



Provincial Differences in the Number of Antenatal Care Visits for Pregnant  
Women in South

Africa: Evidence from the 2016 South African Demographic and Health Survey.

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# COLLEGE OF HUMANITIES

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## Dedication:

*“An investment in knowledge pays the best interest”* - Benjamin Franklin

This paper is dedicated to my parents; Nomalizo Juqu-Manitshana and Sikhumbuzo Manitshana, who have supported me throughout this journey.

To my niece Lathitha Juqu and nephew Alunamida Ginya, may this paper be an inspiration to you, for you to always aim high, always work hard and reap the wonderful benefits.

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My siblings Siviwe Juqu, Nolusindiso Juqu and Lulamile Juqu for their emotional support and for being my pillars of strength.

uThixo anibusise

## Abstract:

The aim of this study was to analyse the levels of antenatal care in South Africa, investigate the provincial differences in antenatal care visits, and examine the sociodemographic and socioeconomic factors associated with antenatal care visits in South Africa. Producing these will makes it possible for the government to have a more justice focused approach to undertaking antenatal care services in every place of need, which will in turn make previously underprivileged groups receive greater priority when addressing increase in antenatal care services.

This study used the 2016 South Africa Demographic and Health Survey. Univariate, bivariate, and multivariate analysis was conducted using Stata 14.

The findings of this study revealed a significant association between provinces and antenatal care visits and that there are differences between provinces in terms of number of antenatal care visits. Maternal age, maternal population group, and maternal place of residence were also significantly associated with the maternal report of four or more antenatal care visits.

Based on the objectives of this study, this study suggested that there should be a special focus on provinces that are geographically challenged and socioeconomically lagging to address inequalities, mobile clinics should be placed in rural areas, and lastly, further research should be conducted.

## Abbreviations and acronyms:

ANC- Antenatal Care

BANC- Basic Antenatal Care

CHPIP- Saving Children Report for the Child Health Identification Program

FANC- Focused Antenatal Care

NCCEMD- Saving Mothers Report by the National Committee on Confidentiality Enquiry into Cases of Maternal Deaths.

PPIP- Saving Babies Report of the Perinatal Problem Identification Program

UNICEF- United Nations Children's Fund

SADHS- South Africa Demographic Health Survey

SDG- Sustainable Development Goals

SSA- Sub- Saharan Africa

StatsSA- Statistics South Africa

WHO- World Health Organisation

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## Chapter 1: Introduction:

### 1.1 Background of study:

Over 13.6 million women have died in the 25 years between 1990 and 2015, globally (UNICEF, 2018), equating to more than 300 000 women dying per year and over 830 women dying per day, due to pregnancy related and childbirth related avertible causes (WHO, 2019). In addition, there are almost 2.4 million deaths of babies that die every year during their first month of life. Many of these deaths and morbidities are due to easily preventable or avoidable diseases. (WHO, 2020).

In the year 2017, maternal mortality was the second highest leading cause of death of women in reproductive ages (15-49 years) (WHO, 2020). More than 95 percent of these deaths occurred in low income and lower-middle-income countries, while more than 65 percent occurred in the African region (World Health Statistics, 2019). A large majority of preventable pregnancy related, and childbirth related deaths attributed to poor Antenatal Care (ANC) utilisation, defined as a description of medical care and medical procedures provided to pregnant women through their pregnancy until childbirth (WHO, 2020). Antenatal care services are aimed at detecting problems that may develop during pregnancy, to the mother or the baby (WHO, 2020). This study aims to examine levels of antenatal care visits within South Africa and to observe the discrepancy between provinces due to a variety of determinants.

Antenatal care is a health care service that is provided to pregnant women to distinguish already prevailing problems or problems that may develop during the pregnancy which may affect the pregnant woman and/or the unborn baby (WHO, 2020). This service consists of numerous screening tests, prophylactic treatments, and diagnostic procedures, routinely offered. ANC services are not only done to detect and manage complications during pregnancy, but also to encourage and uphold the social and physical health of both the baby and the mother, to develop birth readiness and complication preparedness plan and to prepare the woman for normal puerperium (Ngxongo, 2019). Further, antenatal care contributes towards the prevention and treatment of malaria, management of anaemia and screening and treatment of sexually

transmitted infections (Ngxongo, 2019). The World Health Organization (WHO) identified antenatal care as one of the most extensively used strategies to improve child and maternal health (WHO, 2019). Initially, the WHO recommended that pregnant women attend at least four antenatal care services. In November 2016, this number was increased to at least eight antenatal contacts which was seen as a strategy to improve quality. This was based on the belief that good quality antenatal care could reduce both perinatal and maternal mortality and increase survival and health of women and children (WHO, 2019).

Antenatal care services were also seen as effective in achieving the Sustainable Development Goals (SDGs) (WHO, 2019). Goal 3.1 in the SDG goals agenda through 2030 is to pledge healthy lives and endorse wellbeing for people of all ages. Goal 3.2 is to decrease global maternal mortality to fewer than 70 maternal deaths per 100 000 births and for countries to further reduce their maternal mortality rate by at least 66 percent from their 2010 maternal mortality rates. Goal 3.3 of the SDGs is to end preventable deaths of new-borns and all countries aiming to reduce neonatal mortality to as little as 12 deaths per 1 000 births. Goal 3.4 is to reduce premature mortality of new-borns from non-communicable disease by one third by 2030, through treatment and prevention of diseases (WHO, 2018b). Equal access to maternal health facilities would assist in achieving Goal 3.7, which is to ensure widespread access to sexual and reproductive health care services and goal 3.8 that aims to achieve universal health coverage and access to quality essential health care (WHO, 2018b).

Non-attendance of antenatal care health service carries almost four times the risk of maternal and child deaths (Ngxongo, 2019). Of the almost 2 and a half million babies that die as still births during the last weeks of pregnancy, over 900 000 die in Sub-Saharan Africa (SSA). The deaths of babies before the onset of labour or rather antepartum are typically the consequence of maternal infections such as syphilis and pregnancy complications, while new-born deaths are caused by preterm birth and restricted fetal growth as well as congenital infections and fatal alcohol syndrome, among other causes (Lincetto, 2019).

Deaths of babies that die within the first 28 days of birth (neonatal mortality) are typically consequences of suffering from conditions and diseases associated with lack of quality care at

birth, or skilled care and treatment immediately after birth and in the first days of life. Intrapartum-related complications such as birth asphyxia, infections, preterm births, and birth defects were the leading causes of neonatal mortality in 2017 (World Health Statistics, 2019). In pregnant women, maternal deaths were due to causes such as antepartum haemorrhage and hypertension (pre-eclampsia and eclampsia). Malaria, HIV/AIDS, anaemia, and malnutrition are associated with increased maternal and new-born complications as well as death when the prevalence of these conditions is high, (Lincetto, 2019).

The utilisation of antenatal care services differs by social strata, but the burden falls disproportionately on disadvantaged women who have less access to health care and differ per geographical location (UNICEF, 2018). In settings that have poor resources, where fertility rates are usually high and the risks of dying in labour are just as high, the lifetime risk of dying from maternal causes is greatly amplified (UNICEF, 2018). According to the World Health Organization (2020), maternal mortality is higher in women living in rural areas and among women in poorer communities, with more than half of maternal deaths having occurred in fragile and humanitarian settings (where natural disasters tend to occur). There are also large disparities between countries, but discrepancies are also visible within countries and between women with high income countries versus those in low-income countries and among rural versus urban areas (WHO, 2020). These differences and inequalities surrounding maternal health, child health, maternal mortality and child mortality have raised a growing concern for the public health community. Health care policies that seemed effective and strategic were mandated by leaders of different nations, and maternal health and child health was prioritized to ensure that maternal mortality will be reduced significantly (WHO, 2020). However, globally levels remain high and in South Africa, health access inequalities in regions are stark, where provinces with a mostly white population seem to have better health access than others (Igwe, 2015).

## 1.2 [Study significance:](#)

Achievements have been obtained in the mortality and health of women and children and in antenatal care utilisation, however, the least improvement was in Sub-Saharan Africa (WHO, 2020). Globally, maternal mortality reduced from 342 deaths per 100 000 births in 2000, to 211

deaths per 100 000 births in 2017. Neonatal mortality decreased from 38 deaths per 1 000 births in 1990 to 17 deaths per 1 000 births in 2019, in the world. In South Africa, the reduction of maternal mortality was from 160 deaths per 100 000 births in 2000 to 119 deaths per 100 000 births in 2017 (UNICEF, 2020). Neonatal mortality also decreased in South Africa to 11 deaths per 1 000 births in 2019, from 19 deaths to 1 000 births in 1990 (UNICEF, 2020). Over 69 percent of women have attended at least one ANC visit in Africa (Lincetto, 2019). However, there seems to be a slow incline in the number of four or more antenatal care services in South Africa, from 74 percent in 1998, to 76 percent in 2016 (StatsSA, 2020b).

Additionally, three reports focusing on maternal and children's health in South Africa, namely: the Saving Children Report for the Child Health Problem Identification Program (CHPIP), Saving Babies Report of the Perinatal Problem Identification Program (PPIP) and, Saving Mothers report by the National Committee on Confidentiality Enquiry into Causes of Maternal Deaths (NCCEMD), highlighted the available causes and recommendations to improve quality of care required for babies, children and women and they further highlighted the importance of the antenatal care visits in reducing perinatal, children and maternal health (Ngxongo, 2019). This showed that South Africa still has to work on the utilisation of sexual and reproductive health services.

There have been many monumental achievements in South Africa during the early era of democracy, but many inconsistencies still remain. These incorporate the high numbers of maternal mortality South Africa has compared to developed countries and other developing countries, with a maternal mortality ratio of 119 deaths per 100 000 births (UNICEF, 2020), while other developing countries, such as Brazil have 44 maternal deaths per 100 000 births (Smith, 2016). South Africa's maternal mortality rate has been assessed as too high for a country that classified as a middle-income country and with a great ability to provide public services (Bomela, 2020).

Although South Africa has prospered socially and economically, there is prominent variance within provinces. Statistics reveal that health inequalities have grown (Igwe, 2015). This growth in health inequalities corresponds with an increase in income inequalities, for example, in the Western Cape Province where the white population in South Africa are mostly based, compared

to Mpumalanga where the population is predominantly Black, health access inequalities and income inequalities are blunt (Igwe, 2015).

The findings of antenatal care visits at lower geographical and administrative units are vital for South Africa for policy planning and for the evaluation of the effectiveness of intervention programmes that have been put in place prior, therefore, a study on the impact of sociodemographic and socioeconomic determinants on antenatal care visits will be important for relevant government bodies and policymakers as it will indicate inequalities within provinces, per sociodemographic and socioeconomic conditions. This study also indicates the level of access to maternal health care in provinces and will thus make it easier for health policies to be improved upon. In academia, the results obtained will add to existing literature on levels of antenatal care attendance within South Africa as well as the sociodemographic and socioeconomic challenges and determinants of antenatal care visits.

### 1.3 Justification of study:

In Africa, inequality in the attendance of antenatal care visits persists, with every four in five women in the richest quintile accessing four or more ANC visits, while only 48 percent of the poorest women have the same level of access (Lincetto, 2019). Poor quality of ANC clinics, poor service utilisation and poor quality of care is common in Africa. This is often related to a lacking number of skilled providers, particularly in rural and remote areas, lack of standards of care and protocols, few supplies and drugs, and poor attitudes of health providers (Lincetto, 2019).

Health access within South Africa has been found to be much lower amongst the disadvantaged population groups and within certain geographical areas (Igwe, 2015) this includes access to sexual and reproductive health utilities (Tsawe and Susuman, 2014). South Africa has been recognised as a global leader in the development and conceptualisation of the primary health care approach, however, the attainments had an incomplete impact because of inadequate policy interventions and the hostile state interventions throughout the apartheid era. Despite the governments obligation and structural reform to achieve health care targets, obstacles have continued to limit the full implementation of health care (Visagie and Schneider, 2014). The

inability to fully implement health care service targets includes inequalities in the distribution of resources, it is also inclusive of health worker shortages, the shortcomings of leadership in medical health, public sector and political leadership and a complex and prolonged health transition (Visagie and Schneider, 2014). More investment is required towards primary health care and efforts should not only address these persisting challenges but must also incorporate innovative health system designs (Kautzy and Tollman, 2008) to change this primary care system that is not allowing for differences in the utilisation of antenatal care services in provinces.

Studies done in different countries and regions have shown that the geographic distribution of problems of health access and the relationship with risk factors can be vital for cost effective intervention preparation (Woldegiorgis, 2016). In order to work towards evident increases in the number of four or more antenatal care visits, it is important that the same effort that is put into inequalities in health services in countries is also put in inequalities in health care services among smaller geographical units such as provinces.

Biological factors are not the only important determinants of maternal mortality, sociodemographic factors and socioeconomic status may also contribute significantly to high or low and unequal levels of antenatal care services use. Most maternal deaths are caused by diseases that are treatable through cost effective interventions or diseases that were easily preventable to begin with. Cost-effective action can be taken by expanding effective curative or preventive interventions that will in turn save women and children's lives (You et al, 2015). This study has therefore focused on national and provincial estimates of antenatal care visits as well as the sociodemographic and socioeconomic factors associated with differences in antenatal care attendance, it has also attempted to better understand why there are provincial differences in the attendance of antenatal care visits despite the government's efforts to encourage four or more recommended ANC attendance.

#### 1.4 Aim and objectives of study:

This study aims to examine sociodemographic and socioeconomic determinants and how they influence the level of antenatal care visits, using women of reproductive ages by the provinces of



South Africa as the study population. The primary aim of this research was to investigate antenatal care visits levels for South Africa using the 2016 South African Demographic Health Survey (SADHS) and to study the antenatal care visits provincial differentials in relation to a variety of socioeconomic and sociodemographic determinants. The study aimed to achieve three specific objectives. First, it described the number of reported antenatal care visits in South Africa. Secondly, it investigated the provincial differences in number of antenatal care visits within South Africa. Lastly, it investigated which other sociodemographic and socioeconomic factors were associated with the reported number of antenatal care visits in South Africa.

From this, three main research questions were:

1. What were the reported number of antenatal care visits in South Africa?
2. Were there significant differences in reported number of antenatal care visits between provinces in South Africa?
3. What were the other sociodemographic and socioeconomic factors associated with the reported number of antenatal care visits in South Africa?

### 1.5 Statements of hypothesis

Ha: There were significant provincial variations in reported antenatal care visits, controlling for other demographic and socioeconomic factors in South Africa.

Ho: There were no significant variations in reported antenatal care between provinces, controlling for other sociodemographic and socioeconomic factors in South Africa.

### 1.6 Dissertation outline:

This study is organized into five chapters. The first chapter is the introduction. This chapter introduced the study by providing a background of antenatal care followed by the importance and justification of the study. The significance of this study was demonstrated through aims and objectives. The second chapter is the literature review. This chapter reviewed literature relevant to this study. Theoretical and empirical evidence of antenatal care in different nations was

reviewed and so were the estimates and trends in South Africa's antenatal care attendance. Chapter three is methodology. This chapter provided information of the study population, variables that were manipulated for the analysis as well as the models and methods applied to achieve the three objectives of this study. Additionally, descriptions of the utilisation of statistical tools to examine the relationship between variables were discussed. Chapter four is the results chapter. This presented the results of this study in detail, the analysis of the results and further elaborated on the results obtained and produced. Chapter 5 is the discussion chapter. It provided detailed discussion and conclusion that are inferred from the study along with limitations and further research suggestions.

## Chapter 2: Literature review:

### 2.1 Introduction:

South Africa has extremely high maternal mortality levels compared to developed countries and even other developing countries. According to UNICEF (2020), 119 women per 100 000 live births died in South Africa in 2017 due to pregnancy and childbirth related causes. In Sweden, fewer than 5 women per 100 000 live births died from the same cause while in Brazil, the estimated mortality was 44 women per 100 000 live births (Smith, 2016).

From the onset of its implementation in the early 1900s, South Africa has been using the approach of the traditional antenatal care model until the end of 2007. The approach assumed that frequent ANC visits and the classification of women into high and low-risk groups by predicting possible obstetric difficulties was the best way to provide health care for both the mother and the baby (Ngxongo, 2019). In 2002, the WHO adopted the Focused Antenatal Care (FANC) approach which succeeded the traditional approach. Later, South Africa modified and adopted this model to suit the society's circumstances and referred to it as the Basic Antenatal Care (BANC) approach. According to Ngxongo (2019), the change for South Africa to adopt the BANC approach came after the National Department of Health evaluated the effectiveness of the traditional approach and realised it was not being effective in the particular social context of the country.

Attendance of ANC differs by social strata (UNICEF, 2019), that includes sociodemographic and socioeconomic factors. Globally, policymakers and researchers have long sought not only to improve overall population health and reduce the burden of disease, ill-health, and disability, but also to reduce or eliminate health differentials. Omotoso and Koch (2018) show that to achieve these aims the following sociodemographic and socioeconomic factors need to be considered, such as gender, geography, race, ethnicity, and socio-economic status.

### 2.2 Sociodemographic factors:

### 2.2.1 Maternal province:

Geographical location defined in terms of the first level administrative divisions of a country; typically referred to as states, provinces, regions; is one of the variables that may influence the utilization of antenatal care. Particularly in developing countries, these first level administrative divisions are not the same in terms of resources and infrastructure, with some clearly better equipped in terms of service availability (Abor et al, 2011).

Province of residence is similarly effective in explaining antenatal care since various provinces may have diverse levels of socioeconomic progress, demographic composition and may be traditionally varied, thus resulting in differences in the antenatal care visits (Palamuleni, 2011).

A study conducted in Nepal, using data obtained from the 2016 Nepal Demographic and Health Survey found a significant association of four or more ANC services with the residential province and whether the women came from a rural or urban region (Neupane et al, 2020). Two thirds of the total pregnant women who resided in provinces whose provincial GDP per capita was below the Nepals national average of \$718 went for four or more ANC visits. Other provinces of Nepal encompass of more developed districts and therefore had a higher percent of women access more antenatal care services. The economically backward and geographically remote regions had women who were less likely to use 4 or more ANC visits (Neupane et al, 2020).

Research carried out by Prusty et al (2015) on factors associated with utilization of antenatal care services in Cambodia yielded results that show that full ANC coverage was found highest among women from Plain regions, consisting of 32 percent, followed by Tonal sap region (31%), Plateau and mountain region (25%) and the Coastal region (23%). The lowest use of full antenatal care use was in provinces from the North-Eastern parts of Cambodia with less than 15 percent, while Banteay Meanchey and Phnom Penh had the highest percentages of 45 and above of women receiving full ANC. Huge regional variation had been found in terms of visiting facilities for ANC four or more times. (Prusty et al 2015)

The relation between a woman's province and ANC visits can further be seen through this particular study that was conducted in Kenya, using data obtained from the 2014 Kenya

Demographic and Health Survey. The study yielded results that showed that pregnant women in Central Kenya were five times more likely to attend the recommended four ANC visits compared to those in Northern and Eastern Kenya (Wairoto et al 2020). Additionally, in Angola, Luanda and Zaire regions provided greater ANC coverage whereas regions such as Cuanza Sul, Mexico and Lunda Norte had lower ANC usage (Shibre, 2020).

Rahman et al (2017), found that the maternal province of residence also had an influencing contribution for four or more ANC utilisation. The likelihood of those utilizing ANC was seen using data from the 2014 Bangladesh Demographic and Health Survey. Women in the Sylhet division where the Rajshahi and the Khulna division had a positive association in both survey the authors used (Rahman, et al, 2017). Further, women in the Capital city of Dhaka reported more proportion of 4 or more ANC than Sylhet. High fertility rate, low female educational attainment and relatively having difficult to reach areas could be considered as the main reasons for low level of 4 or more ANC utilisation for the Sylhet division (Rahman, et al, 2017).

Every province has a large and steady increase in the proportion of women with at least four ANC visits in Nepal (Sapkota, et al, 2021), the author found this using data from the 2001, 2006, 2011 and 2016 Bangladesh Demographic and Health Survey. The increasing trend was found to be higher in Sudurpaschim Province, where ANC of four or more attendance had increased to almost 70 percent (69%), followed by Lumbini Province where the attendance of at least four visits had increased to 60%, the same as Bagmati Province. The authors in this research claimed that poorer provinces had the least odds of women attending four or more ANC visits than richer provinces, in terms of socioeconomic development (Sapkota et al, 2021).

In Ethiopia, women from Somali (85%), Afar (67%) and Amhara regional state (44%) were less likely to attend ANC, while women in Addis Ababa were 2.6 times more likely to complete four or more ANC visits compared to women in Tigray regional state (Muchie, 2017). The author attributes this to the lower socioeconomic status, isolated environments, lack of access to health services and the variety of ethnic minorities in majority of areas of these regions (Muchie, 2017).

Khatib et al (2020) linked disparities in the underutilization of ANC services with regional disparities in socio-demographic factors such as education, wealth status, age, and employment

in Nigeria. Further, Wairoto et al (2020) claimed that regions that were disadvantaged with respect to access to ANC services bore several other disadvantages; hence geography is a critical determinant of health inequities in Kenya. These areas have a higher proportion of households classified as poor, in addition to having a higher percentage of uneducated women compared to the rest of the country. (Wairoto, et al, 2020).

In South Africa, disparities exist in between the nine provinces and fifty-two health districts. Different rates on health care spending provision have been noted, with a standard correlation between higher rates of maternal mortality and districts with lower capita spending on district health services (Amnesty International, 2014). Provinces see varying maternal mortality rates in health care facilities, highlighting low rates of less than 10 deaths per 100 000 live births in Western Cape and higher rates of over 150 deaths per 100 000 live births in provinces like Limpopo, while Mpumalanga showed an increased in maternal mortality. Substantial difference persist in sexual and reproductive health services and outcomes are also found between and within provinces (Amnesty International, 2014), this is reflected in the various rates of maternal and child deaths

### 2.2.2 Maternal age:

Research completed in South Africa by Tsawe and Susuman (2014) found that age is significantly associated with the use of antenatal care services. A multivariate analysis revealed that women in ages between 35-39 years and 40 and above were five times more likely to utilise four or more antenatal care services than women aged 15-19 years. Similarly, a study using a sample of 556 women in rural areas in Zambia found that women above the age of 35 were more likely to use antenatal services, showing a positive association between the age of women and the use of ANC (Jacobs, et al, 2017).

Rurangiwa et al (2017) asserted that women above 30 years were 78 percent more likely to attend adequate antenatal care services than women aged 30 years or less in Rwanda. Research in Ethiopia also revealed that older women have higher chances of ANC visits (Yaya, et al, 2017). Jacobs et al (2017) claimed that the older generation seems to be more well-informed about

health-care services, they also have greater decision-making power than younger women, and thus benefit more from using such services, hence the higher likelihood of utilization. In addition, older age as a predictor of utilization of ANC services could also be related to greater likelihood of having a previous birth and interaction with services (Jacobs, et al, 2017).

Research conducted on higher education attainment associated with optimal antenatal care visits among women of childbearing ages in Zambia also revealed that the higher the age of the woman, the higher the chances of full ANC coverage. Women above 35 years were 70 percent more likely to attend four or more ANC visits compared to women between 15-19 years (Myunda, et al, 2016). Similarly, Khatib et al (2020) stated that older women are sensitive to ANC utilisation, therefore the likelihood of insufficient ANC visits was more common among the younger cohorts of women when compared with the older age group in Nigeria

Using the Indonesia Demographic and Health Survey, 2016, Laksono et al (2019) found that that women in the age group of 15–19 years had 70 percent less chances of making four or more ANC visits compared to women in the age group of 45–49 years and the age group of 20–24 years had 33 percent less chance of making 4 or more ANC visits compared to women in the age group of 45–49 years. This showed that the youngest age group had a lower possibility of adequate ANC visits than the oldest age group. (Laksono et al, 2019).

Prusty et al (2015) also found that the frequency of full ANC services was found to be higher among women whose age at childbirth was 20-24 years and to women between 35-49 years in Cambodia. The authors assumed that the older the woman at childbirth, the more the awareness and ability to accessing the recommended number of ANC services and therefore leading to higher usage of ANC for Cambodian women. This is linked to the uniqueness of Cambodian family structure. In Cambodia, extended families have family members from older generations that have traditional and cultural beliefs and ideas on pregnancy which in turn have a negative influence on the use of ANC by pregnant women (Prusty et al, 2015).

In contrast to these findings, a distinctive feature that emerged from a study conducted in Bangladesh, authors claimed that pregnant women below the age of 35, from 20 to 34, were more likely to have had 8 ANC visits and a higher mean of ANC frequency than their older

counterparts (>35 years) and younger than them (<20 years) (Islam and Masud, 2018). Further, in Botswana, 3 out of 5 mothers who used antenatal care services were of a younger generation of mothers of ages less than 35. The likelihood of women using ANC services reduced as women approached 35 to 49 years, from the 2007 Botswana Family Health (Mathe, 2017). Wilunda et al (2015) also declared that the odds of attending ANC reduced with increasing age in Ethiopia.

Afaya et al (2020) concluded that in Ghana, women who were aged 21–30 years had four times the chances to utilise ANC services four or more times compared to those aged 20 years and below. In South Africa as well, women between 20 and 34 years had more ANC visits compared to women less than 20 years of age (Ousman, et al, 2019). Data obtained from the Ethiopian Demographic and Health Survey, 2018, also showed that there were higher odds of at least four ANC attendance in women between ages 20-24 and 25-29 than those younger and older (Muchie, 2017). The odds of completing the recommended number of antenatal care services was higher in women in the age cohort of 24-29 years than their older counterparts in African countries (Tessama and Miniyuhn, 2021).

In contradiction, in a Bangladesh context, Rahman et al (2017) argued that less parous and younger women had more odds of attending four or more ANC visits than older women. These women are less experienced on birthing issues on which they then see more prenatal visits. Moreover, higher prevalence of four or more antenatal care service utilisation among women aged 20–29 years can be better explained by the predominance of childbearing at the ages 20-29 in a Bangladesh context (Rahman, et al, 2017).

In contradiction, women who were less than 20 years at the time of delivery had significantly higher odds ratio of four or more ANC services as compared to women in the 20–34-year age group in Tanzania (Gupta, et al, 2014). The percentage of four or more ANC visits was highest among the age cohort 15-19 years, 74 percent, and lowest among women older than 35 years, 54 percent in Nepal as well (Neupane, et al, 2020). Younger women might prefer to visit often, mainly to be reassured that the baby is growing well and is in proper position, women with higher age at birth usually have high parity and might rely on their experiences from previous pregnancies and not feel the need for antenatal check-ups (Gupta, et al, 2014).



There seems to be almost the same chances of all age cohorts in attending four or more ANC services. In explaining the differences in Botswana, Mathe (2017) states that the younger generation, because of their education and exposure to social amenities that educates on modern health trends, are more informed of ANC, while their older counterparts are tied to traditional and cultural values that restrict the discussion on delivery experiences. While Islam and Masud (2018) claim that older women may also be likely to have other children, and in the absence of child-care, as a result may be less likely to attend ANC in Bangladesh. Tessama and Minyihun (2021) further assert that older women have probably had earlier pregnancies and have gained more experience and awareness about the benefits of visiting health facilities

### 2.2.3 Maternal marital status:

Childbearing typically occurs in the context of marriage in the African context (Mathe, 2017).

Unmarried women were 1.5 times more likely to use ANC services than those who were married in Nigeria. Women who were household heads had more antenatal care visits than those of male-headed households. This may be attributed to married women having challenges to obtain permission to seek health care (Nwosu and Ataguba, 2019). A study that corresponds with this is that of Tessama and Animut (2020), who also asserts that women who were not in unions had a higher likelihood of attending four or more ANC services than their counterparts in Africa. The author agreed that men are considered as the decision makers in family life spheres, including reproduction, therefore, women probably face problems getting permission from their spouses to attend antenatal care (Tessama and Animut, 2020). Additionally, in Ethiopia, Africa, most women are socioeconomically dependant on male partners who make decisions and influence maternal health care services (Tessama and Animut, 2020).

In a contrast, a study in Botswana maintained that antenatal care services increased with marriage, arguing, that 24.2 percent women in unions attended care services, especially in the early stage of pregnancy, compared to 19 percent in women who were never in unions (Mathe, 2017). Tessama and Minyihun (2021) also argued that odds of completing four or more antenatal care visits among married mothers increased by 11 percent when compared with single mothers

in East Africa. These authors found that women who do not have partners tend to experience financial difficulty that might prevent them from attending ANC regularly (Tessama and Minyihun, 2021).

Two-thirds of women who were in unions went for at least four antenatal care visits, while 40 percent of those who were not went for five and more in South Africa (Tsawe and Susuman, 2014). Further, in Rwanda, women who were single, widowed, divorced, separated, or not married to the household head made 3 times less ANC visits than married women (Rurangiwa, et al, 2017). The reason for married women to make more visits to ANC may be explained by the support married and cohabitating women in Rwanda receive from their husbands or partners as a result of ANC attendance sensitization campaign, which equally targets men and encourage them to follow their wife or partner to the clinic. Alternatively, a husband may also stay in charge of the household when the wife travels to the ANC clinic (Rurangiwa, et al, 2017).

Tizazu et al (2020) carried out a study in Ethiopia that corresponded with married women having higher chances of full ANC coverage through their husbands support and approval, compared to their counterparts. The possible reason might be due to women feels confident and increase their health-seeking behaviour, this encourages them to attend more antenatal care visits (Tizazu et al, 2020). In Indonesia, women who have a husband or a partner were 2 times higher chances of making four or more ANC visits compared to women were not in any unions. Women in unions claimed that their partners provided support on their healthy lifestyles (Laksono, et al, 2019).

Women who were not in unions were 70 percent less likely to utilise ANC services at least four times compared to those that were married in Ghana (Afaya, et al, 2020). In Ghana, women who were not married were expected to remain virtuous until marriage in order to prevent public ridicule, therefore some women who got pregnant without a husband avoided ANC visits to prevent public ridicule (Afaya, et al, 2020). A systematic review on determinants of ANC utilisation in Sub-Saharan Africa by Alex et al (2019), showed that married women were more likely to utilise four or more ANC visits than those that were not currently married or never married. The authors showed that being married conferred a protective effect on ANC utilisation as a predisposing factor. Married women had higher odds of attending the recommended

services due to psychosocial and financial support they received from their husbands (Alex, et al, 2019). Similarly, Afaya et al (2020) stated that unmarried women, especially those from low socioeconomic status were likely to lack financial means such as travel costs and may therefore be affected when it comes to meeting the required number of ANC care services during their pregnancy term in Ghana (Afaya, et al, 2020).

In contrast, Sumankuuro and Wang (2017), found no association between marital status and antenatal care services in Ghana. They found that some partners and husbands felt that they had no responsibility to help expectant mothers to reach a suitable health facility for ANC, whether it be by providing transport, finances, or company. For fear of the partner, some expectant mothers comply with the partner and receive few ANC visits before childbirth. In some cases, men could not see the point of attending ANC services. Therefore, there was no difference whether women were married or not to attend the recommended number of antenatal care (Sumankuuro and Wang, 2017).

#### 2.2.4 Maternal population group:

In this study, maternal population group refers to either race or ethnicity of the mother.

In Benin Republic, Dansou et al (2017) found that ethnicity had a significant influence on antenatal care service utilization, from data obtained from the 2011/2012 Benin Demographic and Health Survey. The authors claimed that the persistence of underlying cultural beliefs and value systems in various ethnicities continued to shape ANC services uptake amongst pregnant women (Dansou, et al, 2017). Additionally, in Cambodia, population group played a significant role in the utilization of four or more ANC services. The results revealed that Buddhist women had a higher chance of 60 percent of attending ANC visits compared to non-Buddhist women. The authors claimed that the Buddhist community was at an advantageous position in the community (Prusty et al, 2015). In Vietnam as well, there was growing inequity in maternal health services, primarily along the lines of ethnicity (Malqvist et al. 2013).

A systematic review in Sub-Saharan Africa found that ethnic differences influenced attending at least one ANC visit in countries differently. (Alex, et al, 2019). Wabiri et al (2017) found that, compared with other races, Black African women had poorer access to services and therefore

less visits of at least four or more antenatal care services in South Africa. Statistics South Africa (2020) also revealed that Asian or Indian women along with women in the White population reported higher proportions of women attending four or more visits, while on the other hand, Black or African women had less chances of completing for our more visits.

In Nigeria the results on ethnicity showed that Hausa women and other women from minority tribes were less likely to report for antenatal care services when pregnant, even less likely to meet the recommended number of visits compared to the Yoruba and Igbo women (Nghargbu and Olvania, 2019). In Nairobi as well, there were ethnical differences in attendance of four or more antenatal care services, with women who were Kikuyu or Kamba being more likely to attend all recommended four services compared to women from other ethnic groups (Rossier, et al, 2014)

Contrary, in Lesotho, ethnicity was not found as an influencing factor because almost the whole population (99.7%) are Basotho and only a small portion (0.3%) encompass other ethnic groups such as Xhosas, Asians, Europeans and, Zulus (Mathe, 2017).

#### 2.2.5 Maternal place of residence:

Residence refers to a place in which individuals or an individual resides. In this study, residence refers to rural and urban residence.

In Sub-Saharan Africa, rural residence negatively impacted utilisation of antenatal care services. This was attributed to sparse distribution of health services in rural areas, long distances to travel and travel related costs that discourage the frequency of antenatal care services utilisation (Alex, et al, 2019).

A study conducted on determinants of frequency and contents of antenatal care visits in Bangladesh found that mothers in rural areas were 2.6 times less likely to use the suggested antenatal care visits, or more, than mothers in urban areas. The average number of visits among women in rural areas was 2.4 visits while it was 1.3 more in urban areas, being 3.7 visits. Further, women in urban areas claimed to have received good quality services from medically trained providers, compared to their rural counterparts. (Islam and Masud, 2018). Jacobs et al (2017),

also asserted that there is a negative trend towards ANC utilization amongst women in rural areas. Women in rural areas had a reduction of 44 percent in the odds of having inadequate ANC visits in Ethiopia (Yaya, et al, 2017).

Further, research by Mathe et al (2017) found that more than a quarter of women in urban areas not only had more frequency of antenatal care, but also attended early compared to a fifth of those in the rural area. In Ethiopia, 72 percent of urban residents attended four or more ANC visits, while only 23 percent of women in rural areas attended the recommended eight antenatal care services. The results revealed that urban women were 65 percent more likely to complete for our more ANC services than women in rural areas (Muchie, 2017). In another study carried out in Ethiopia, on spatial distribution and determinants of an optimal ANC visit among pregnant women in Ethiopia, the results revealed that only 27 percent of rural respondents completed four or more ANC visits, while 63 percent of women in urban areas completed the same ANC visits. The authors claim that this is due to socioeconomic inequalities and health differences in health services between urban and rural areas (Tessama and Animut, 2020).

In Angola as well, urban residents attended ANC services more than rural residents (Shibre, 2020). Pregnant women who lived in urban areas utilized ANC services 1.8 more times than rural women. The author associates this to women having to traverse long distances to receive maternal health services in rural areas and the lack of transport (Shibre, 2020). A corresponding study was a study by Mekonnen et al (2019) conducted in Ethiopia. The authors asserted that respondents stated that distance to health facilities was a major barrier to reaching health facilities, the lack of these facilities also contributed as a hindrance along with limited finances and transport services. The results, using four surveys also revealed that rural women were less likely to utilise at least four antenatal care visits compared to urban women (Mekonnen, et al, 2019).

In South Africa, the attendance of both women in rural and urban areas improved, but women in rural areas still attended four or more antenatal care visits less than their urban counterparts. In 2011, women in rural areas had 55 percent fewer ANC visits and 21 percent fewer in 2016, with variations across administrations (Ousman, et al, 2019). Additionally, in Nigeria, the odds of

less than a minimum of four visits were higher among rural residences, compared with those from urban residences. This is apparently due to Nigeria having more health facilities situated in urban areas than rural areas, therefore urban women have better access (Khatib, et al, 2020). Noh et al (2019), found that in Pakistan, women residing in large cities had a greater proportion of attending four or more antenatal care visits, than those in smaller cities. Then women in smaller cities had a greater chance of the recommended ANC visits than women in rural areas (Noh, et al, 2019). The authors attribute this to better access to health care services in urban areas, while women in rural areas depended only on primary health care (Noh, et al, 2019).

A greater proportion of rural women underutilized ANC compared to their urban counterparts in Nigeria (Adewuyi, et al, 2018). These findings were linked to rural respondents being generally disadvantaged in respect of access to healthcare facilities. Where facilities exist, inaccessibility due to the poor road network, lack of efficient transport system and distance barrier may co-exist in the residence. Traditional beliefs are also a factor which contributed to underutilization of maternal healthcare services like ANC in rural residence (Adewuyi, et al, 2018).

In contradiction, an analysis done in Indonesia showed that there is no difference between urban and rural areas in ANC utilization in Indonesia. (Laksono, et al, 2019).

It seems that in most developing and middle-income countries, due to inequality in respondent's socioeconomic status, means of transportation, distance and knowledge to health care facilities, women from rural areas had less exposure to four or more ANC visits.

## 2.3 Socioeconomic factors:

### 2.3.1 Maternal education attainment:

Maternal education has a significant positive association with the mean of ANC visits and the proportion of women who had four and more visits. Educated Zambian women were between 2.5 times more likely to attend ANC than their uneducated counterparts (Jacob, et al, 2017). Research by Khanal et al (2015) in Timor-Leste found that mothers with little education were less likely to attend the recommended number of four or more ANC services. This is attributed to

educated mothers having better knowledge on the importance of ANC and ability to decide when and where to seek health care (Khanal, et al, 2015).

The mean of ANC visits was found to be 1.5 visits among women with no education compared to 4.5 visits among women with higher levels of education. Higher levels of the mother and husband education led to more ANC visits than of unions with no education, in Bangladesh (Islam and Masud, 2018). Women who had higher or secondary or primary education had a significantly higher probability of going for four or more ANC check-ups in Nepal (Neupane, et al, 2020).

Data obtained from the Zambian Demographic and Health Survey found that educated women were more likely to have suitable knowledge on ANC services and understood the importance of attending the recommended number of services, thus they had higher chances of attending four or more ANC visits than uneducated women in Zambia (Myunda, et al, 2016).

Over 60 percent of Ethiopian women with high-level literacy completed four or more ANC visits compared to 29 percent of women with middle level literacy and 14 percent of women with low level literacy (Muchie, et al, 2017). The authors attribute this to educated women having better access to information and ability to overcome cultural barriers of ANC utilization. Illiteracy leads to poor quality interactions between a pregnant and service provider consequently discouraging utilization of ANC services (Muchie, 2017). Further, Tizazu et al (2020), revealed that the usage of at least four ANC visits were higher among women with higher education compared to uneducated women in Ethiopia. The reason was: education creates a better chance to access through different sources, understand and utilize pieces information of regarding maternal and child health care as well as a better understanding of the importance of completing ANC visits and the consequence of danger signs on pregnancy (Tizazu, et al, 2020).

Laksono et al (2019) found that in Indonesia, women with primary education had 2.5 times the chances of making four or more ANC visits compared to women who had no education at all and women with secondary education were 4 times more likely to make four or more antenatal care services compared to those with no education and lastly, women with higher education were also four times more likely to attend four or more ANC visits than women with no education. The likelihood of more ANC visits increased with higher educational attainment (Laksono, 2019). In

Benin Republic as well, compared to uneducated women, those with primary level of education were three times more likely to attend at least four ANC visits (Dansou, et al, 2017).

In South Africa, women who reported that they had attained secondary level education were 2.9 times more likely to use ANC than women who had no education (Tsawe and Susuman, 2014). Over a quarter of women who attended antenatal care on the onset of pregnancy had secondary or higher education, while only 15 percent had lower education (Amnesty International, 2014). A nurse in Kwa-Zulu-Natal, South Africa, claimed that the high number of girls out of school in the rural communities with low levels of educational attainment made it hard for her to help them comprehend the advice she would give on antenatal care; therefore, the attendance was low (Amnesty International, 2014).

In Nepal, women with tertiary education had one-and-half times greater odds of receiving good quality ANC compared to those with primary education (Joshi, et al, 2014). The authors stated that female education empowers women, it improves wealth and reduces gender disparity therefore increasing levels of education of women is linked to increased odds of receiving four or more ANC visits, which was highest among women with tertiary education compared to those with primary education (Joshi, et al, 2014). Additionally, research on determinants of subnational disparities in antenatal care utilisation using data obtained from the Demographic and Health Survey data in Kenya showed that women with tertiary education were three times more likely to utilise four or more antenatal care services compared to those with no education (Wairoto, et al, 2020).

Afaya et al (2020) carried out research on women's knowledge and its associated factors regarding optimum utilisation of antenatal care in rural Ghana. The author declared that the respondent's educational level was found to have a strong influence on the utilisation ANC services for four or more times. The results revealed that women who had tertiary educational attainment were more likely to use ANC services 10 times more than those without education. Participants who had tertiary, secondary and basic education were more likely to use ANC services compared to those who had no education. (Afaya et al, 2020).



A study conducted in Nigeria found not only a positive association between maternal education and the number of ANC visits, but with that of the spouse too and that the higher the spouse's educational attainment, the more the ANC visits of the mother (Nwosu and Ataguba, 2019). Additionally, data obtained from Nepal demographic and health survey 2016, revealed that 77 percent of women with educated partners went for four or more ANC visits (Neupane, et al, 2020).

Educated women are more likely to meet the minimum requirements of four ANC visits than the uneducated, specifically, women with higher level education attainment and tertiary education attend more ANC visits those with primary and those with no education. Shibre et al (2020) suggested that in Angola, health knowledge remains the important factor that explains the observed association between higher level of maternal education and use of maternal health care services including ANC. The evidence further asserts that as a woman acquires more accurate information about a wide range of information on different health topics, she is more likely to use maternal health services (Shibre, 2020). In general, it can be explained that the more educated a person is, the easier it is to receive new health information and understand the risks and dangers of good or bad behaviours that have an impact on health. Education has also been shown to play a role in one's insight of the value of quality of health services (Laksono, et al, 2019). The overall patriarchal society in Timor- Leste and low level of maternal education might have contributed to their lack of household decision making, resulting in a high rate of non-utilization of ANC services (Khanal, et al, 2015)

### 2.3.2 Maternal household wealth status:

The odds of receiving any ANC visits among the richest mothers were 1.48 times higher than the mothers who were poorest in Bangladesh (Islam and Masud, 2018). Similarly, in Ethiopia, it was found that respondents of the high economic class had higher odds of adequate ANC visits (Yaya, et al, 2017). Nwosu and Ataguba (2019) further claimed that the number of visits recorded by women increased for richer women relative to poorer women. This could also be due to the costs involved in antenatal care visits, such as food and transport.

A study conducted in Indonesia by Laksono et al (2019) also found that the higher the wealth status background of the woman, the higher the probability of attending four or more ANC visits, with the richest women being 3.6 times more likely to attend the recommended number of ANC visits compared to the poorest women. Similarly, in Nepal, the odds of women from wealthiest quintiles attending four or ANC services were three times more likely than women from the poorest quintile (Joshi, et al, 2014).

In Ethiopia as well, women in the wealthiest quintile had three-and-a-half-fold higher odds of attending ANC compared to women in the lowest wealth quintile (Wilunda, et al, 2015). Dansou et al (2017), also found that the richest women were 11 times more likely to receive over four ANC services and about three times more likely to receive four antenatal care services. The authors claimed that the medical treatments costs were amongst the reasons for self-medications and no ANC attendance among the poorer women in Benin Republic (Dansou, et al, 2017).

In another study conducted in Nepal, women from wealthy backgrounds were more likely to attend four or more ANC services. Not only did they believe that the deity would be angry for them giving birth at home instead of animal sheds, but they also believed it would be angry had the pregnancy been known of, and therefore they attended less four or more ANC visits (Neupane, et al, 2020). However, another study on the socioeconomic and demographic determinants of antenatal care services utilisation in central Nepal found no association between the women's financial background the utilisation of antenatal care (Pandey and Karki, 2014).

The same odds of wealthy women being three times more likely to attend four or more ANC visits are presented by a study conducted by Mekonnen (2019), in Ethiopia. A distinctive feature, however, is that in Ethiopia, both women from wealthy and middle-income backgrounds had the same likelihood of attending four or more ANC visits (Mekonnen, et al, 2019).

Further, Ousman et al (2019), in agreement with the studies, stated that household wealth index was significantly associated with the number of ANC visits in South Africa. Women from middle wealth indices households had 39 percent in 2005, 23 percent in 2011 and 27 percent more visits than women in low wealth indices in 2016, while women in high indexed households had 84

percent in 2005, 51 percent in 2011 and 16 percent more visits in 2016 compared to from low wealth index households (Ousman, et al, 2019).

Sanogo and Yaya (2020) in a study conducted on wealth status, health insurance, and maternal health care utilization in Africa in Gabon, found that women from the richest households were more likely to have health insurance coverage and therefore are 2.5 times more likely to adequately utilized antenatal care services, attending four or more visits, while their counterparts are more likely to not have health insurance coverage and in addition attend less four or more antenatal care services (Sanogo and Yaya, 2020).

The highest percentage of one to three ANC visits was found in the poor level households backgrounds, while the likelihood of four or more visits was pointedly higher among women from middle and rich households in Tanzania (Rwabilimbo, 2020). The author claimed that this is because women from wealthier households had better access to substantial resources such as money and cars which in turn ease access to ANC services and had better access to standard health facilities (Rwabalimbo, 2020). In Angola, disparities favouring the advantaged subpopulation as compared to the disadvantaged poor subpopulations were evident, this mean that full ANC coverage of four or more visits was among the richest populations, higher by 54 percent, compared to the poorest and 26 percent higher in women from middle income households than the poorest (Shibre, 2020).

A study that was carried out in Bangladesh, by Rahman et al (2017), using two surveys found that the richest women were 1.8 times more likely to utilize four or more ANC visits in 2011 and 3.6 times more likely in 2014, compared to the poorest group. In Timor-Leste, Khanal et al (2015), concluded that mothers from lower wealth status households were at higher risk of not making the recommended four or more ANC visits and claimed that the economic hardships that restrict these women were access and pay for the expenses associated with ANC services. In Cambodia, 19 percent of poorer women, 22 percent of poor women, 29 percent of women in middle income households, 37 for rich women received four or more antenatal care services, while every second woman from the richest quintile had full four ANC visits (Prusty, et al, 2015).

A study on factors associated with the use of antenatal care in Sindh province, Pakistan, found that household wealth was strongly associated with ANC utilization revealed that women in the poorest quintile were six times less likely to make the recommended four ANC visits than women in the richest quintile (Noh, et al, 2019). Khatib et al (2020), also found that for wealth index quintiles comparison with the poorest quintile, the higher the wealth index quintile the lower the likelihood of less than four ANC visits in Nigeria. In Kenya as well, the odds of four or more ANC utilisation were two times higher in the least poor quintile (rich) than the poorest wealth quintile (Wairoto, et al, 2020).

The poor women category consisted of 17 percent of women who attended the minimum ANC visits, 32 percent from the middle-income household and 57 percent in the rich households attended four or more antenatal care visits, in a study on quality of antenatal care services and completion of four or more antenatal care visits in Ethiopia carried out by Muchie (2017). Women in the middle household were 78 percent more likely to complete for our more visits, while women in the rich index were 85% more likely, compared to their counterparts (Muchie, 2017).

The results obtained for ANC visits by household wealth index showed that a substantial gap exists between the well-off and the disadvantaged. Women from wealthy household quintiles were more likely to attend four or more ANC than women in the middle-income households, who more likely to complete the ANC coverage compared to their poor counterparts. Distance, costs, and transport were the main reasons for poor antenatal care utilization among the economically less fortunate.

### 2.3.3 Maternal employment status:

In South Africa, seven out of ten women who reported they were self-employed went for the 2016 recommended number of antenatal care visits of at least four (Tsawe and Susuman, 2014).

Data obtained from the Ethiopian Demographic Health Survey showed that there were higher odds of inadequacy, of four less antenatal care visits, in women who engaged in unskilled labour and the informal economy, such as agriculture, housekeeping, and other jobs, while women who were not working attended more than them (Yaya, et al, 2017). Further, Joshi et al (2014) showed

a link between partners occupation with the use of at least four or more ANC, finding that women whose husbands were involved in agriculture had lower odds of four or more ANC visits than those whose husbands were involved in other occupations, in Nepal. The authors linked farming with poverty and lack of disposable income. (Joshi, et al, 2014).

Contrary to this, in the review of studies Sub-Saharan Africa, 40 percent of the papers found no association between employment and receiving antenatal care services, while other studies found that women who were farmers were more likely to utilise four or more ANC services (Alex, et al, 2019).

Rwabilimbo (2020), found that in Tanzania, the highest prevalence of four or more ANC service use was among women who were formally employed, while informally employed women had the highest prevalence of attending between one and three ANC visits. A study conducted in Cambodia also found that women who were employed in white collar profession had significantly higher odds of timely and adequate use of ANC (Zhou, et al, 2020).

According to Muhwava (2016), employed women had more access to antenatal care than unemployed women. This may be attributed to the inability to meet the costs associated with the ANC visits, for instance, transport and food, despite the health service that is provided free of charge. In South Africa, transport has been identified as the biggest cost of ANC. Furthermore, employed women claimed to have received better quality due to seeking private health care and having access to health insurance, than unemployed women who rely on public health care facilities (Muhwava, 2016). In Nigeria as well, respondents that were not employed had 40 percent likelihood of not attending the required number of ANC visits. Unemployed women do not earn income and therefore have less probability of attending ANC and further undertaking frequent visits (Nghargbu and Olvania, 2019). Mekonnen et al (2019), found that in Ethiopia, mothers who were unemployed were four times less likely to utilise ANC coverage than their unemployed counterparts.

The odds of having at least four visits among women who had occupation increased by 24 percent compared with women who had no occupation in Africa. These findings were related to income and societal influence that come with employment outside the home (Tessama and Minyihun

2021). In a systematic review by Alex et al (2019), the results showed that women who were employed were three times more likely to meet the recommended number of antenatal care services than unemployed women in Sub-Saharan Africa. Being employed also increased the odds of early initiation of ANC. Employment status is closely related to income and educational status as educated women tend to be employed and consequently earn income. Beyond being a source of funds for sponsoring ANC use, employment can also increase women's exposure and access to information on ANC, thus further promoting utilisation (Alex, et al, 2019).

Contrary to this, data obtained from the Timor-Leste Demographic and Health Survey 2009-2010 found that employed women attended four or more antenatal care visits less than the unemployed, claiming that losing hours of work results in losing income which has a large impact on their livelihood (Khanal, et al, 2015).

Women who are employed seem to mostly have higher odds of attending the four or more recommended number of antenatal care visits in Angola (Shibre, 2020). The author attributes this to women's involvement in employment not only increase their financial ability to use quality medical care, but also empower them to take part in the decision-making process regarding accessing healthcare, because it raises their awareness and provides new behaviours, opportunities, and ideas through the interaction with other people outside the community and home (Shibre, 2020).

The studies that have been previously examined have revealed the factors that determine antenatal care frequency, timing and complications of low use of antenatal care attendance. These studies were inadequate in that they did not disclose factors and determinants associated with provincial difference in antenatal care visits. Also, these studies were limited in geographical scope and sample size as they only focused on a handful of communities with studies such as determinants of access to and use of maternal health care service by Tsawe and Susuman (2014), women's knowledge and its associated factors regarding optimum utilisation of antenatal care in rural Ghana by Afaya et al, (2020), the use of antenatal care in two rural districts of Upper West region in Ghana by Sumankuuro and Wang (2017), determinants of utilization of antenatal care and skilled birth attendant at delivery in South West Shoa Zone by Wilunda et al (2015), utilising

a minimum of four antenatal care visits and associated factors in Debre Berhan Town, North Shewa, Amhara, Ethiopia, 2020 by Tizazu et al (2020) and psychosocial factors associated with early initiation and frequency of antenatal care (ANC) visits in a rural and urban setting in South Africa by Muhwava (2016) among others. These issues therefore limit their applicability to a society like South Africa that is always socially changing. These limitations make it imperative for this study to be to analyse the levels of antenatal care visits and establish the factors of differentials in the patterns of antenatal care services visits within and between the nine provinces which could be beneficial for health decisions on the South African population

#### 2.4 Provincial differences:

South Africa has been consistently ranked as one of the most unequal countries in the world. An empirical fact that has its roots in the history of European colonisation and apartheid. Inequality in this country remains one of the most salient features of the society (StatsSA, 2019). This seems to be more evident in health access. A study conducted by Igwe (2015) claimed that there were evident health inequalities in South African provinces, with Western Cape, predominated by the white population, having better quality health services, however, there were inequalities within the province as well, among different population groups and socioeconomic subpopulations. The author further argued that systemic lapses, ideological supports, weak policies, and health sector structural conditions have intensified health inequalities. This results in the white majority provinces receiving more healthcare funding and having better access compared to provinces where access to health services is generally inadequate, predominated by black majority (Igwe, 2015).

Similarly, McLaren (2014) claims that inadequacy in health services is particularly evident in the non-white areas because of the apartheid legacy. Twenty-seven years after the declaration of freedom, geographical location is still racially defined, which exacerbates barriers if health facilities are located far from the non-White neighbourhood.

Antenatal care in South Africa is characterized by large spatial differences which are strongly linked to the level of socio-economic inequalities. All nine provinces reflect differences in

environment, geographical division population, and development. In addition, Igwe (2015), reveals that in the predominantly white Western Cape Province (mostly urban and richer) of South Africa, maternal mortality figures reflect 27 deaths per 100 000 births while in the predominantly black Eastern Cape (mostly non-urban); the figures are 70 deaths per 100 000 births. Poor provinces like Mpumalanga and Limpopo have relatively low levels of infrastructure development (such as health facilities, roads), education, income, and poor health services (Chirwe, 2016), in contrast, richer provinces like the Western Cape and Gauteng have better infrastructure development, higher income and education levels (Chirwe, 2016).

The legacy of colonization and apartheid has left the black population with several drawbacks that have made them more likely to be living in poverty, in rural areas and in the poorest provinces, which influences child, infant and, maternal mortality through the use of medical facilities, health system variables and infrastructure (Igwe, 2015).

### [2.5 Theoretical framework:](#)

The theoretical framework that underpins this study is based on the utilisation of the Commission of Social Determinants of Health (CSDHs) work from 2005 to 2008. The framework which directed the CSDHs was built on theoretical models that were used to explain the primary process of causation that underpin health inequities. This framework was designed to help policymakers identify the direction of to assist in processes to fight health inequities effectively (Solar and Irwin, 2010). Thus, from this framework, this study will make use of the conceptual framework for action on the social determinants of health to explore provincial differences in the number of antenatal care visits for pregnant women in South Africa (Solar and Irwin, 2010).

The model comprises of three core components: (1) socioeconomic and political context; (2) structural determinants of health inequities; and (3) intermediary determinants of health.

Socioeconomic and political context- This term is broad, but it mainly refers to the variety of factors that incorporate cultural, functional and structural features of a social system whose influence on people eludes influence on patterns of social stratification and therefore on people's



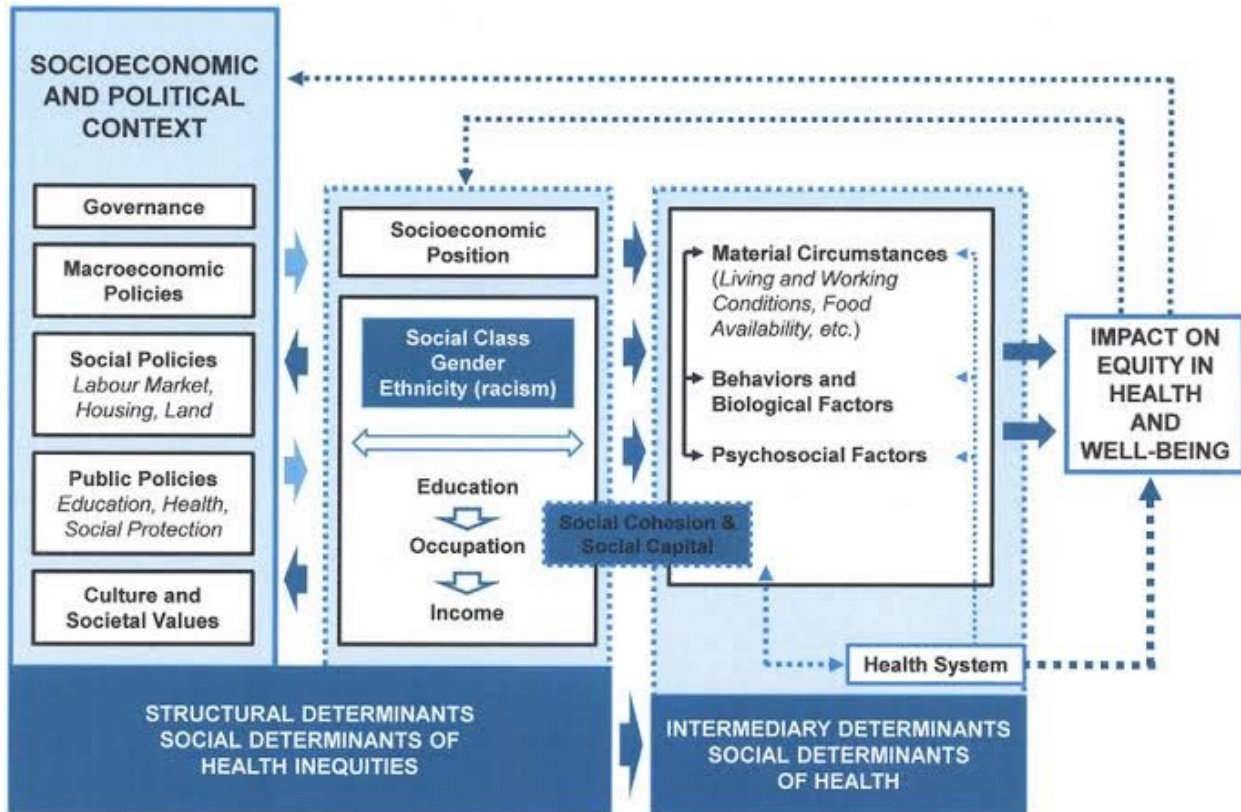
health opportunities as well. The quality of some social determinants of health is conditioned by public and government policies that have an influence on a range of factors that conversely influence the distribution and effects of social determining factors of health across different populations (Solar and Irwin, 2020).

Structural determinants and socioeconomic position- these are social factors that promote and in the same breather undermine one's health and the health of the population. The variables that are used to operationalised ones socioeconomic position and thus affect health are: income- his includes affording quality material for shelter, health care services, among others, education- the knowledge that an individual attains through education may enable one's ability to communicate proper quality of health and access, occupation- this variable is associated with income and therefore results in tangible rewards and monetary resources that determine living standards and health, social class- the disadvantaged social classes are at higher risks of running down their energy and being affected physically or psychologically, race- privileged racial groups often have better health outcomes than the oppressed races (Solar and Irwin, 2010).

Intermediary determinants- these encompass psychosocial, behavioural, and material circumstances and the health system. Psychosocial circumstances include stressors such as high debts and stressful living conditions, behaviour circumstances include smoking, diet, and alcohol consumption among others, which either enhance or protect health and lastly, material circumstances are linked to the physical environment such as housing. Depending on their quality, these can prevent or create health risks (Solar and Irwin, 2010).

In accordance with literature, this framework shows anything health related depends on an individual's social strata and the health system works according to social stratification.

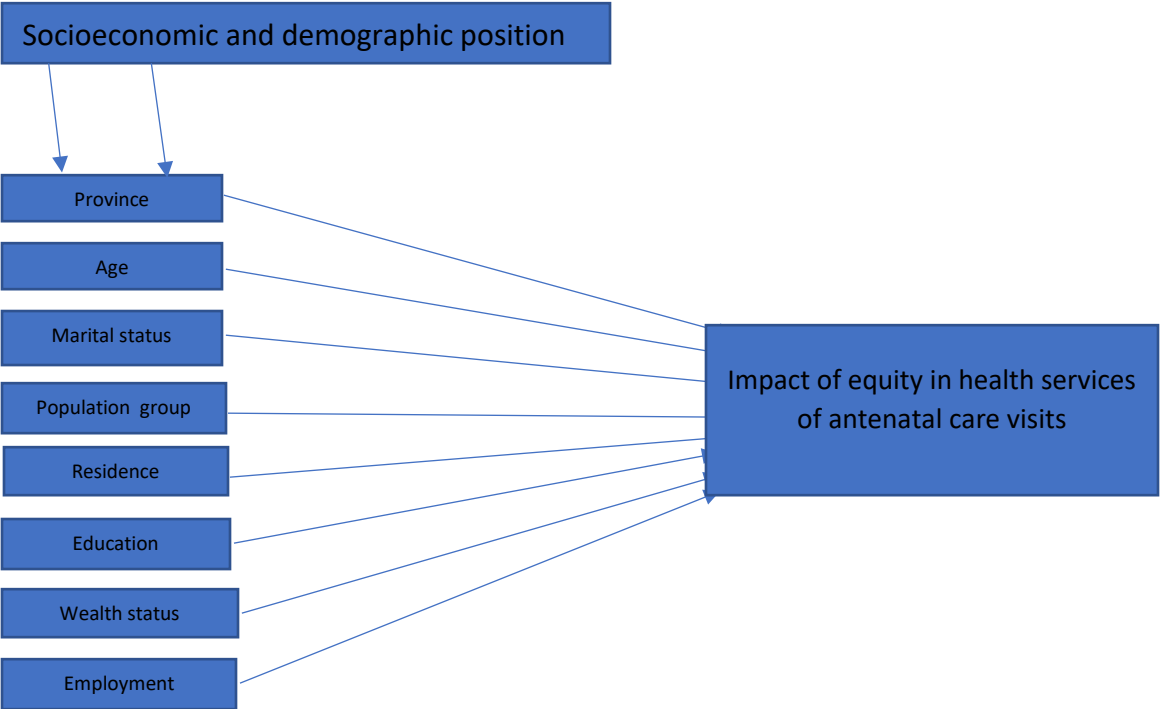
Figure 2.1 The Commission on Social Determinants of Health Conceptual Framework (Solar and Irwin, 2010).



## 2.6 Conceptual Framework:

A conceptual framework is presented beneath. The conceptual framework for action on the social determinants of health that has been developed by Solar and Irwin's has been modified focusing on sociodemographic and socioeconomic factors having a direct influence on antenatal care visits. In the framework illustrated (figure 2.2), demographic, and socioeconomic characteristics such as province, age, marital status, place of residence, employment status, household wealth status, education and race are shown to have a direct influence on antenatal care visits.

Figure 2.2. Conceptual Framework Adapted from Solar and Irwin’s Conceptual Framework for Action on the Social Determinants of Health (2010).



## Chapter 3: Methodology:

### 3.1 Introduction:

This chapter focuses on the data and research methods that were used for this study. Particular reference was dedicated to the data source, description of the data source, study population, sample size, questionnaire design, fieldwork, research hypothesis, variables used in the study, data management and data analysis and ethical issues.

### 3.2 Study description:

This study used secondary data obtained from the 2016 South African Demographic and Health Surveys (DHS) which is a nationally representative survey that provides data of a wide range of indicators of population, nutrition, and health. The sample design was designed to be representative of the population at the national and the provincial level, with a sample size of 11 083 households.

The data collection interviews were undertaken between and June 2016 to November 2016 (StatsSA, 2016). The data obtained from the women's questionnaire provides adequate data on the sociodemographic and socioeconomic variables that were necessary in examining antenatal care in South Africa.

### 3.3 Description of the data source:

The SADHS used the Statistics South Africa Master Sample Frame (MSF) sampling frame created using the 2011 Census enumeration areas. In this Master Sample Frame, enumeration areas of controllable size were treated as the primary sampling units, while small enumeration areas were merged with neighbouring enumeration areas to create new primary sampling units. Larger enumeration areas were split into smaller primary sampling units. This frame encompasses information about the geographic type (either farm, urban or traditional), and the projected number of residential dwelling units in each primary sampling unit. The sampling convention used by Statistics South Africa is dwelling units. One or more households may be in any given

dwelling unit, the most recent surveys have found 1.03 households per each dwelling unit on average (StatsSA, 2016). The country of South Africa is administratively divided into nine provinces, namely: Eastern Cape, Western Cape, Northern Cape, North West, Gauteng, Free State, Limpopo, Mpumalanga and Kwa-Zulu-Natal.

The South African Demographic and Health Survey 2016 sample was designed to provide estimates of crucial indicators for the whole country, for all nine provinces separately and for rural and urban areas separately. To ensure that this survey was comparable across all provinces, the primary sampling units were not allocated by a proportional allocation but rather allocated to provinces to ensure adequate sample sizes for each province. All provinces were graded into traditional areas, farms, and urban areas. The survey followed a stratified two-stage sample design with a probability proportional to size sampling of the primary units at the first stage and systematic sampling of dwelling units at the second stage yielding 26 sampling strata. The 2011 Census dwelling units count was used as the measure of size for the primary sampling units. A total of 750 sampling units were found from 26 sampling strata, yielding 224 primary sampling units in traditional areas, 58 in farm areas and 468 in urban areas (StatsSA, 2016).

#### 3.4 Study population:

In total, 15 292 households were selected for the DHS sample of which 11 083 were interviewed. In these households, 8 514 women were interviewed of the 9 878 who were eligible, showing a response rate of 86 percent. The study population consists of the 3036 women aged 15-49 who reported one or more births in the five years preceding the survey. Females who have not had no births in the past 5 years were not accounted for to be able to yield accurate results. They have instead remained censored. The study was focused on females off all demographic and socioeconomic status.

#### 3.5 Questionnaire design:

The South African Demographic and Health Survey consists of four Questionnaires namely, a woman's questionnaire, a man's questionnaire, a household questionnaire, and a biomarker questionnaire. The woman's questionnaire collected information for all women from age 15 to

49. In all households, questions from the following topics were asked: Age, education, birth history, child mortality, use of family planning and contraceptives, knowledge about contraceptives, labour, antenatal, postnatal care, infant feeding practices, breast feeding, child illnesses and vaccinations, sexual activities, marriage, women, and partners work background, knowledge about HIV and AIDS, HIV transmission, pregnancy related mortality maternal and child (StatsSA, 2016).

### 3.6 Fieldwork and data processing:

Data used by the SADHS was collected by 30 field teams. Each team consisted of a supervisor, 1 male interviewer, 3 female interviewers, a nurse and a logistics driver or officer. Every day electronic data files were transferred to the Statistics South Africa head office in. Provincial offices and senior staff from Statistics South Africa's head office coordinated the fieldwork activities. StatsSA also supervised the fieldwork, they received support from South African Medical Research Council (SAMRC) on the biomarker collection. Another very important aspect of supervision were the field work inspection visits made by independent teams from Stats SAs Monitoring and Evaluation chief directorate and StatsSA Survey Coordination. During the field work data collection, monitoring teams visited eighty-four completed clusters in four provinces (Western Cape, Free State, Gauteng and Kwa-Zulu Natal) for confirmation on the visitation of the dwelling units, to make sure that each household member was correctly listed and verify nonresponse. Feedback was provided to provincial coordinators, and, where necessary, clusters were revisited. The survey data collection took place from 27 June 2016 to 4 November 2016 (StatsSA, 2016)

### 3.7 Variables used in study:

#### 3.7.1 The dependent variable:

The dependent variable in this study is "number of antenatal care visits". This is defined as the treatment received for pregnancy by women with one or more live births five years before the 2016 South African Demographic and Health Survey. The question asked was "How many times

did you receive antenatal care during this pregnancy” (StatsSA, 2016). This variable was presented as counts, then recategorized into four groups: no ANC (0), 1-3 ANC visits (1), 4-7 ANC visits (2), and 8+ ANC visits (3). However, as noted previously the WHO recommended minimum was four ANC visits so lastly, the variable was recategorized into two categories. Women who had three or less antenatal care visits were categorized as (0) and those who had four or more antenatal care visits were grouped as (1).

### 3.7.2 The independent variable:

The independent variables applied in this study are of a sociodemographic and socioeconomic nature. Variables that were demographic indicators were: maternal province, maternal age in 5-year groups, maternal marital status, maternal population group and maternal place of residence. Economic variables were maternal education attainment, maternal wealth status and maternal employment status. These variables assist in providing background characteristics of the sample of females who were participants. Furthermore, these variables were selected based on the literature review. In addition, these are variables that are known to have an influence on the number of antenatal care visits across various developing countries.

In terms of construction of the variables: The place of province variable was originally referred to as “region”, referring to an area within a particular country. This consist of the nine South African provinces, namely: Eastern Cape, Western Cape, Northern Cape, North West, Limpopo, Free State, Mpumalanga, Kwa-Zulu-Natal, and Gauteng.

The age variable was initially named “age in 5-year groups” which was grouped into 5-year intervals. This is maternal age. The most vital variable in demographic examination is age because crucial events such as marriage, divorce, mortality and fertility are reliant on age (Palamuleni, 2011). This refers to the ages of the female respondents who were part of the selected sample during the present day when the study was conducted. Marital status was initially referred to as “current marital status” which was initially coded as 1. Never in union, 2. Married, 3. Living with partner, 4. Widowed, 5. Divorced, 6. Separated/ no longer living together. For the purpose of this

study however, married and living with partner were merged into a “1” category, married, while never in union, widowed, divorced and separated were merged into “2” category, not married.

Population group was initially termed “ethnicity” with categories that are 1. Black, 2. White, 3. Coloured, 4. Indian and Asian and 996. Other. For the purpose of this study, Black remained as 1, White as 2, Coloured as 4 and Indian and Asian were merged to 996. Place of residence was initially termed “type of place of residence”, dichotomized into 1. Urban and 2. Rural. Education was referred to as “Highest education level” which was coded as 1. None, 2. Primary, 3. Secondary, and 4. Higher. Household wealth status initially had five categories, i.e., 1. Poorest, 2. Poor, 3. Middle, 4. Richer, 5. Rich. These were then recoded, poorest and poor were merged into “poorer”, middle remained and richer and rich were merged into “richer”. Employment status was initially referred to as “respondent currently working”. This was dichotomized into 1. Yes and 2. No.

The below shows all the independent variables that have been used in this study. The variables have been divided according to sociodemographic and socioeconomic characteristics

Table 3.1. The main variables used in the study, variable definitions, and variable descriptions.

<b>Dependent variables</b>	<b>Definition</b>	<b>Description</b>
No. of Antenatal Care visits	Treatment rendered to pregnancy by women with one or more live births five years before the 2016 South African Demographic and Health Survey.	Categorical
<b>Independent variables</b>		
<b>Sociodemographic:</b> Maternal province	Province of residence of the mother:  *Eastern Cape (EC)	Categorical



	<ul style="list-style-type: none"> <li>*Western Cape (WC)</li> <li>*Northern Cape (NC)</li> <li>*North West (NW)</li> <li>*Free State (FS)</li> <li>*Limpopo (LP)</li> <li>*Gauteng (GP)</li> <li>*Kwa-Zulu-Natal (KZN)</li> <li>*Mpumalanga (MP)</li> </ul>	
Maternal age in 5-year groups	<p>Age of the mother</p> <ul style="list-style-type: none"> <li>*15-19</li> <li>*20-24</li> <li>*25-29</li> <li>*30-34</li> <li>*35-39</li> <li>*40-44</li> <li>*45-49</li> </ul>	Categorical
Maternal marital status	<p>Women either in union or not</p> <ul style="list-style-type: none"> <li>*Married</li> <li>*Single</li> </ul>	Categorical
Maternal population group	<p>Ethnicity of the mother</p> <ul style="list-style-type: none"> <li>*Black</li> <li>*White</li> <li>*Coloured</li> <li>*Indian and Asian</li> <li>*Other</li> </ul>	Categorical
Maternal place of residence	<p>Where the mother resides</p> <ul style="list-style-type: none"> <li>*Urban</li> <li>*Rural</li> </ul>	Categorical
<b>Socioeconomic</b>		

Maternal education attainment	The highest education level the mother has attained: *None *Primary *Secondary *Higher	Categorical
Maternal household wealth status	The mothers economic/ financial status *Poorer *Middle *Richer	Categorical
Maternal employment status	Whether the mother is employed or not *Yes *No	Categorical

3.8 Data management:

The 2016 SADHS data was downloaded from the Demographic and Health Survey website after receiving permission and access to the data. A statistical program called STATA 14 was used to examine the acquired data after the data required was transformed into STATA format. The variables that were used in this study were extracted from the women’s individual recode (IR) module. There were missing observations in the dependent variables and this is because there were females who had not experienced interested in the study which was antenatal care. As the “don’t know” category was small in size incomplete observations were simply censored.

3.9 Data analysis:

For this study, univariate, bivariate and multivariate analyses were done to meet the above objectives. The association between the dependent variable (antenatal care visits) and the

sociodemographic and socioeconomic variables were examined using the odds ratio (OR) at  $p$ -value of  $<0.05$  and 95 percent confidence interval (CI). For the analysis of this research, the `svy` commands in Stata version 14 were utilised to ensure that the multi-stage probability-based survey design was taken into account.

To achieve the first objective, a univariate analysis was done showing frequency and percentage distribution of antenatal care visits. The same was done for all the independent variables as well to see the population distribution according to socioeconomic and demographic factors. To achieve the second objective, a bivariate analysis was conducted using the chi-square test. Chi-square test was also used to examine the province variable associated with the dependent variable.

To achieve the third objective, a multivariate logistic regression analysis was done to determine the significant factors associated with provincial differential in antenatal care visits from those variables that were significantly associated with antenatal care in the bivariate analysis.

### 3.10 Ethical issues:

This study was conducted using secondary statistics and data already collected by the South African Demographic and Health Survey, 2016 datasets. Consent was not compulsory because the survey was conducted anonymous. This is simply because analysis of the data did not include any individual communication with the respondents by the researcher. There were also no issues relating to privacy because personal information such as names of respondents were not revealed in the datasets. An ethics approval letter to conduct the study was also received from the University of Kwa-Zulu-Natal

## Chapter 4: Results:

### 4.1 Introduction:

This section focuses on the results obtained from the study. Firstly, a univariate analysis of all the sociodemographic and socioeconomic factors, as well as the outcome variables, was conducted to observe the background characteristics of the respondents. Percentage distributions of all the sociodemographic and socioeconomic variables are presented to show a detailed description of the demographic background of the respondents. In addition, a bivariate examination of antenatal care visits by socioeconomic and sociodemographic variables was done. Lastly, a multivariate examination of variables that were statistically significant to antenatal care visits was done.

### 4.2 Univariate analysis:

The following section shows descriptive analyses of all the factors and the outcome variable that were utilised in the study. The variables are shown using a series of frequency and percentage distribution tables and discussions

Table 4.1 provides a detailed representation of the sociodemographic and socioeconomic background characteristics of the women who had given birth in the five years preceding the 2016 SADHS survey data collection. In terms of the sociodemographic variables, the percentage distributions for maternal province showed that majority of the respondents were residents in Gauteng (28%), followed by 18% of the respondents in Kwa-Zulu-Natal. Just over one in ten women were resident in the Eastern Cape (11%), followed by Limpopo, Mpumalanga and Western Cape that consisted of less than 10 percent of the respondents each. One in twelve respondents were resident in North West (8%), Free State had 5% of the respondents and the smallest being Northern Cape with a percentage of 2% of the respondents residing in the province

In terms of the maternal age of respondents, more than a quarter of women were in the age cohort of 25-29 years (28%) while the minority was between the ages of 45-49 making up 1.4%.

Almost a quarter (23%) of the women who had given birth in the five years preceding the survey were in the age cohort of 20-24 years of age, followed by 13.7% in ages 35-39. Additionally, women in the cohort age of 40-44 consisted of 6.6% and those in the teenage years (15-19) consisted of 5.8 percent.

In reference to maternal marital status, more than half of the women were not in a union (56%) while 44% was in a union at the time of the survey. A large majority of South African women respondents were African/Black (91%) followed by a 7% of Coloured women, 2% of White women and the smallest group belonged to other population groups (1%). This is because South Africa is a predominantly Black nation (StatsSA, 2017). Almost two thirds of the sample of respondents lived in urban areas (64%), while 36% lived in rural areas. These results confirmed that South Africa has been greatly urbanized.

In terms of the socioeconomic variables, the percentage distributions of educational attainment showed that majority of the females in South Africa have Secondary education (79%), with a large difference of the second highest majority, where almost one in 8 women had attained higher education (12%). One in twelve (8.2%) of respondents had primary education, with the lowest females having no education (1%) at all.

In reference to the maternal household wealth status, the results obtained in the study showed that majority of the respondents were residents in the poorest household wealth quintiles and make up almost half of the population (46%), followed by 32% respondents who fall within the richest wealth quintiles and the lowest percentage of 22% was comprised of those who were residents in the middle household wealth quintiles.

Table 4.1 further showed that more than two thirds of women were unemployed in South Africa (68%) and only less than a third were employed (33%), claiming high levels of unemployment among women in South Africa. Lastly, a very large majority of women attended four or more antenatal care services in South Africa while at least a 5<sup>th</sup> attended three or less antenatal care services.

Table 4.1 Frequency and percentage distribution of women who had given birth in the five years preceding the SADHS survey data collection by demographic and socioeconomic background characteristics, South Africa, 2016.

<b>Independent variables</b>	<b>N</b>	<b>%</b>	<b>95% CI around %</b>
<b>Sociodemographic variables:</b>			
<b>Maternal province</b>			
Western Cape	182	9.1	7.6-10.8
Eastern Cape	377	11.0	9.6-12.7
Northern Cape	253	2.0	1.7-2.3
Free State	279	4.8	4.1-5.2
Kwa-Zulu-Natal	467	18.0	16.1-20.7
North West	344	8.0	5.7-11.3
Gauteng	310	28.0	24.6-31.1
Mpumalanga	421	9.2	7.5-11.2
Limpopo	403	9.9	8.6-11.4
Total	3036	100.0	
<b>Maternal age in 5-year groups</b>			
15-19	204	5.8	4.9-6.9
20-24	709	23.0	21.2-25.0
25-29	831	28.2	26.1-30.4
30-34	644	21.4	19.5-23.4
35-39	397	13.7	12.3-15.2
40-44	210	6.6	5.6-7.8
45-49	41	1.4	1.0-2.0
Total	3036	100.0	
<b>Maternal marital status</b>			
Not in union	1818	55.8	53.3-58.3
In union	1218	44.2	41.7-46.7

Total	3036	100.0	
<b>Maternal population group</b>			
African	2712	90.6	88.5-92.4
White	43	1.6	1.1-2.4
Coloured	260	6.8	5.4-8.5
Other	21	1.1	0.5-2.5
Total	3036	100.0	
<b>Maternal place of residence</b>			
Urban	1607	64.0	60.8-67.0
Rural	1429	36.0	33.0-39.2
Total	3036	100.0	
<b>Socioeconomic variables:</b>			
<b>Maternal education attainment</b>			
No education	43	1.4	0.9-2.1
Primary education	278	8.2	6.9-9.7
Secondary education	2408	78.9	76.7-80.9
Higher education	307	11.6	9.8-13.6
Total	3036	100.0	
<b>Maternal household wealth status</b>			
Poorer	1473	45.8	42.0-49.5
Middle	694	22.1	19.6-24.8
Richer	869	32.1	28.6-35.9
Total	3036	100.0	
<b>Maternal employment status</b>			
Unemployed	2112	68.0	65.5-70.4
Employed	924	32.0	29.6-34.5
Total	3036	100.0	
<b>No of antenatal care visits</b>			

Three of less	571	21.9	19.6-24.4
Four or more	2371	78.1	75.6-80.4
Total	3036	100.0	

N=unweighted. %= weighted.

Table 4.2 provides a representation of the number and percentage of women who took part in the research and the number of times they attended antenatal care services they attended. 6% of women who gave birth in the past 5 years before the survey did not attend any antenatal care, 2% only attended once, 4% attended twice, and a growing 9% attended three times. Basically, more than a fifth of women (21%) who took part in the research attended antenatal care less than the 2016 minimum required.

Most women who gave birth in past 5 years who took part in the survey went to 6 antenatal care visits (18%). The second largest number of antenatal care visits done was 5 visits (15%), 1 more visit than the prescribed number of visits in 2016, while the third largest was 7 visits (13%). The fourth largest number of antenatal care visits done was that of 4 visits consisting of only 13% of the women and more than one in every 12 women attended 8 antenatal care services (9%). Almost three-quarters of women in South Africa went for more than 4 and less than 8 antenatal care visits, which was the new minimum requirements of antenatal care services.

Additionally, 155 women consisting of 5% went for 9 antenatal care visits, followed by 1% that went for 10 visits. All ANC attendance between 11 and 20 visits was by less than 1% and 0.3 % for 20 visits. More than 3% of women claimed to not recall the number of times they attended antenatal care services. Table 4.2 demonstrated that over three quarters of women have attended more than 4 antenatal care services in South Africa.



Table 4.2 Frequency and percentage distribution of women who had given birth in the five years preceding the SADHS survey data antenatal care attendance, showing 95% confidence interval, South Africa, 2016.

No of antenatal care services attended	N	Percentage (%)	95% CI around %
0	152	5.7	4.3-7.5
1	63	2.1	1.5-2.9
2	104	4.4	3.5-5.4
3	252	9.1	7.7-10.7
4	380	12.8	11.3-14.5
5	472	14.5	13.1-16.0
6	579	17.9	16.3-19.6
7	395	13.2	11.7-14.9
8	264	8.5	7.4-9.8
9	155	4.7	3.8-5.7
10	47	1.4	1.0-2.0
11	10	0.3	0.1-0.6
12	26	0.9	0.6-1.4
13	8	0.3	0.1-0.7
14	3	0.1	0.3-0.7
15	7	0.3	0.1-0.6
16	4	0.1	0.2-0.2
17	2	0.0	0.0-0.1
18	7	0.2	0.8-0.4
19	3	0.1	0.0-0.2
20	9	0.3	0.1-0.6
"Don't know"	94	3.3	2.4-4.5

N=unweighted %=unweighted

Results from table 4.3 demonstrated that in regard to no antenatal care visits, Gauteng women were leading with just over one tenth not receiving antenatal care services (11%), followed by Mpumalanga with one in every twelve women not attending ANC visits (8%) and Northern Cape (8%). Eastern Cape had the least proportion of women who did not attend any ANC (2%) as well as North West (2%). 1 in every 20 women did not utilise ANC services in Western Cape (5%), in addition to 4% in Limpopo and Kwa-Zulu-Natal

In terms of women who were pregnant 5 years preceding the survey reporting to one to three ANC visits, Gauteng was leading with a quarter (24.5%) of women reporting this to be the case. Less than one fifth (18%) of women residing in Limpopo had one to three ANC visits, followed by 16% in Kwa-Zulu-Natal and 15% in Eastern Cape. Similarly, women in the Northern Cape reported one to three ANC visits, as did one in every eight women in Free State (12.3%) and 13% of respondents residing in Limpopo. Only a small percentage of women in the Western Cape (3%) reported one to three visits, followed by North West 8%.

Over two thirds of women in Kwa-Zulu-Natal (67%) reported four to seven ANC visits, as did two thirds of women in North West (66%), North West (66%) and Eastern Cape (66%). Similarly, just under two thirds (64%) of women attended between four and seven ANC visits in Limpopo. The lowest proportion of respondents who attended either 4, 5, 6, or 7 antenatal care services resided in Free State, with over 1 in every two women attending 4-7 ANC services (52%), followed by 55% of women in Gauteng. In Mpumalanga, 58% of the women attended 4-7 visits as did 57% in Western Cape.

Table 4.3 showed that 35 percent of Western Cape women attended eight or more ANC visits, followed by Free State mothers (30%). Almost a quarter of North West respondents attended eight or more ANC visits (24%). The lowest proportion of women who attended either eight or more antenatal care services were women from Gauteng (10%) followed by women who reside in Northern Cape, where 12% of women attend 8 or more ANC services. In Limpopo, eight or more ANC visits were reported by almost one fifth (19%) of respondents in the survey, while this was the case for 17% in Eastern Cape and 16% in Mpumalanga. In Kwa-Zulu-Natal, 14.8% of the women reported attending eight or more ANC visits.

Table 4.3 Percentage distribution of women who had given birth in the five years preceding the SADHS survey data antenatal care attendance of 0, between 1 and 3, between 4-7 and 8+ visits, South Africa, 2016.

Region	0 ANC visits	1-3 ANC visits	4-7 ANC visits	8+ ANC visits	Percentage totals
Western Cape	5.0	3.6	56.6	34.9	100.0
Eastern Cape	1.5	15.2	66.0	17.3	100.0
Northern Cape	7.5	14.1	66.3	12.0	100.0
Free State	5.1	12.3	51.7	30.3	100.0
Kwa-Zulu-Natal	3.5	16.0	66.9	14.2	100.0
North West	1.8	8.2	66.4	23.6	100.0
Gauteng	10.6	24.5	54.1	10.7	100.0
Mpumalanga	8.4	17.9	57.5	16.2	100.0
Limpopo	4.3	12.7	63.9	19.1	100.0
Total	5.9	16.0	60.4	17.1	100.0
				X <sup>2</sup> = 240.6575 P= 0.0000	

#### 4.3: Bivariate regression model:

Table 4.4 below shows the percentage distributions of antenatal care visits by demographic and socioeconomic characteristics. Over 9 in 10 of women attended four or more antenatal care visits in Gauteng (92%) and exactly 9 in 10 women in North West (90), followed by more than 80% in Eastern Cape (83%), Limpopo (83%) and Free State (83%) with the same attendance, and 8 in 10 women in Kwa-Zulu-Natal (81%). Women in the Northern Cape have an attendance of over three-quarters (78) of four or more antenatal care services. Women who reside in Gauteng, North West, Eastern Cape, Limpopo, Free State, Kwa-Zulu-Natal, and Northern Cape have attended the minimum or more requirement of antenatal services more than the national rate. The lowest

attendance of four or more antenatal care visits was visible in Gauteng where almost two thirds of women attended four or more ANC services (65%), followed by Mpumalanga (74%).

Gauteng hosts the highest number of women who attended three or less antenatal care services, consisting of over a third of women (35%), followed by Mpumalanga (26%) where more than a quarter of the respondents attending less than three antenatal services. Over 15% of women who gave birth in the past years attended less than three antenatal care visits in Kwa-Zulu-Natal (19%), Free State (17%), Limpopo (17%) and Eastern Cape (17%). The lowest distribution of women who attended three or less visits were in Northern Cape (3%), followed by Western Cape (9%) and lastly, North West where only 1 in 10 women attended utilised three or less ANC services (10%).

There was a significant association of ANC service visits with maternal province ( $p < 0.000$ ).

A majority of females who attended four or more antenatal care visits was evident in in the age cohort 25 to 29 years, with one in every five women attending four or more ANC services, followed by (20%) followed by the age cohort 30-34 (19%). Over three quarters of women in women between age cohorts 15-19 years (77%) and 20-24 years (79%) attended four or more ANC visits. Women between the ages of 35-39 (73%) and 40-44 (74%) attended less than the national's attendance of four or more antenatal care visits. In age cohort 45-49 years, only ever 1 in 2 women attended more than four visits.

In terms of less than three or less antenatal care visits per maternal age group, what stood out was women aged 45-49 years, with half of the women attending three or less antenatal care visits, which is the only age cohort with the same percent attendance of three or less visits and four or more visits. Over a quarter of women in ages between 35-39 (27%) and 40-44 years (26%) utilised 3 or less ANC services. In the 20-24 years cohort, over 1 in every 5 women received 3 or less ANC services (21%) and 23% of women between 15 and 19 years (23%). The lowest percentage distributions of three or less antenatal care visits was in the ages 25-35, with 25-29 consisting of one in 5 women attending 3 or less antenatal care services and the same with ages 30-34. A large majority of women per age group went for four or more antenatal visits, with the exception of the cohort 45-49 years.

There was a significant association of ANC service visits with maternal age group ( $p < 0.0082$ ).

In terms of maternal marital status, more than a quarter of women in unions attended four or more antenatal care visits (78%), while only 22% of women in unions went for less. This is almost the same with women who were not in unions, where almost 80% of married women went for four or more ANC visits while less than a quarter went for 3 or less ANC visits. Most female respondents whether in a union or not went for four or more antenatal visits.

In regard to maternal population group, the highest four or more ANC services percentage distribution was among Coloured women, where more than 9 in ten women went for four or more ANC visits (91%), followed by other population groups (87%). 84% of White women utilised four or more ANC services, and lastly more than three quarters of African women (77%). Conversely, more African women had three or less ANC visits, less than a quarter (23%), then White women (16%), followed by other population groups (13%) and lastly, Coloured women (9%). The reason for Black women having the least percentage of four more visits could be due to problems they have to accessing antenatal care.

There was a significant association of ANC service visits with maternal population group ( $p < 0.0001$ ).

The highest percentage of the sample of respondents who attended four or more antenatal care visits was women who lived in rural areas (82%), while only over three quarters of women in urban areas attended the same (76%). The higher percentage distribution of women who attended three or less visits was in urban areas with almost a quarter (24%) and only 18 percent in rural areas. An interesting distinctive feature that emerged from these results is that there are more females in rural areas than in urban areas that attended four or more antenatal services. This is interesting because according to literature, rural females have a reduced chance of four or more antenatal visits than urban women.

There was a significant association of ANC service visits with maternal place of residence ( $p < 0.0045$ ).

In socioeconomic variables, South African women with higher educational attainment (84%) attended more four or more visits than their counterparts. All women in terms of education attended more than the national rate of four more ANC visits, with more women with primary education (78%) followed by those with secondary education (77%) and tertiary education (77%). The lowest percentage of the sample of respondents attending three or less ANC visits was in women with higher education (16%), followed by those with almost a quarter with no educational at all (22%), while the highest was among those with primary and those with secondary education, with both primary and secondary education consisting of almost a quarter (23%). Most women in South Africa with no educational attainment, primary education, secondary education or tertiary education attended four or more antenatal care visits.

Table 4.4 demonstrated that the percentage of sample for women who had births in the past 5 years who attended four or more antenatal care visits was highest in both in women in middle wealth status, where every 8 in 10 women attended four or more ANC visits (80%) and those who fall under the richer wealth status (83%), with only a slight difference in women who fall under the poorer wealth status, three quarters (75%). Conversely, a fifth of women who fell in both the middle wealth status (20%) and richer wealth status (20%), had the least women who attended three or more antenatal care visits with women in the poorer wealth quintile having the most (25%).

With reference to maternal employment status, out of the women employed, 81% attended four or more antenatal care visits and 77% of unemployed women attended four or more. In terms of women who attended three or less antenatal care visits in relation to employment status, unemployed women had the highest percent of almost a quarter (23%) while 20% of employed women attended three or less visits. Whether employed or unemployed, most respondents attended four or more antenatal visits.

Table 4.4 Analysis of sociodemographic and socioeconomic factors by the number of antenatal care visits among women who had given birth in the five years preceding the SADHS survey data, South Africa, 2016

Independent variable	3 or less ANC visits in (%)	4 or more ANC visits in (%)	
<b>Sociodemographic variables:</b>			
<b>Maternal province</b>			
Western Cape	8.5	91.5	
Eastern Cape	16.7	83.3	
Northern cape	21.7	78.4	
Free state	17.4	82.6	
Kwa-Zulu-Natal	19.0	81.0	
North West	10.0	90.0	
Gauteng	35.1	64.9	
Mpumalanga	26.3	73.7	
Limpopo	16.9	83.0	
			X <sup>2</sup> = 147.5339 P= 0.0000
<b>Maternal age in 5 years</b>			
15-19	23.4	76.8	
20-24	20.8	79.2	
25-29	19.8	80.2	
30-34	19.3	80.8	
35-39	27.0	72.9	
40-44	26.0	74.0	
45-49	50.3	49.7	
			X <sup>2</sup> = 35.5894 P= 0.0082
<b>Maternal marital status</b>			
Not in union	21.7	78.3	
In union	22.2	77.8	

			X2= 0.086 P= 0.8614
<b>Maternal population group</b>			
African	23.1	76.9	
White	15.7	84.3	
Coloured	9.2	90.8	
Other	13.0	87.0	
			X2= 23.3022 P= 0.0001
<b>Maternal place of residence</b>			
Urban	24.1	75.89	
Rural	18.0	82.0	
			X2=14.6732 P= 0.0045
<b>Socioeconomic variables:</b>			
<b>Maternal education</b>			
No education	21.8	78.3	
Primary education	22.8	77.2	
Secondary education	22.8	77.2	
Higher education	15.6	84.4	
			X2= 9.0820 P= 0.2014
<b>Maternal household wealth status</b>			
Poorer	24.6	75.4	
Middle	19.7	80.3	
Richer	19.7	80.3	
			X2= 10.0735



			P= 0.1681
<b>Maternal employment status</b>			
Unemployed	23	77	
Employed	19.6	80.4	
			X <sup>2</sup> = 4.3970 P= 0.1192

\*Significant at  $p < 0.05$ ; N.B.

4.4 Multivariate regression model:

The results in table 4.4 depicted maternal province, maternal age in 5 years, maternal population group and maternal place of residence have a substantial influence on antenatal care visits as some of the categories had p-values that are greater than 0.05.

Eastern Cape, Free State, North West and Limpopo had no substantial influence on antenatal care visits, while Northern Cape, Kwa-Zulu-Natal, Gauteng and Mpumalanga have a significant relation with the number of antenatal care visits. Respondents in Northern Cape also had 66% less odds of attending 4+ ANC visits than the Western. Women residing in Kwa-Zulu Natal had 55% less likelihood of attending 4+ ANC visits in comparison to women in Western Cape. Women in Gauteng almost 80% less likely hood of attending four or more ANC services than women that reside in Western Cape (79%), while mothers in Mpumalanga had 68% less

In terms of maternal age of respondents in 5 years, only the age cohort of 45-49 had a substantial influence on ANC, while ages 15-44 showed no influence on antenatal care visits. Women that gave birth in the 5 years preceding the survey aged 45-49 had 70% less likelihood of utilizing four or more ANC services compared to their 15-19 age cohort counterparts.

Despite that in the sample of respondents by maternal population group none of the women in any population group showed any influence on antenatal attendance, white women, coloured women, and all other population groups showed increased chances of attending 4+ ANC visits than Black women.

In terms of maternal place of residence, neither women in rural nor urban areas had a significant relation with antenatal care, however women in rural areas were 10 percent more likely to attend 4+ ANC visits than women in urban areas.

Table 4.5 Multivariate analysis of sociodemographic and socioeconomic factors statistically significant to antenatal care visits among women who had given birth in the five years preceding the SADHS survey data, South Africa, 2016.

<b>Independent variable</b>	<b>Odds ratio</b>	<b>p- value</b>	<b>95% confidence interval of OR</b>
<b>Maternal province</b>			
Western Cape	1.0		
Eastern Cape	0.6	0.072	0.3-1.1
Northern Cape	0.3	0.001	0.2-0.7
Free State	0.5	0.090	0.3-1.1
Kwa-Zulu-Natal	0.5	0.024	0.3-0.2
North west	1.0	0.921	0.6-2.0
Gauteng	0.2	0.000	0.1-0.4
Mpumalanga	0.3	0.000	0.2-0.6
Limpopo	0.6	0.097	0.3-1.1
<b>Maternal age in 5 years</b>			
15-19	1.0		
20-24	1.2	0.453	0.7-2.3
25-29	1.4	0.171	0.9-2.4
30-34	1.4	0.235	0.8-2.2
35-39	0.9	0.572	0.5-1.5
40-44	0.9	0.721	0.5-1.7
45-49	0.3	0.008	0.1-0.8
<b>Maternal population group</b>			
African	1.0		
White	1.9	0.202	0.7-5.1

Coloured	1.6	0.101	0.9-2.9
Other	2.1	0.164	0.7-5.9
<b>Maternal place of residence</b>			
Urban	1.0		
Rural	1.1	0.731	0.8-1.4

\*Significant at  $p < 0.05$ ; N.B.

Chapter 5: Discussion:

## 5.1 Introduction:

The main objective of this chapter was to provide an interpretation and further discuss of the results found in the study by integrating the study findings with the existing literature that has been reviewed in this study. This research study was conducted to explore whether there were provincial differences in the frequency of antenatal care services visits and whether demographic and socioeconomic characteristics such as maternal province, maternal place of residence, maternal age in 5 year groups, maternal household wealth status, maternal marital status, maternal population group, maternal education attainment and maternal employment status have an influence on the number of antenatal care services women who gave birth in the past 5 years preceding the survey utilised.

This paper has addressed three specific objectives. The first objective of the study was to analyse the levels of antenatal care services in South Africa, which was achieved through a univariate analysis. The second objective was to investigate the provincial differences in number of antenatal care visits within South Africa. This objective was achieved by a bivariate analysis. The last objective was to identify sociodemographic and socioeconomic factors associated with provincial differences in antenatal care visits in South Africa. This objective was achieved through a bivariate and multivariate logistic regression examination. A detailed discussion of the findings obtained in this study that incorporates objective one, objective two and objective three is presented below

## 5.2 Levels of antenatal care visits in South Africa:

Maternal mortality has been decreasing significantly over the past few years and it has been consistent. Globally, maternal mortality reduced from 342 deaths per 100 000 births in 2000, to 211 deaths per 100 000 births in 2017, while the reduction was from 160 deaths per 100 000 births in 2000 and 119 deaths per 100 000 births in South Africa (UNICEF, 2020). Neonatal mortality has also been decreasing. Globally it reduced from 38 deaths per 1000 births in 1990 to 17 deaths per 1000 births in 2019, while in South Africa, neonatal mortality reduced to 11 deaths per 1000 births in 2019, from 19 deaths to 1000 births in 1990 (UNICEF, 2020). On the

other hand, there was a slow incline in the number of four or more antenatal care services in South Africa, from 74 percent in 1998, to 76 percent in 2016 (StatsSA, 2020c).

Although, maternal mortality has declined substantially, South Africa experiences higher mortality rates than other developing countries (Smith, 2016). Additionally, the levels of antenatal care services use have been stagnant. According to the results of this study, just of a fifth of women utilised three or less antenatal care services, 13 percent attended 4 ANC visits, over two-thirds received between four and seven antenatal care services and one in five attended eight or more ANC services. These findings are congruent to Statistics South Africa findings, which found that the utilisation of four more antenatal care services has increased to 76 percent, while 23 percent attended three or less ANC visits (StatsSA, 2020b).

Regarding levels of maternal mortality, neonatal mortality and antenatal care services levels, the Sustainable Development Goals targets are well within South Africa's reach. Goal 3.1 in the SDG goals agenda through 2030 is to ensure healthy lives and promote wellbeing for all ages. Goal 3.2 is to reduce global maternal mortality to fewer than 70 maternal deaths per 100 000 births and countries should further reduce their maternal mortality rate by at least two thirds from their 2010 baseline. Goal 3.3 of the SDGs agenda through 2030 is to end preventable deaths of new-borns, with all counties aiming to reduce neonatal mortality to as low as 12 deaths by 1000 births. Goal 3.4 is to reduce premature mortality of new-borns from non-communicable disease by one third by 2030, through prevention and treatment. (WHO, 2018b).

New-born health and maternal health are closely linked. The death of both the mother and the baby is preventable through the utilisation of healthcare services to prevent or manage identified complications (WHO, 2019).

### 5.3 Provincial differences in number of antenatal care visits within South Africa:

In South Africa, inequality has long been and is still recognized as one of the most striking features. South Africa is consistently ranked as one of the most unequal countries in the world and the roots lie in the history of colonisation and apartheid (Igwe, 2015). Twenty-seven years after the end of Apartheid, the legacy of apartheid is still evident. According to Chirwe (2016), health care services in South Africa are characterised by large spatial differentials which are powerfully linked with the level of socio-economic disparities. Some provinces have relatively low income and education, infrastructure development, high unemployment rates and poor health care services (Chirwe, 2016). The legacy of apartheid has left Black people in remote areas which worsened barriers to health care facilities (McLaren, 2014). The inequity among provinces still remains. To effectively address this issue and work toward the inclination of four or more and eight or more antenatal care visits, it is crucial that efforts be focused on provincial levels rather than focusing on national levels only. The general objective of this research was to produce levels of antenatal care visits the provinces of South Africa and further assess the differentials in ANC visits in relation to sociodemographic and socioeconomic status which could further depict prevailing challenges of poverty and inequality.

Results of this study found that there are differences in the attendance of antenatal care services per province. The highest proportion of women who did not attend any antenatal care services were found in Gauteng and the lowest in Eastern Cape. One in ten women in Gauteng did not receive any antenatal care service at all, which is the highest in the country. Once again, the highest number of women who only attended between one and three ANC visits was found in Gauteng with a quarter of women, and the lowest in Western Cape. Kwa-Zulu Natal (67%) hosted the largest number of women who attend the number of antenatal care services recommended by WHO in 2016 of four or more, in this case, 4-7 followed by North West (66%), Eastern Cape (66%), Northern cape (66%) and Limpopo (65%), while the lowest proportion of women was found in Free State.

The World Health Organisation later recommended that pregnant women should attend at least eight antenatal care services to achievement sufficient care. In that category, women in the

Western Cape were the most likely to attend 8 or more visits, with at least one in three women attending ANC four or more times, followed by Free State (30%). In this category, the least number of women resided in Gauteng (11%) and Northern Cape (12%).

Women who attended four or more (4-20) antenatal care visits was the key outcome variable in this study as at the time the data was collected in 2016, the new recommendations had only recently been made available. Again, women residing in Western Cape were the largest portion that attended four or more ANC visits, where nine in ten women met the four visits minimum, followed by the North West (90%). The lowest portion of four or more antenatal care attendance was in Gauteng (65%), followed by Mpumalanga (74%). Attendance in all provinces except for Gauteng and Mpumalanga was higher than the national average of 76% in four or more antenatal care visits.

According to StatsSA (2020c), maternal mortality was lowest in Western Cape with 59 deaths per 100 000 births, followed by Northern Cape with 95 deaths per 100 000 births. While North West had the highest maternal mortality rates of 139 deaths per 100 000 births, followed by 130 deaths per 100 000 births in Limpopo. In regard to neonatal mortality, provinces that had reached the target, or lower than 12 deaths per 1 000 births, were all the provinces except for Northern Cape, with 13 deaths per 1000 births, while Western Cape held the least number of neonatal deaths of 7 births per 1000 deaths (StatsSA, 2020c).

As per results produced in this study, it is evident that there are clear disparities of antenatal care service attendance between provinces. There are also differences in neonatal and maternal deaths. These can be explained by several factors. In terms of demographics, Western Cape is the one province with the highest proportion White people and according to StatsSA (2020c), 14% of residents in the area did not use public health care infrastructures and almost 50% of them rated the quality of health care facilities as good and only 4% percent had no access, compared to a predominantly Black province, Mpumalanga, where over 9% of residents claimed to not have any access to health care facilities (StatsSA, 2020c). Most residents in provinces like Western Cape used private health facilities than public, compared to regions like Eastern Cape (StatsSA, 2020c). Igwe (2015) found that health sector structural conditions and weak policies in

the rural regions have resulted in provinces with white majority receiving more health care funding and having better access to health care facilities than black majority provinces. In the 2015 to 16 financial year, the national average of public sector spending on primary health care was R993 per capita for the non-medical scheme population, but it was only around R567 in Eastern Cape R526 in Mpumalanga, yet R1,107 in Gauteng, and R1 761 in the Northern Cape. (McIntyre and Ataguba, 2016).

The SA government stated that overall, the health department has 813 hospitals. Of these, the public sector comprised of 49 percent while the private compromised of 51 percent. Further, despite a small component of medical doctors as a proportion of total healthcare workers, 70 percent of these medical doctors are employed in the private sector and only 30 percent are in the public sector (Presidential health summit report, 2018). These numbers clearly imply shortages and point to inequality between the private and public hospitals and may further hint at a shortage of public health infrastructure.

Burger and Christian (2018) stated that the government intended to progress access to health care for the most marginalised and poorest by increasing the health care facility network and abolishing user fees for primary health care. However, despite these efforts, health outcomes remain differentiated, unequal, and unfair. Furthermore, many public hospitals are in a terrible state with much of public healthcare infrastructure run down and dysfunctional due to neglect, underfunding and mismanagement. This compromises the quality of healthcare (Burger and Christian, 2018).

The shortage of health care professionals poses a serious challenge to the South African health system. The government has acknowledged before that quality care and adequate staffing was the focal point of improving maternal survival and other health objectives of the primary health care system. The current staffing adequacy has raised concerns on the quality of services they provide. Almost a half of clinics (47%) in South Africa reported no visits from doctors and nearly 20 percent of community health centres and almost a half (48%) pf community health care centres reported to not having advanced midwives (Amnesty International, 2014).



Distances seems to be another exacerbating barrier to access health care services. Only two-thirds of South Africans live less than 2kms away from the nearest public clinic while ninety percent live within 7 kms (McLaren, 2014). This is congruent with literature that has been conducted in nine other developing nations which found that distance is indeed a barrier to accessing antenatal care services. These developing countries include Angola (Shibre, 2020), Ethiopia (Mekonnen et al, 2019) and other Sub-Saharan African countries (Alex et al, 2019), among others.

McIntyre and Ataguba (2016), also state that the distance people need to travel to a health facility is also an important component of the convenience of access as there are extensive differences in households' proximity to a health facility between urban and rural, between socio-economic groups and across provinces in South Africa. The chances of using a health service is far lower for those living furthest from health Facilities. The number and distribution of health facilities clearly influences various communities' proximity to a health facility. The availability of health personnel is also a key element of access to quality health care (McIntyre and Ataguba, 2016). It has been commonly accepted that highly specialised services should be concerted in facilities such as central hospitals, which to some extent explains the high levels of specialists in the Western Cape and Gauteng, and to a lesser extent in Free State and Kwa-Zulu-Natal (McIntyre and Ataguba, 2016).

David et al (2018) found that Eastern Cape (67%) and Limpopo (68%) are the provinces with the highest incidence of poverty, while it was relatively lower in Western Cape (29%) and Gauteng (33%). The highest number of social grant receivers were in Kwa-Zulu-Natal, followed by Gauteng and Easter, while the least number of people were Northern Cape and Free State (Statista, 2021). There seems to be a link between provincial finances and antenatal attendance, with women from the least poor provinces, Western Cape, utilising more antenatal care services than those from provinces with a higher proportion of the population living in poverty such as Mpumalanga.

Reducing national disparities is critical towards accelerating an increase in the utilisation of antenatal care services and therefore reducing neonatal and maternal mortality. Feasible approaches such as advancing human resources for health, adjusting access to all pregnant

women despite their place of region, improving the quality of medical care and increasing community outreach services for maternal care, maternal knowledge, and access, are needed especially in provinces that are still challenged with very high estimates of maternal and neonatal mortality and low estimates of antenatal care.

#### 5.4 Discussion on sociodemographic factors associated with antenatal care visits in South Africa:

A study reviewing Sub Saharan determinants of antenatal care services found that age was significantly associated with the attendance of four or more antenatal care services. The bivariate analysis results obtained in this study indicated that maternal age is one of the characteristics that have a statistically significant analysis on the number of antenatal care services in South Africa. The results found that women between ages 30-34 (81%) followed by age cohort 25-29 (80%) and 20-24 (79%) had the highest proportion of four or more antenatal care attendance and the age cohort 45-49 years the lowest (50%).

Results obtained from the multivariate examination found that women between age groups 25-29 and 30-34 years were 40% more likely to attend antenatal care services compared to their 15-19 years counterparts. On the other hand, women aged 45-49 years were 70% less likely to attend antenatal care services than their 15-19 years counterparts. This finding is congruent to a study conducted by Islam and Masud (2018) in Botswana which found that younger women in ages 20 to 34 had a higher mean ANC frequency and more likely to have four or more ANC visits. Another study also revealed that 3 of 5 mothers in Botswana of ages less than 35 years utilised ANC more. They claimed that the likelihood of receiving ANC decreased with age (Mathe, 2017).

Similarly, in Ghana, women between 21 and 30 years were 4 times more likely to receive four or more ANC visits than their younger counterparts (Afaya et al, 2020). Ousman et al (2019) confirmed this by stating that in South Africa, women in the age cohort 20 to 34 years had higher odds of attending four or more ANC visits. Evidence was also further provided by data obtained from the Ethiopian Demographic and Health Survey, 2016, showed higher odds of 20-24 years attendance than other age groups (Muchie, 2017).

This can be ascribed to the fact that women aged 20-34 falls under the working age population, therefore females in this cohort are not economically reliant on anyone (Sikweyiya, et al, 2019) to attend antenatal care services. Another explanation could be because younger women also tend to be more experienced than older women in South Africa (StatsSA, 2020a) and as literature has found, educated women have higher odds of attending four or more antenatal care services. Women in this age cohort may also be less parous and inexperienced on pregnancy, they therefore visit often to be assured that the baby is growing well.

Contrary to the study's findings, a study conducted in Rwanda found that women above the age of 30 years were 78% more likely to attend four or more antenatal care visits than those younger (Rurangiwa, et al, 2017). This is the same for Ethiopia (Yaya et al). In Cambodia as well, utilisation of antenatal care increases with age (Prusty et al, 2015). Laksono et al (2019) also found that in Indonesia, age cohort 20-24 years had 35% less chances of full ANC coverage and age cohort 15-19 had 70% less likelihood of complete ANC coverage than women aged 45-49 years. This pattern is also the same for women in Zambia (Myunda, et al, 2016), among other developing countries. Jacobs et al (2017) revealed that the older generation has greater decision-making power and tend to be more parous therefore more experienced about the importance of antenatal care utilisation.

Another finding contrary to results in this study was results from a study in Bangladesh which found that less parous and younger women in ages 15-19 were more likely to attend four or more ANC visits than older women (Rahman, et al 2017). The same was seen in results in a study conducted in Tanzania, where women less than 20 years had higher odds of adequate antenatal care attendance than women between 20-34 years (Gupta, et al, 2014). The same results are evident in Nepal (Neupane et al, 2020). Younger women are less experienced on birthing matters for which they seek more prenatal visit (Rahman, et al, 2017). In South Africa, women aged 15-19 could fear attending antenatal care services due to possible public ridicule as a result of the perceptions around teenage pregnancy.

In South Africa, most births occurred to women aged 20-29 years, which could be the reason why the results of this study claim that women between 20-24 and 25-29 years attended antenatal

care services the most. The reason for the contradiction in some of the literature could be due to, some countries such as Bangladesh, have a higher prevalence of four or more utilisation among women aged 15-19 because the predominance of their childbearing ages is 15-19 years (Rahman, et al, 2017).

In a multivariate analysis, the results in this study demonstrated that the age 45-49 years was the only age significant to four or more antenatal care services.

Regarding maternal marital status, the results in this study found no influence on maternal marital status and number of antenatal care visits from the bivariate regression. This is incongruent with Sumankuuro and Wangs (2017) who found no association between marital status and antenatal care services in Ghana. More than a quarter of the women (78%) of women in unions received four or more antenatal care services while 79% of unmarried women utilised four or more ANC services, both married and unmarried women utilised services more than the national average, however, married women attended four ANC visits the least. The results of this dissertation are congruent with literature.

Nwosu and Ataguba (2019), found that in Nigeria, unmarried women were 50% more likely to attend four or more ANC visits than their married counterparts. In a study looking at African regions as well, found that the likelihood of unmarried women attending four or more services is higher (Tessama and Animut, 2020). This is apparently ascribed to men being considered as the decision makers in Africa, including making decisions on reproduction, who sometimes do not agree with women seeking antenatal care services (Tessama and Animut 2020). Additionally, in Ethiopia, women tend to be socioeconomically dependant on their male partners who then make decisions that influence maternal health care services (Tessama and Animut, 2020).

In contrast to the results demonstrated by this study, Tessama and Minyihun (2020) found that in Africa, married mothers had 11% increased likelihood of attending four or more ANC services than single mothers. A study conducted in Ghana also found that women who were married had higher odds of attending four or more antenatal care visits than single women (Afaya, et al, 2020). The author claimed that single women were expected to remain virtuous and it was a shame to be pregnant while unmarried and they attended antenatal care services less to prevent public

ridicule (Afaya, et al, 2020). Mathe (2017), also suggested that women who do not have partners tend to experience financial difficulty which may prevent them from attending ANC regularly and claimed that married women were not only likely to attend the full coverage of ANC more, but in early stages of pregnancy. Another reason for this could be that cohabiting, or married women are more likely to have planned pregnancy and thus receive financial and psychosocial support from their partners and thus have more frequent attendance of four or more ANC visits.

Regarding maternal population groups, in the bivariate analysis, results revealed that maternal population group had an influence on the attendance of antenatal care visits, although there was no significance in the multivariate examination. The population group with the highest odds of attending four or more antenatal care services was the “other” population group, which consisted of Asians and Indians among others, which was 2.1 times more likely to attend antenatal care than Black women. This is followed by White women, who were 90% times more likely to have frequent antenatal care services than Black people, followed by Coloured people who were 60% more likely to attend four or more ANC visits.

The results are congruent with literature. A systematic review conducted by Alex et al (2019), found that ethnic differences influence the attendance of ANC. Wabiri et al (2017) demonstrated that compared with other races, Black women had poorer access to services and therefore had less for or more services in South Africa. Additionally, Statistics SA (2020) found that Asian, White and Indian women had higher odds of attending four or more visits than their Black counterparts. In South Africa, the minority groups had higher attendance than majority, yet in Nigeria, the minority, Hausa had lower portion of women attending antenatal care than ethnicities like Yoruba and Igbo (Nghargbu and Olvania, 2019). Similarly, in Cambodia, the majority group, Buddhist had higher odds of 4+ ANC visits than their counterparts, by 60% (Prusty, et al, 2015). Contrary, Lesotho showed no difference between ethnic groups (Mathe, 2017).

McLaren, 2014, attributed the difference to antenatal care services by women to distance. The author claims that 14% of Black Africans live more than 5 km from the nearest facility, in contrast to only 8% of Coloureds and 4% of Whites, and they are substantially less likely to report a recent

health consultation. Further, Africans were far more likely to be resident in remote areas, previously demarcated as homelands where few services were introduced and maintained, which on its own counts as a barrier to health care facilities (Gradin, 2012). The author also suggests that the legacy of apartheid and colonisation has left Africans with several drawbacks that make them more likely to be poor and be in poorer provinces, which therefore affects the availability of income and therefore access to medical facilities and proper infrastructure (Gradin, 2012).

Regarding income, a media release on Statistics South Africa (2017) found that income per capita Gini coefficient has declined to 0.68% in 2015, from 0.72% in 2006. However, there were prominent variations among population groups. While income inequality reduced among the apartheid legacy beneficiaries, from 0.56 in 2006 to 0.51% in 2015, it increased among Black people, having the highest income inequality, increasing from 0.64% in 2006 to 0.65 in 2015, while it declined for Coloured and Asians (StatsSA, 2017).

McIntyre and Ataguba (2016) further claim that the divide of public and private health sector segments is deep rooted in the past unjust policies of apartheid, which caused disparities in health care services between Black and White citizens that there is inequitable access to health services between the poor majority and the rich minority in South Africa. This situation still persists.

In terms of maternal place of residence, the results of this study found an association between maternal place of residence and the number of antenatal care services in the bivariate analysis, but no association in the multivariate examination, 64% of women in urban areas went for four or more antenatal care visits compared to 36% in rural areas.

The frequent attendance is in correspondence to literature. Research carried out in Botswana found that women in urban areas were more likely to attend ANC four or more times than women from rural areas. The same results were found in Ethiopia, where 72% of urban residents attended four or more antenatal care services and only 27% in rural areas. Tessama and Anmut (2020) ascribe this to socioeconomic inequalities and differences in health services between urban and rural areas.

In Angola as well, urban residents were more likely to attend ANC four or more times than women in rural areas (Shibre, 2020). Ousman et al (2019) conducted research in South Africa where the authors found that the attendance of women in both urban and rural women has improved, however, women in urban areas still attended four or more ANC visits than women from rural areas. Statistics South Africa (2020) also agreed that there was an increase in four more antenatal care visits among women in rural areas, from 71 percent in 1998 to 80 percent in 2016, however, they claim that there was a decline in rural areas, from 78 percent in 1998 to 73 percent in 2016. (Ousman, et al, 2020).

Mekonnen et al (2019), found that in Ethiopia, the distance in rural areas was a major barrier to access to health care services and also, the lack of these facilities also contributed a hindrance, along with finances and transport services. This was the same claim in Nigeria. The author claimed that there were more health facilities in urban areas than rural areas (Khatib, et al, 2020). While Shibre (2020), also found transport as a major barrier in Angola.

In South Africa, the consequences in apartheid are still evident in are areas that were previously homelands where underdevelopment was promoted which came with underdeveloped infrastructure and roads (Burger and Christian, 2018). This makes it difficult for women in rural areas to access health facilities during pregnancy as the roads are in dire states and the distance tend to be long, as literature has already confirmed that distances were longer in rural areas than urban areas.

Amnesty International (2014), found that people living in rural areas of South Africa are only served 12% of country's doctors and 19% nurses. Remote rural areas may have little to no transport where women must alternate walking long distances to reach the nearest health facility, therefore making frequent visits undoable. Some rural areas often have only a few passenger vehicles available for use, making it impossible to make it to the health facility if one misses public transport. Burger and Christian (2018) also added South Africa's underdeveloped public transport network deficiencies and shortcomings increase travel times and costs. Women in rural areas may also struggle with money to reach the nearest health facility. David et al (2018)

found that the estimates of income and poverty were higher in rural areas (55%) than urban areas (25%).

#### [5.5 Discussion on socioeconomic factors associated with the provincial differences in antenatal care visits in South Africa:](#)

In terms of maternal education attainment, the bivariate examination in this study did not find this variable to have an influence. In the results, 84% of women with tertiary education attended for our more ANC visits, followed by women with no education (78%). The proportion of women who utilised four or more ANC visits the least were women with primary education and those with secondary (77%). The proportion of four or more ANC visits was almost the same across educational categories, except for those with tertiary qualification. A distinctive feature of this study, however, is uneducated women attending more than women with primary and secondary education.

Women with tertiary education attending four or more antenatal care services the most is congruent with literature. Jacobs et al (2017) asserted that maternal education has a significant positive association with the mean of ANC visits and the proportion of women who had four and more antenatal care services. Research conducted in Nepal found that women with tertiary qualification were 1.5 times more likely to utilised four or more ANC services than those with primary education (Joshi, et al, 2014). In Kenya as well, women who had tertiary education were three times more likely to utilise full coverage of ANC services (Wairoto et al, 2020). Joshi et al (2014) advocated that female education improves wealth, it reduces gender disparity and empowers women, and therefore women afford themselves the chance to access antenatal care services. Educated women tend to have autonomy and thus are knowledgeable enough to make decisions of antenatal care attendance.

Contrary to the findings of this research, Neupane et al (2020) argued that women with any form of education had a significantly higher probability of going for four or more ANC check-ups than those with no education in Nepal. The same results were found in Bangladesh, the higher the levels of education, the higher the chances of attending ANC four or more times (Islman and Masud, 2018). Further contradiction was evident in a study in South Africa, where women with



secondary education attainment were more likely to utilise four or more times ANC services than uneducated women (Tsawe and Susuman, 2014).

The contradiction between the findings from Tsawe and Susuman (2014) and this study could be because Tsawe and Susuman collected data from one province, the Eastern Cape, South Africa, while this study used data obtained from the SADHS 2016.

Regarding maternal household wealth, a bivariate analysis done in this study found no association between ANC visits and maternal household wealth. This is congruent to a study conducted in Nepal that found no association between whether a woman fell under the poor, poorer, middle, rich or richer income category and the attendance of antenatal care services.

However, a study in Bangladesh e found that richest mothers were 48% more likely than poorest mothers to utilise four or more antenatal care services (Islam and Masud, 2018). Similarly, in Ethiopia, women who had higher economic class were more likely to attend more four or more ANC visits than their lower-class counterparts (Yaya, et al, 2017). This can be attributed to women from poor backgrounds not having sufficient money for transport and food they may need for antenatal care services.

Sanogo and Yaya (2020) found that women from wealthy backgrounds tend to afford health insurance and thus adequately utilise antenatal care services, while women from poorer backgrounds did not have health insurance and attended less four or more antenatal services in Gabon. Research carried out in Tanzania found similar results. The author suggested that women from wealthier households had better access to material resources such as money and cars that can facilitate access to ANC services and better health facilities (Rwabilimbo, 2020).

Burger and Christian (2018) found that the stark differences in access to health are due to problems with affordability and availability of health care facilities in remote areas. Some subpopulations have to travel further and pay more to reach facilities. Igwe (2015) claims that even though the end of Apartheid came with ideas to close inequality gaps in health, the less financially privileged majority still struggles the most with access. It seems that health access in South Africa still favours advantaged minority subpopulations

In terms of maternal employment status, results in this research demonstrated no significant between maternal employment status and the number of antenatal care services. This is in accordance to the findings of Alex et al (2019) who found that 40 percent of the studies they reviewed found no association between employment status and antenatal care frequency.

However, a study conducted by Muhwava (2016) in South Africa found that employed women had more access than unemployed women to attend ANC four or more times. Similarly, in Nigeria, women who were not employed had 40% greater likelihood not attending adequate ANC services compared to employed women (Khatib, et al, 2020).

A distinctive feature was that of Ethiopia. Women who engaged in informal economy and unskilled labour, such as housekeeping or agricultural jobs attended less four or more antenatal care visits than women who were not working at all (Yaya, et al, 2014). In Nepal, farming was linked with poverty and lack of disposable income (Joshi, et al, 2014). Contrary in Sub-Saharan Africa, women who worked in agriculture were more likely to utilise ANC services than unemployed women (Alex, et al, 2019). In Cambodia, women involved in white collar profession had higher odds of 4+ ANC attendance than those who in the informal economy (Zhou, et al, 2020).

The reason for less adequate antenatal care services among unemployed women was ascribed to the inability to meet costs associated with ANC visits, such as transport and food, despite the free charge of the service in South Africa (Muhwava, 2016). In Angola, the reason for more visits among employed women was attributed to the increase of employed women's financial ability to access medical care (Shibre, 2020). Additionally, at least 30% of women are unemployed in South Africa (StatsSA, 2020a). This means that at least 30% of women could potentially struggle to afford accessing health care services, therefore the four or more antenatal care rates remain lower for them.

## 5.6 Conclusion:

The aim of this study was to examine the levels of antenatal care services in South Africa, to examine these levels per province as well as identify the sociodemographic and socioeconomic factors that have an influence on the number of antenatal care visits.

The results stemming from this study suggested that large discrepancies exist in the country among young females, particularly those who reside in the rural provinces and rural areas of South Africa. This is mainly due to the fact that they are more disadvantaged and live under circumstances where tradition dictate matters of reproduction and maternal health. This shows that there is a need to address issues of inequality, poverty alleviation, health services and educational attainment in order to the utilization of antenatal care services. This will lead to South Africa meeting the planned Sustainable Development Goals that the country is aiming for.

Although the health issue of antenatal care has received considerable attention in literature, knowledge gaps have remained, particularly in the context of South Africa, in obtaining a comprehensive overview in the drivers and approaches that are beneficial in the increase of antenatal care services and in turn the eradication maternal and neonatal deaths and better child and maternal health. Thus, the significant contribution that this study has made to the body of literature is that it has shown that antenatal care is not only driven solely by socioeconomic and demographic factors, but various underlying cultural factors subtly operate through these factors and should thus be studied in future research.

Lastly, the theoretical framework that was utilised by this study should be expanded to include demographic, and socioeconomic characteristics such as province, age, marital status, place of residence, employment status, household wealth status, education, and race in conjunction with the socioeconomic and political context, structural determinants of health inequities, and intermediary determinants of health in the Commission of Social Determinants

This research has claimed that one approach to bring better outcomes in maternal and child health and survival is to address antenatal care services at provincial levels and has also attempted to provide the evidence gained from the latest available SADHS data, SADHS 2016. The results obtained from this study may assist the government in implementing policies more

effectively and focus in making better decisions towards better growth of antenatal care visits within the country at provincial levels.

## 5.7 Recommendations:

### 5.7.1 Policies:

This study's recommendations include the government implementing public health intervention programs and targeting these at addressing differences in the sociodemographic and socioeconomic determinants of antenatal care use in South Africa in order to not only further increase the attendance of four or more antenatal care services, but the attendance of eight or more and thus reduce maternal and neonatal mortality.

The lack of special focus on provinces that are geographically challenged and socioeconomically lagging does not address inequality. Financing in maternal health should aim at catering for women who have geographic, demographic, and socioeconomic barriers. Rural provinces such as Eastern Cape and Limpopo need more health expenditure per person than women in provinces such as Western Cape, where many claimed to not use public health services. Further, literature in this study found that hospitals tend to be placed in centralized places and that distance is a major issue. Therefore, mobile clinics should be placed in rural areas. This not only helps pregnant women's access to maternal health services, but it also helps the community as well with health services and job opportunities and shortens distance to the nearest clinic.

### 5.7.2 Further research:

Another characteristic that could have an influence in the number of antenatal care visits of South African women could be cultural factors, such as some women only believing in traditional healers and their spouses or partners autocratic behaviours as a result of patriarchy and ethnic norms. There should be studies done on this. Such studies would explore other aspects of the Commission of Social Determinants framework such as other community predictors and community's belief systems that were not addressed in this study. These findings could thus be beneficial in interpreting if cultural beliefs have any form of association with the number of

antenatal care services of pregnant women and whether these beliefs encourage or discourage antenatal care services. The usage of qualitative study could be beneficial, using in depth interviews with pregnant women who attend less ANC visits. The use of in-depth interviews could be beneficial in these studies as the interviews would provide better information on women's personal experiences and therefore make it to find new issues that the researcher would have not considered. Primary data collection could also help with information on the eight or more antenatal care visits, unlike the SADHS.

Another study recommendation could be a trend analysis that could be conducted to compare the provincial differences of antenatal care visits in South Africa over a certain period of time. This could be done using both the 1998 and the 2016 SADHS. This would reveal if there has been any progress of antenatal care use in provinces and be able to compare differences among provinces in a space of 18 years.

#### [5.8 Limitations of study](#)

Underreporting or over reporting of the number of antenatal care services pregnant women attended could be a key limitation of this study. This study found that 3.3 percent of women do not recall the number of times they utilized ANC. Women who do not know the importance of antenatal care could maybe not see the need to keep count of the visits they have made thus skewing the results of this study.

Furthermore, this study is cross sectional, therefore causation could not be inferred. This made it difficult to identify the direction of association between the outcome and the independent variable. Additionally, the Demographic and Health Survey is a secondary data source. It has limited data and thus variables such as those that encompass cultural factors, which could be predictors and have an association with antenatal care visits are not included in the survey. The shortcomings of the DHS not consisting of cultural characteristics did not however affect the results obtained in this study, they simply provided suggestions of the possibility of cultural beliefs having an influence on antenatal care which thus calls for further research.

Additionally, in November 2016, the World Health Organisation increased the recommended number of antenatal care contacts from four to eight. This was a few months after the SADHS 2016 data was collected. So, this study therefore focused on provincial differences in meeting the minimum of four visits, which was applicable at the time of data collection. The inequalities noted at the four-visit minimum would be expected to widen with the increase to an eight-visit minimum.

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