | 1,708 (52.19) | 1,955 (51.18) | 9.669 (0.020) |
| Rural | 300 (54.86) | 1,564 (47.81) | 1,864 (48.82) | |
| **Region** | | | | |
| North-central regions | 140 (25.59) | 1,324 (40.46) | 1,464 (38.33) | 87.686 (0.000) |
| Central regions | 200 (36.50) | 1,200 (36.67) | 1,399 (36.64) | |
| Southern regions | 39 (7.19) | 230 (7.02) | 269 (7.04) | |
| North-eastern regions | 168 (30.73) | 519 (15.85) | 687 (17.98) | |
| **Women's health insurance status** | | | | |
| No | 518 (94.64) | 2,764 (84.49) | 3,282 (85.95) | 41.355 (0.000) |
| Yes | 29 (5.36) | 507 (15.51) | 537 (14.05) | |
| **Total** | **547 (100.00)** | **3,272 (100.00)** | **3.819 (100.00)** | |

From the results in Table 4.2, 547 women utilised less than 4 ANC visits and the highest proportion (60.84%) were those aged below the mean age (15-28 years), while 39.16% of women were aged between 29-49 years. Among the 3,272 women who sufficiently utilised ANC services ($4^+$ visits), the majority were aged between 15-28 years (50.35%), followed by

women aged 29-49 years (49.65%). The test of association between ANC utilisation and the age of a woman was found to be significant ($\chi^2$ = 21.376, P-value<0.05). Among the women who had less than 4 ANC visits, the highest proportion (56.99%) were women who had given birth to less than three children, while those that indicated to have given birth to three and more children represented 43.01%. Similarly, 59.01% of women who had visited ANC services for at least four times had given birth to less than three children, followed by those with three and more children representing 40.99%. The test of association between ANC utilisation and the parity of a woman was not significant ($\chi^2$ = 0.820, P-value>0.05).

The relationship between the educational level of a woman and ANC utilisation was found to be significant ($\chi^2$= 94.254, P-value< 0.05). Five hundred and forty-seven (547) women had only utilised ANC services for less than four times during their last pregnancy. Of the 547 women, 56.51% of them had secondary/higher education, followed by those with primary education (31.86%) while 11.63% of them were not educated. The results further show among the women that utilised ANC services for at least four times, 75.13% had secondary/higher education, followed by those with primary education (20.15%) while 4.72% had no education.

The relationship between ANC utilisation and educational attainments of husbands/partners of women was also found to be significant ($\chi^2$ = 39.822, P-value <0.05). Of the 547, 25.45% indicated that their husbands/partners had secondary/higher education, 14.32% highlighted that their husbands/partners only went up to primary school, and 12.73% had uneducated husband/partner. Among the women who had taken at least four ANC visits, 33.44% indicated that their husbands/partners had secondary/higher education, 9.19% had husbands/partners who had only primary education while 7.41% women highlighted that their husbands/partners were uneducated.

Table 4.2 further shows an association between ANC utilisation and women's marital status. Pearson's chi-squared test of association indicated that the relationship between ANC visits and women's marital status was not significant ($\chi^2$ = 1.498, P-value> 0.05). The results further indicated that, of the 547 women with less than 4 ANC visits, the highest proportion (48.14%) were women who were married or cohabitating, followed by women who have never been in a union (46.38%) and women who were either widowed, divorced or separated (5.48%). For the 3,272 women with $4^+$ visits, most of them were never in a union (49.15%), followed by those who were married or living together with their partners (45.71%) and women who were widowed, divorced or separated from their husbands (5.14%).

Women who utilised ANC services for less than four times belonged mostly to the Aawambo (26.86%) and Kavango (20.38%) ethnic groups. Herero women represented 14.51% followed by Damara/Namas (11.61%). The least were women from the Lozi ethnic group (8.02%). Among the women who had taken at least four ANC visits, the majority (53.96%) indicated that they were Aawambo, followed by those that indicated other ethnic groups (12.10%), Damara/Namas (11.25%), and Kavango women (10.04%). The least to utilise at least four ANC visits were Hereros and Lozi women, with 6.92% and 5.73% respectively. The relationship between ANC visits and ethnicity was highly significant ($\chi^2$=171.035, P-value<0.05).

With regards to enabling factors, the relationship between ANC visits and the wealth index was significant ($\chi^2$= 21.192, P-value<0.05). The results further show that, of the 547 women that had less than four ANC visits, the highest proportion (49.13%) were those from poor households, followed by women from rich households (30.04%) and the middle wealth class (20.83%). Similarly, of the women who had made at least four ANC visits, the majority were from poor households (39.75%), followed by those that belonged to the rich wealth class (39.22%) and those that belonged to the middle wealth class (21.02%). With health insurance, about 85.95% of the women indicated that they had no health insurance at the time of the survey while 14.05% were insured. More than ninety-four percent (94.64%) of the women who had less than 4 ANC visits had no health insurance just like 84.49% of the 3,272 women with sufficient ANC utilisation ($4^+$ visits). The test of association indicated a significant relationship between ANC visits and health insurance in Namibia ($\chi^2$= 41.355, P-value< 0.05).

The results show that 54.86% of the 547 women with less than four ANC visits resided in rural areas while 52.19% of the women who had taken at least four ANC visits lived in urban areas. The chi-squared test of association indicated that the relationship between ANC visits and women's place of residence was significant ($\chi^2$= 9.669; P-value<0.05). The results also show a significant relationship between women's region of residence and ANC utilisation ($\chi^2$ = 87.686, P-value< 0.05). More than 36% of the women with less than four ANC visits lived in the Central regions (Erongo, Khomas Omaheke, and Otjozondjupa regions), followed by those that resided in North-eastern regions (Kavango west, Kavango east, and Zambezi regions) (30.73%) and North-central regions (Oshikoto, Oshana, Ohangwena, Omusati, and Kunene regions) (25.59%). Conversely, the North-Central regions housed majority (40.46%) of the women who had at least 4 ANC visits, followed by those that lived in Central regions (36.67%), and North-eastern regions (15.85%). The least were from Southern regions (7.02%).

### 4.2 The predisposing and enabling factors associated with ANC utilisation in Namibia

The results of the BLR analyses are summarised as unadjusted, predisposing, enabling, and full adjusted models and interpreted in this section. The category ‘less than 4 visits’ was used as the reference category since the study wanted to compare the differences between women with insufficient ANC visits (less than 4) and those with sufficient ANC visits ($4^{+}$ visits).

**Table 4.3: Summary of the unadjusted, predisposing, enabling and full adjusted BLR models**

| Characteristics | Unadjusted model | | Predisposing model | | Enabling model | | Full adjusted model | |
|---|---|---|---|---|---|---|---|---|
| | OR | P-value [CI] | OR | P-value [CI] | OR | P-value [CI] | OR | P-value [CI] |
| **Predisposing characteristics** | | | | | | | | |
| **Age (in years)** | | | | | | | | |
| Age (in years) | 1.033 | 0.000 [1.019 - 1.046] * | 1.063 | 0.000 [1.035 - 1.092] * | | | 1.055 | 0.000 [1.027 - 1.083] * |
| **Parity** | | | | | | | | |
| Children ever born | 0.944 | 0.015 [0.902 - 0.989] * | 0.867 | 0.003 [0.789 - 0.953] * | | | 0.883 | 0.010 [0.804 - 0.971] * |
| **Women's education level** | | | | | | | | |
| No education **(RC)** | | | | | | | | |
| Primary | 1.557 | 0.010 [1.113 - 2.180] * | 1.320 | 0.154 [0.901 - 1.934] | | | 1.325 | 0.148 [0.904 - 1.941] |
| Secondary/ higher | 3.275 | 0.000 [2.390 - 4.488] * | 2.195 | 0.000 [1.490 - 3.233] * | | | 2.011 | 0.000 [1.360 - 2.973] * |
| **Husband/partner's education level** | | | | | | | | |
| No education **(RC)** | | | | | | | | |
| Primary | 1.102 | 0.601 [0.766 - 1.587] | 0.956 | 0.819 [0.650 - 1.406] | | | 0.956 | 0.820 [0.651 - 1.405] |
| Secondary/higher | 2.257 | 0.000 [1.640 - 3.106] * | 1.742 | 0.003 [1.202 - 2.526] * | | | 1.588 | 0.014 [1.097 - 2.299] * |
| No husband/partner | 1.806 | 0.000 [1.342 - 2.430] * | 0.966 | 0.945 [0.364 - 2.566] | | | 0.913 | 0.859 [0.335 – 2.488] |
| **Marital status** | | | | | | | | |
| Never in a union **(RC)** | | | | | | | | |
| Married/living together | 0.896 | 0.247 [0.744 - 1.079] | 0.899 | 0.835 [0.330 - 2.450] | | | 0.902 | 0.842 [0.324 – 2.506] |
| Widowed/divorced/separated | 0.885 | 0.561 [0.587 - 1.335] | 0.910 | 0.855 [0.329 - 2.519] | | | 0.951 | 0.924 [0.341 – 2.655] |
| **Ethnicity** | | | | | | | | |
| Damara/Namas **(RC)** | | | | | | | | |
| Hereros | 0.492 | 0.000 [0.340 - 0.712] * | 0.469 | 0.001 [0.299 - 0.734] * | | | 0.453 | 0.001 [0.280 - 0.732] * |
| Kavangos | 0.508 | 0.000 [0.361 - 0.716] * | 0.563 | 0.015 [0.355 - 0.893] * | | | 0.677 | 0.145 [0.400 - 1.145] |
| Lozi | 0.738 | 0.159 [0.483 - 1.126] | 0.644 | 0.088 [0.389 - 1.067] | | | 0.792 | 0.488 [0.409 - 1.533] |
| Aawambo | 2.072 | 0.000 [1.512 - 2.839] * | 2.042 | 0.001 [1.339 - 3.113] * | | | 1.859 | 0.026 [1.078 - 3.205] * |
| others | 0.670 | 0.023 [0.475 - 0.945] * | 0.590 | 0.032 [0.364 - 0.955] * | | | 0.551 | 0.021 [0.333 - 0.912] * |
| **2. Enabling characteristics** | | | | | | | | |
| **Wealth index** | | | | | | | | |
| Poor **(RC)** | | | | | | | | |
| Middle | 1.248 | 0.068 [0.984 - 1.582] | | | 1.138 | 0.381 [0.852 - 1.520] | 0.947 | 0.708 [0.711 - 1.260] |
| Rich | 1.614 | 0.000 [1.310 - 1.989] * | | | 1.240 | 0.146 [0.928 - 1.657] | 1.098 | 0.558 [0.802 - 1.504] |
| **Residence** | | | | | | | | |
| Urban | | | | | | | | |
| Rural | 0.754 | 0.002 [0.628 - 0.904] * | | | 0.717 | 0.028 [0.532 - 0.965] * | 0.881 | 0.363 [0.671 - 1.158] |
| **Region** | | | | | | | | |
| North-central regions **(RC)** | | | | | | | | |
| Central regions | 0.635 | 0.000 [0.505 - 0.799] * | | | 0.427 | 0.000 [0.305 - 0.598] * | 0.696 | 0.076 [0.466 - 1.038] |
| Southern regions | 0.618 | 0.013 [0.422 - 0.904] * | | | 0.490 | 0.000 [0.340 - 0.705] * | 0.809 | 0.406 [0.491 - 1.334] |
| North-eastern regions | 0.326 | 0.000 [0.255 - 0.417] * | | | 0.326 | 0.000 [0.236 - 0.450] * | 0.659 | 0.109 [0.396 - 1.098] |
| **Health insurance status** | | | | | | | | |
| No | | | | | | | | |
| Yes | 3.241 | 0.000 [2.208 - 4.758] * | | | 2.866 | 0.000 [1.796 - 4.573] * | 2.292 | 0.001 [1.406 - 3.735] * |

All variables whether significant or not significant under the unadjusted, predisposing, or enabling models were retained in the full adjusted logistic regression model. * Denotes statistically significant associations at a 5% level.

*4.2.1 Unadjusted BLR results of both predisposing and enabling factors*

On the results of the regression analysis, as shown in Table 4.3, the odds of attending at least four (4) ANC visits as compared to less than four ANC visits increased by 3.30% (OR=1.033; 95% CI: 1.019 – 1.046) with each additional year of age for women in Namibia. With every additional child born to a woman in Namibia, the results further show, that the likelihood of attending at least four ANC visits reduces by about six percent (OR=0.944; 95% CI:0.902 - 0.989). The likelihood of attending at least four ANC visits, as compared to less than four ANC visits, increased by 55.70% (OR =1.557; 95% CI: 1.113 – 2.180) for women with primary education and it was 3 times higher for women with secondary/higher education (OR =3.275; 95% CI: 2.390 – 4.488) as compared to women with no education at all. Also, the odds of a woman attending $4^{+}$ visits as compared to less than 4 ANC visits, was 2.257 times higher for women whose husbands/partners had secondary/higher education (OR =2.257; 95% CI:1.640 – 3.106) as compared to those without education. Similarly, women who indicated that they had no husband/partner had a higher probability of attending at least four ANC visits (OR=1.806; 95% CI: 1.342 – 2.430) as compared to women whose husbands/partners had no education.

In terms of ethnicity, the results indicate that it was less likely for a Herero woman to attend at least four ANC visits as compared to a Damara/Nama woman (OR= 0.492; 95% CI: 0.340 – 0.712). This was similar to Kavango women and women of other ethnic groups, as their odds of utilising at least four ANC visits decreased by 49.20% (OR=0.508; 95% CI: 0.361 - 0.716), and 33.00% (OR=0.670; 95% CI: 0.475 – 0.945) respectively as compared to the odds of at least four ANC attendance by Damara/Nama women. However, with regards to Oshiwambo speaking women, they were highly likely to attend at least four ANC visits as compared to less than four ANC visits than Damara/Nama women (OR=2.072; 95% CI: 1.512 - 2.839).

Moreover, women from rich households had a higher probability of attending $4^{+}$ ANC visits as compared to those belonging to poor households (OR=1.614; 95% CI:1.310 – 1.989). Results further indicate that women with health insurance were 224.10% (OR=3.241; 95% CI: 2.208 – 4.758) highly likely to attend at least four ANC visits as compared to those without medical insurance. The probability of attending at least four ANC visits reduced by 24.60% (OR=0.754; 95% CI: 0.628 - 0.904) for women residing in rural areas as compared to those in urban areas.

As compared to women who resided in North-central regions, there was a 0.635 (OR=0.635; 95% CI: 0.505 - 0.799) times lower probability of a woman residing in Central regions to attend

at least four ANC visits as compared to less than four ANC visits in Namibia in 2013. This outcome was however similar to those women that resided in both Southern (OR=0.618; 95% CI: 0.422 - 0.904) and North-eastern (OR=0.326; 95% CI: 0.255 - 0.417) regions, as they too had a lower likelihood of attending at least four ANC visits as compared to women that resided in North-central regions. It is however worth noting that the marital status of women did not influence ANC utilisation amongst pregnant women in Namibia.

### *4.2.2 Predisposing BLR model results*

Just like the unadjusted model results, the age of a woman was found to be highly significant in influencing the utilisation of ANC services by pregnant women in Namibia in the predisposing BLR model. When controlling for other predisposing factors, the odds of attending at least four ANC visits as compared to less than four ANC visits increased by 6.30% (OR=1.063; 95% CI: 1.035 – 1.092) with each additional year of age.

The model further shows a significant relationship between the parity of a woman and ANC utilisation. When controlling for other predisposing variables, the likelihood of attending at least four ANC visits reduces by 13.30% (OR=0.867; 95% CI:0.789 - 0.953) with every additional child born to a woman in Namibia.

Similar to the unadjusted model, women's educational level contributed significantly to the utilisation of ANC services by pregnant women. When other predisposing variables were kept, the likelihood of attending at least four ANC visits as compared to less than four ANC visits increased by 119.50% (OR =2.195; 95% CI: 1.490– 3.233) for women with secondary/higher education compared to women with no education at all. However, under the predisposing model, primary education was found not to be significantly associated with ANC utilisation when compared to the unadjusted model. When other predisposing factors were controlled, the odds of a woman attending $4^{+}$ visits as compared to less than 4 ANC visits, was 1.742 (OR =1.742; 95% CI:1.202 – 2.526) times higher for women whose husbands/partners had secondary/higher education as compared to those without education. 'No husband/partner' category was found not to be significant under the predisposing model as compared to the unadjusted model.

In terms of ethnicity, when other predisposing factors were controlled, results indicated that it was less likely for a Herero ethnic group of pregnant women to attend at least four ANC visits

as compared to Damara/Nama women (OR= 0.469; 95% CI: 0.299– 0.734). This was similar to Kavango ethnic group of pregnant women and those belonging to 'other ethnic groups', as their odds of utilising at least four ANC visits decreased by 43.70% (OR=0.563; 95% CI: 0.355 - 0.893), and 41.00% (OR=0.590; 95% CI: 0.364 – 0.955) respectively as compared to the odds of at least four ANC attendance by Damara/Nama women. However, with regards to the Aawambo ethnic group of pregnant women, they have higher odds of attending at least four ANC visits (OR=2.042; 95% CI: 1.339- 3.113) to less than four ANC attendance as compared to Damara/Nama ethnic group of pregnant women. These findings were found to be similar to the results in the unadjusted model.

### *4.2.3 Enabling BLR model results*

Table 4.3 further illustrates the results of the enabling BLR model which only analyse the effects of the enabling factors on ANC utilisation amongst pregnant women in Namibia. The enabling model outlined that pregnant women that reside in rural areas had a lower probability of attending at least four ANC visits as compared to those women that lived in urban residence (OR=0.717; 95% CI:0.532 – 0.965). This was the case when the effects of other enabling factors were controlled. When other enabling variables were controlled, there was a 0.427 (OR=0.427; 95% CI: 0.305 - 0.598) times lower probability of a woman residing in Central regions to attend at least four ANC visits compared to women that resided in North-central regions. Similar to that were residents of both Southern (OR=0.490; 95% CI: 0.340 - 0.705) and North-eastern (OR=0.326; 95% CI: 0.236 - 0.450) regions, they were less likely to attend at least four ANC visits as compared to women that resided in North-central regions.

When the effects of other enabling variables were controlled, results further indicated that there was an increased likelihood of pregnant women with health insurance to attend at least four ANC visits as compared to those with no health insurance in the country (OR=2.866; 95% CI: 1.796 – 4.573). However, households' wealth status was found not to have an influence on pregnant women's ANC utilisation under the enabling model as compared to the unadjusted model results.

### *4.2.4 Full adjusted BLR results of both predisposing and enabling factors*

All the variables, whether they had an influence on the uptake of ANC services or not under the unadjusted, predisposing or enabling models, were included in the adjusted model. This, however, indicates that even the marital status of women and wealth index which were found not to have an influence on ANC utilisation under the unadjusted and enabling models were retained for the full adjusted BLR analysis.

Based on the full adjusted model when other variables were held constant, the odds of attending at least four (4) ANC visits as compared to less than four ANC visits increased by 5.50% (OR=1.055; 95% CI: 1.027 – 1.083) with each additional year of age for women in Namibia. Moreover, an inverse relationship between a woman's parity and attendance of at least four ANC visits was observed by the study, indicating that for every additional child being born to a woman, the likelihood of attending at least four ANC visits reduces by 11.70% (OR=0.883; 95% CI:0.804 - 0.971).

There was also a higher probability of attending at least four ANC visits for women with secondary/higher educational levels as compared to those with no education (OR =2.011; 95% CI: 1.360 – 2.973). This was achieved when other variables were controlled. The husband/partner's educational level significantly influenced the utilisation of ANC services women in Namibia. When other variables were kept as constant, women whose husbands/partners attended up to secondary/higher education were more likely to attend at least four ANC visits by 58.80% (OR =1.588; 95% CI: 1.097 – 2.299) more than those whose husbands/partners had no education at all.

When controlling for other factors, results, however, indicated that it was less likely (OR= 0.453; 95% CI: 0.280 – 0.732) for a Herero ethnic group of pregnant women to attend at least four ANC visits as compared to pregnant women from Damara/Nama ethnic group Similarly, pregnant women belonging to other ethnic groups had a lower likelihood of attending at least four ANC visits as compared to pregnant women from the Damara/Nama ethnic group (OR= 0.551; 95% CI: 0.333 – 0.912). For pregnant women from the Aawambo ethnic group, findings indicated a higher probability of attending at least four ANC visits as compared to pregnant women from the Damara/Nama ethnic group (OR= 1.859; 95% CI: 1.078 – 3.205). Women with health insurance as compared to those who were not insured were highly likely to attend sufficient ANC visits as compared to less than four ANC visits (OR=2.292; 95% CI: 1.406 – 3.735).

Variables such as wealth index, residence, and regions that were found to have an influence on ANC utilisation under the unadjusted, predisposing, or enabling models, were however found not to be significant under the full adjusted model.

# CHAPTER 5: DISCUSSION

This chapter provides detailed discussions and interpretations of the study findings supported by findings from the existing literature reviewed. The main research objective for this study was to determine whether predisposing and enabling factors such as maternal age, educational level, ethnicity, parity, marital status, wealth index, type of residence, region and health insurance status of a woman have an influence on the uptake of ANC services by pregnant women in Namibia. The study was designed to address two specific objectives; the first one was to examine the levels of ANC utilisation amongst different subgroups of pregnant women in Namibia. This objective was attained using frequency and percentage distributions of ANC utilisation for each predisposing and enabling factors included in the study and comparisons were made. In addition, the second objective of the study was to identify the predisposing and enabling factors associated with ANC utilisation amongst pregnant women in Namibia. This objective was achieved using unadjusted and adjusted binary logistic regression models. A detailed discussion of the various findings on both objectives is presented in this chapter.

## 5.1 Levels of ANC utilisation by pregnant women in Namibia

This study generally examined ANC utilisation in Namibia and identified the predictors of ANC utilisation in Namibia through logistic regression. Based on the findings of the study, 85.67% of the 3,819 women included in the study had made at least four ANC visits as recommended by the WHO and more than fourteen percent (14.33%) of women had made less than four ANC visits during their last pregnancies. This indicated that close to 97% of women in Namibia had made at least one ANC contact during their last pregnancies. Even though the proportion of pregnant women that made at least one ANC contact was observed to be high in the country based on the 2013 NDHS, the fraction of pregnant women (14.33%) with no ANC visits still have not met the WHO recommendations, considering the associated possible risks. Namibia is still challenged with a high rate of maternal mortality and this could be associated with a high proportion of pregnant women who do not visit ANC services during pregnancies as well as by the quality of ANC services rendered to pregnant women by healthcare providers (Do, Wang, Hembling, & Ametepi, 2017). Pregnant women who are less educated and those that reside in rural areas were observed to have low uptake of ANC services. This may be due to the availability of healthcare services in rural areas to render ANC services, this situation

may hinder the country's progress towards achieving the SDGs (Do, Wang, Hembling, & Ametepi, 2017).

### 5.2 Predisposing characteristics associated with ANC utilisation in Namibia

At the unadjusted level, maternal age had an influence on the uptake of at least four ANC visits by pregnant women in Namibia. This was evident even after adjusting for the influence of other factors. Studies have found mixed evidence of the association between maternal age and the utilisation of ANC services. Some studies identified young maternal age as compared to older age as having high odds of utilising ANC services (Ali et al., 2018). This study, however, found that as the age of a mother increases the likelihood of utilising at least four ANC services increases too. This finding is supported by previous studies that outlined a significant association between ANC utilisation and increased maternal age (Banda, 2013; Rurangirwa, Mogren, Nyirazinyoye, Ntaganira, & Krantz, 2017; Ali et al., 2018). Banda (2013) discussed that young women are more likely to delay starting ANC services which thus affects the overall number of visits to be made during the pregnancy. This may be linked to societal beliefs, cultures, and taboos (United Nations Population Fund, 2012).

In many countries of the world, it is culturally wrong for a young girl to fall pregnant before marriage. This prevents some adolescent girls from utilising ANC services for fear of rejection and discrimination (University of Carolina Population Center, 2015; Govender et al., 2018; Warri & George, 2020). Furthermore, adolescent girls tend to diagnose their pregnancies a bit late, and this is mostly due to the gap in knowledge about fertility and menstrual cycles (University of Carolina Population Center, 2015; Govender et al., 2018; Warri & George, 2020). In 2010, Namibia introduced a policy on learner pregnancy, which aimed at preventing as well as giving support to young mothers during pregnancy and after delivery (Hubbard, 2010). It further emphasises early detection of pregnancies for adolescent-mothers to start ANC as early as the first trimester as well as to provide maternal information to the young mothers to be. However, the implementation of the policy has been slow due to societal beliefs and acceptance (Hubbard, 2010).

Findings from this study also show that multiparous women have decreased odds of attending four or more ANC visits and this is consistent with findings from similar studies that show that an increase in parity of a woman reduces the utilisation of ANC services (Trinh, Dibley, &

Byles, 2007; Agus & Horiuchi, 2012; Joshi, Torvaldsen, Hodgson, & Hayen, 2014; Agha & Tappis, 2016; Gitonga, 2017; Yaya et al., 2017; Islam & Masud, 2018). This reduction in ANC utilisation as parity increases might be explained by the complications associated with the first pregnancy (obstetric history) as well as with the assumption multiparous might have that they have full knowledge of ANC ( Joshi, Torvaldsen, Hodgson, & Hayen,, 2014; Warri & George, 2020). An assumption made is that the second or later pregnancy may carry lower risks of complications if the first pregnancy and birth were uncomplicated (Joshi, Torvaldsen, Hodgson, & Hayen, 2014). Therefore, women who had not experienced any complications with the first pregnancy may not see the need to utilise ANC services (Joshi, Torvaldsen, Hodgson, & Hayen, 2014). The possible explanation may be women who had been pregnant many times were less motivated to go for ANC visits due to experience gained from previous pregnancies and births.

A study conducted in Indonesia concluded that having given birth to many children may influence the uptake of ANC services by pregnant women (Agus & Horiuchi, 2012). Low percentages of ANC uptake were observed amongst multiparous women as compared to nulliparous women, as the percentage of ANC uptake reduced by 20 to 40 percent amongst multiparous women (Agus & Horiuchi, 2012). In another study conducted in Nepal, women with multiple children were highly associated with a reduction in the uptake of four or more ANC visits amongst pregnant women in the country (Joshi, Torvaldsen, Hodgson, & Hayen, 2014).

In this study, women who had attended at least four ANC visits were mostly those with secondary/higher educational level, representing more than 75% of those that utilised ANC for at least four visits. The findings further show that as the level of education increases among the women, the probability of utilising at least four ANC services increases too, suggesting that higher levels of education have a significant influence on women's use of maternal health services. The study findings are consistent with those from previous studies that have identified education as a critical element in determining a woman's ability and willingness to utilise maternal health services (Pillai, Maleku, & Wei, 2013; Tunçalp et al., 2014). Al-Ateeq & Al-Rusaiess (2015) observed that an educated woman is an empowered woman, thus women with higher educational level are well-informed and cognisant of the benefits of ANC services and pregnancy-related complications. Educated women are therefore more likely to seek ANC services early during pregnancy (Banke-Thomas, & Ameh, 2017).

Based on literature presented in this study, countries that recorded improved maternal healthcare utilisation, as well as reductions in MMR, have invested tirelessly on girl's education (Sosale, Ramachandran, & Asaduzzaman, 2019). One of the exemplary countries is Bangladesh which has made enormous reductions in maternal mortality by investing highly into girls' education (Tunçalp et al., 2014). Bangladesh managed to halve its MMR in less than two decades, from 724 deaths per 100 000 live births in 1990 to 338 per 100 000 live births in 2008 (Hogan et al., 2010). The country's secondary education enrolment for girls increased from 39 percent in 1998 to 67 percent in 2017 (Sosale, Ramachandran, & Asaduzzaman, 2019). Such progress is a result of several incentives, such as the Female Secondary School Assistance Project (FSSAP), which commenced during the early 1990s and it provides stipends and tuition waivers to girl-learners (Sosale, Ramachandran, & Asaduzzaman, 2019).

Education helps to improve women's confidence in making rightful decisions regarding their own health (Tekelab, Chojenta, Smith, & Loxton, 2019). In Namibia, inequality in education still persists and it is one of the major drivers of inequities in healthcare utilisation in the country (Rashid & Antai, 2014). Many families struggle to send their children to school due to poverty (Rashid & Antai, 2014). Educated women would have greater opportunities to receiving health information and pay more attention to maternal healthcare, thus enabling them to access and utilise ANC service sufficiently knowing the benefit of it. In 2011, a policy on free primary education for all was introduced in Namibia (Ministry of Education, 2011), followed by a policy on free secondary education in 2014 (The Namibian, 2014). These two policies were introduced to eradicate inequalities in education in the country and to make sure every child in Namibia is sent to school regardless of the economic status of the household (Ministry of Education, 2011; The Namibian, 2014). Even though the government has put up policies to educate the girl-child, inequality in education in the country still exists which leads to inequities in healthcare utilisation in the country (Rashid & Antai, 2014).

Besides women's education, countries with patriarchal societies leave women with limited control over decision-making, thus placing husbands/partners as decision-makers in households (United Nations Population Fund, 2012). Namibia is one of the countries in the world with a very strong patriarchal culture and women are supposed to be subordinate and cannot independently take decisions on their own but with support of men (Reid, 2013). Based on this, men's education matters, especially as a factor that may influence ANC utilisation amongst pregnant women and in turn reduce maternal and child mortality in a country (Adeleye & Okonkwo, 2016). If a man is educated and understands the dangers of a woman not seeking

healthcare services while pregnant, he is highly likely to influence the woman to seek ANC services on time (Adeleye & Okonkwo, 2016).

From the findings in this study, more than thirty-three percent of those that utilised at least four ANC visits had husbands/partners that had secondary/higher education as compared to only 9.19% and 7.41% whose husbands/partners had primary and no education respectively. The results show a significant association between ANC utilisation and husbands/partners 'education such that the odds of utilising at least four ANC visits was observed to be 2.257 times higher for women whose husbands/partners had attained secondary/higher educational level as compared to husbands/partners with no education. This was visible even after controlling for covariates. Moreover, women whose husbands had primary education were 1.102 more likely to attend at least four ANC visits as compared to those whose husbands/partners have no education.

Studies have outlined that husbands who are educated tend to support their women's access to healthcare services, especially during prenatal, delivery and postnatal care as this increases the women's probability of getting sufficient maternal care (Rashid & Antai, 2014; Tekelab, Chojenta, Smith, & Loxton, 2019). This gender-based social hierarchy may, however, cause negative health effects to women whose husbands/partners are not educated as they may not know the benefit of their women utilising ANC services (Fauk, Cahaya, Merry, Damayani, & Liana, 2017). Furthermore, women who indicated to have no husbands/partners had higher odds of utilising at least four ANC visits compared to women whose husbands had no education at all. Women's autonomy could, therefore, play a role in influencing their utilisation of ANC services. Pregnant women who have no husbands/partners tend to make better decisions and are more likely to use ANC services compared to women who are married or in relationships (Fauk, Cahaya, Merry, Damayani, & Liana, 2017). A study conducted in Nigeria highlights that one of the reasons why single women tend to highly utilise ANC services is because they are independent, educated and thus do not need to seek permission from their spouses and partners to visit ANC services (Rurangirwa, Mogren, Nyirazinyoye, Ntaganira, & Krantz, 2017). The study findings were however contradicted by some literature, which concluded that single women have low support, hence lower odds of using ANC services as compared to women who had sufficient support from husbands/partners (Kawaguchi et al., 2014).

Research has shown a huge difference in ANC utilisation by women of different ethnic origins (Trinh, 2012; McKinn, Linh, Foster, & McCaffery, 2019). This concurs with the findings of

this study, as disparities in utilisation of ANC exist between women of different ethnicity in Namibia. Aawambo ethnic group of pregnant women were found to be more likely to attend at least four ANC visits as compared to Damara/Namas, with the odds ratio of 2.072 while other ethnicities such as Hereros, Kavangos, and others were less likely to attend four ANC visits. Ethnicity influenced the utilisation of ANC services in both developing and developed countries (Tiruaynet & Muchie, 2019). Women of Asian and Pakistan origin were found to initiate their ANC visits later and made significantly fewer ANC visits compared to white British women in the UK (Rowe & Garcia, 2003). In Ethiopia, Amhara ethnic group of pregnant women were more likely to receive significant ANC services than Oromo ethnic group of pregnant women, and on the other hand, Gumuz women were less likely to utilise sufficient ANC services than Oromo women (Tiruaynet & Muchie, 2019). Different ethnic groups may have different cultures, values, norms, and beliefs, and these may influence the utilisation behaviours and perceptions of ANC services (Bryant et al., 2010).

Even though studies found a significant relationship between ANC and marital status of pregnant women, this study found no association with the utilisation of ANC services for women in Namibia. This finding is similar to a previous study conducted in Namibia, using the 2006 - 2007 NDHS, which concluded that marital status had no influence on prenatal care and that women who were single, as compared to married ones, were less likely to utilise postnatal care (Rashid & Antai, 2014). Another study conducted in Ethiopia found no association between ANC utilisation and marital status (Tekelab, Chojenta, Smith, & Loxton, 2019). In some studies that found a relationship between ANC utilisation and marital status, it was outlined that unmarried women were less likely to attend ANC services as compared to those that were married (Rurangirwa et al., 2017; Gitonga, 2017; Maduka & Ogu, 2018). In some societies, unmarried women delay their first ANC visits compared to women who are married (Gitonga, 2017). Gitonga (2017) and Rurangirwa et al. (2017) attribute this to the social support that married women get from their husbands.

### 5.3 Enabling characteristics associated with ANC utilisation in Namibia

This study has shown that pregnant women belonging to rich households were more likely to utilise a minimum of 4 ANC services compared to women from poor households. Economic disparities within societies have been identified as one of the major contributors to unequal healthcare utilisation in the world (United Nations Population Fund, 2012; Yaya, Bishwajit, &

Shah, 2016). This may be explained by the fact that women from poor households face financial constraints which may prohibit them from accessing facility-based ANC services (Adewuyi et al., 2018). ANC services are 100% subsidised by the government in Namibia, and no cost is required at public hospitals (MoHSS, 2014). However, women who live far from healthcare facilities spend money on care-seeking costs such as transportation which may serve to discourage those from poor households from attending at least four ANC services (Basha, 2019).

Lack of correct and sufficient information about the importance of ANC may be another reason why women from poor households do not sufficiently utilise ANC. Poor women do not have enough access to mass media such as TV and radios as they lack the means to purchase the facilities (Wilunda et al., 2017). A study conducted in India outlined that the utilisation of ANC services increases with the increase in wealth quintile (Singh et al., 2012). In Ghana, the government introduced free maternal health policy with the assumption of curbing financial barriers and reducing disparities in the use of maternal health services in the country (Arthur, 2012). The introduction of the free maternal health policy suggests that wealth still has a significant influence on the use of ANC services, with women in higher wealth quintiles being most likely to uptake more ANC visits than women in the lowest wealth quintile (Arthur, 2012).

As found in this study, women that had at least four ANC visits were mostly residents of urban Namibia (52.19%). This agrees with a study in Ghana which also found that urban women utilised more ANC services than women in rural areas (Afulani, 2015). And another study in Nigeria revealed that living in an urban residence increases the odds of ANC services utilisation by more than twofold (Babalola & Fatusi, 2009). The difference in ANC utilisation between urban and rural residents may be because women living in urban areas have better access to healthcare facilities and information, and as a result, they receive the services from nearby health facilities (Tekelab, Chojenta, Smith, & Loxton, 2019). Women in rural areas travel longer distances to healthcare facilities (Dero, & Ali, 2018). This, however, causes women residing in remote areas to incur substantial opportunity costs since ANC would require traveling and long waiting hours (Lincetto et al., 2006). The long-distance to maternal healthcare facilities and transport costs may discourage pregnant women from seeking ANC services due to both the time taken and the costs involved (Simkhada et al., 2008; Yaya et al., 2016; Mekonnen et al., 2019; Tekelab et al., 2019).

The geographical location (region) is another factor that was found to have an influence on the utilisation of ANC services by pregnant women in Namibia. The results indicated that women who lived in Central regions (Erongo, Khomas, Omaheke, and Otjozondjupa), Southern regions (Hardap and //Karas) and those in North-eastern regions (Kavango west, Kavango east, and Zambezi) were less likely to attend four and more ANC services as compared to women who lived in North-central regions (Oshikoto, Oshana, Ohangwena, Omusati, and Kunene). This is in contrast to the findings by Rashid & Antai (2014) who observed that regions situated in rural areas were found to have low utilisation of ANC amongst pregnant women in Namibia. The central regions of Namibia is where the capital city 'Windhoek' is found as well as the two coastal towns of Walvis Bay and Swakopmund, as well as Otjiwarongo and Okahandja towns in Otjozondjupa region. Hence, these findings contradict the assumption that since urban dwellers are closer to healthcare facilities, they are more likely to fully utilise healthcare services as compared to regions located in rural areas (Arthur, 2012).

In addition to long distances that women might have to travel to access ANC services, especially among women residing in the Southern and North-eastern regions, women that resided in urban areas such as those in Central regions might be discouraged by overcrowding and long waiting time associated with healthcare facilities in urban areas (Van Rooy, Mufune, & Amadhila, 2015). Furthermore, the Central northern regions is where the majority of one of the active ethnic group 'Aawambo' lives, and Aawambo women were found to be highly likely (OR=2.072; 95% CI: 1.512 - 2.839) to utilise at least four ANC services in Namibia as compared to other ethnic groups. However, this could be associated with the fact that Aawambo represents more than 50% of the total Namibian population (Namibia Statistics Agency, 2017b).

One of the barriers to maternal healthcare utilisation is the lack of affordability and financial accessibility (Owoo & Lambon-Quayefio, 2013). In this study, the coverage of health insurance among the study population was 14.05% (537), yet health insurance was found to have a significant influence on the utilisation of ANC services. The odds of women who were insured were found to be 3.241 times higher than the odds of women who were not insured. This was still valid after controlling for the effect of other predictors. Literature indicates that pregnant women who are insured prefer to utilise private healthcare than public healthcare facilities (Konje et al., 2018). This is because of perceived poor quality of ANC services, absence of healthcare providers, shortage of supplies and drugs, and long hours of waiting at public healthcare facilities (Finlayson & Downe, 2013; Konje et al., 2018). Even though public ANC

services are 100% subsided by the government of Namibia and no upfront fees are required from patients, the country is faced with poor quality of public healthcare services (Brockmeyer & Ebert-Stiftung, 2012).

In agreement with the above findings were studies conducted in Mexico and Ghana, which also reported higher odds of ANC utilisation by women who had health insurance than those without (Browne et al., 2016; Heredia-Pi, Servan-Mori, Darney, Reyes-Morales, & Lozano, 2016). In Namibia, a study conducted in 2011 indicated that mothers with medical insurance were 20% more likely to deliver under the supervision of a healthcare professional compared to women without medical insurance (Zere et al., 2011). This shows that health insurance plays a major role in maternal healthcare utilisation (Zere et al., 2011).

# CHAPTER 6: CONCLUSION, RECOMMENDATIONS, AND LIMITATIONS

## 6.1 Conclusion

Among safe motherhood advocates, there has been an increase in advocating for ANC utilisation in recent years as an intervention for reducing maternal morbidity and mortality (Phengsavanh et al., 2018). Noting the importance of ANC utilisation, this study was carried out to identify the predisposing and enabling factors associated with ANC utilisation amongst pregnant women in Namibia. The two specific objectives were to examine the levels of ANC utilisation amongst different subgroups of pregnant women in Namibia and to identify the predisposing and enabling factors associated with ANC utilisation amongst pregnant women. The overall conclusion made from this study was that ANC utilisation is still a challenge in Namibia particularly amongst multiparous, younger and uneducated women, and residents of rural areas. In addition, ANC utilisation was observed to be low amongst women whose husbands/partners had no education. The regional and ethnic differentials in ANC utilisation indicated that lower ANC utilisation was prevalent amongst residents of Central, North-eastern, and Southern regions as well amongst Hereros and 'other' ethnic groups.

Lower ANC utilisation is still a serious health issue in Namibia, and it requires the effectiveness of ongoing interventions if marked progress is to be made in reducing maternal and child mortality in the country. The results of this study reveal disparities in the utilisation of ANC services among different subgroups of Namibian pregnant women. The disparities are mostly spatial and socio-economic as women who reside in rural areas are more disadvantaged due to the remoteness of the area they reside in and the inadequacy of maternal healthcare service in their areas. Moreover, uneducated women and those with uneducated husbands/partners have less access to information and are therefore less knowledgeable about maternal healthcare and the benefit of ANC services. Furthermore, some cultures and beliefs tend to prevent women from making rightful decisions on seeking ANC services.

The inference that can be drawn from the findings is that even though the country's National Reproductive and Child Health Policy and the National Health Policy Framework were established to address the maternal healthcare burden in the country, better strategies were not put up that would educate all women on the benefits of ANC services utilisation regardless of

their socio-economic status and where they reside. Based on this, it is pivotal for the Namibian government and civil society organisations to scale up inclusive strategies that would enable all women in the country to fully utilise ANC services. Such measures should be able to eradicate all barriers to ANC utilisation such as physical, economic, and socio-cultural.

## 6.2 Research and policy recommendations

### *6.2.1 Further research*

This study contributes to the body of knowledge on factors associated with ANC utilisation in Namibia. This may, however, generate further scholarly research desires. It is of interest if further research is conducted in the country to assess the quality of ANC services given to pregnant women in the country with a specific focus on both service provision as well as experiences of women. The findings could provide crucial evidence on why women and children continue to die due to maternal related complications even though ANC utilisation is shown to be on the increase in the country. The study could combine both quantitative and qualitative methods approaches, and it would combine information from in-depth interviews and DHS data. The use of in-depth interviews can be done with women who recently gave birth or are pregnant and can be identified from ANC facilities countrywide. With the in-depth interview technique, the researcher would obtain qualitative information on what pregnant women have experienced at ANC facilities, the attitudes of service providers, and personal assessment of ANC services.

Furthermore, another scholarly research could look at the effects of delayed utilisation (defined as not attending prior to 28 weeks of gestation) or non-utilisation of ANC services. This assessment can look at both the new-born and the mother's health. This study needs to be a longitudinal mixed-method study that could follow those women who either gave birth without any ANC utilisation and those who commenced ANC late. The study would look at which adverse outcomes of pregnancy are associated with delayed or non-utilisation of ANC services in the country. Records from maternal healthcare facilities in the country would be used for analysis as well as for identifying women who can then be interviewed and recruited for a panel study. A panel study is a study that collects information on the same individuals at different points in time (Duncan, 2015). Panel studies have the ability to measure individual change over time, thus, provide high-quality intergenerational data (Duncan, 2015).

### *6.2.2 Policy significance*

The findings of this study indicate an inequality in the utilisation of ANC services between regions and social and economic classes involving the poor, less educated, uninsured, and rural residents as low utilisers of ANC services in the country. Policy intervention strategies focusing on both the demand and supply of ANC services are thus required to address the inequalities. The goals of universal healthcare coverage need to be turned into reality with special attention to the needs of poorer women, those with less education, and those living in remote areas. The policy interventions should be extended beyond the healthcare systems to investing in female education, women's economic empowerment, and the decentralisation of developmental facilities to remote areas. These will have a trickling down effect in addressing spatial and socioeconomic inequalities and ultimately affect healthcare utilisation in Namibia.

More specifically, and as stated by the WHO, for a country to improve its healthcare system, women and children should be put at the forefront of the developmental agenda and this can be achieved through education and women empowerment (WHO, 2010). Therefore, it is essential that policies be structured and implemented in such a way that women and children are prioritised across all regions and population groups. Even though Namibia introduced a policy on decentralisation which was adopted in 1997 with the idea of empowering communities through sharing power and responsibilities between national and sub-national governments, more still needs to be done, as rural residences still lack services. They walk long distances to seek healthcare services which on many occasions are provided by unqualified personnel (UNICEF, 2018).

The government should also think of an ANC insurance system that would provide primary care services for all pregnant women in the country even at private healthcare facilities. This is as public services are deteriorating and putting mothers and unborn babies at risk. Specifically, the government can emulate the Jampersal insurance scheme which was introduced in Indonesia in 2011 to provide cover for all pregnant women without any other health insurance (Achadi et al., 2014). Under the Jampersal scheme, pregnant women are allowed to utilise both public and listed private facilities free of charge. Alternatively, the government should think of introducing an incentive program for poor pregnant women which would provide an amount of money to those that have completed the minimum required maternal healthcare services. This was also introduced in Indonesia as the Program Keluarga

Harapan (PKH) in 2007 for low-income pregnant women (Wang et al., 2017). The PKH incentive program provides a total amount of 66 USD to pregnant women on a condition that they have completed all maternal healthcare services (Wang et al., 2017). The PKH and the Jampersal schemes were found to increase the utilisation of facility-based maternal care in Indonesia (Wang et al., 2017).

Furthermore, the expansion of transportation systems such as road networks in rural areas, increasing the number of care-centres, and the establishment of mobile clinics in rural areas of the country are also recommended. Interventions on mass communication also need to be strengthened to educate women living in rural areas, the poor and the less educated, for them to understand the importance and benefits of ANC utilisation. This may be done through community outreach programs, engaging traditional leaders, and utilising constituency offices in rural regions since they are the major mode of communication for rural residences. This can hopefully change the attitudes of communities in all rural regions at large.

Social and cultural norms and beliefs stigmatising pregnant young women (girls) thus, discouraging them from utilising ANC services on time, should be changed through the introduction of educational campaigns as well as through the inclusion of the subject matter into life skills curriculum in schools. In addition, stronger efforts are needed through policies to eradicate caste/ethnicity-based social discrimination in the country. Broadcasting of crucial ANC related information needs to be strengthened at all healthcare facilities and educational institutes and through mass media mostly radios that reach rural areas.

### 6.3 Limitations of the study

The results of this study should be carefully discussed owing to the following limitations. Firstly, is the fact that this was a cross-sectional study, and data used were collected at a specific time in 2013. The study only looked at the association between variables and causation was not inferred. Hence, the research did not determine the direction of the association between variables.

Secondly, this study used the Namibia DHS survey data, DHS surveys are retrospective as information is self-reported. Respondents were asked to report on events that happened 5 years

before the survey (MoHSS, 2014). Thus, there could be a problem with recall bias whereby respondents may not have recalled the exact number of ANC visits made years back. Even though this limitation may not pose a serious implication on the findings, it may, however, affect the findings of the study. In addition to recall bias, some respondents may not be willing to disclose the information requested.

Also, since data analysed in this study were collected in 2013, changes in ANC utilisation by pregnant women in Namibia that may have occurred since then were not examined. However, the analyses were still relevant to planning as this was the latest NDHS.

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