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School of Public Health



INEQUALITIES IN UTILISATION OF MATERNAL HEALTH SERVICES IN ZIMBABWE

Nyasha Madzudzo

Student Number: 876411

A Research Report submitted to the Faculty of Health Sciences,

University of the Witwatersrand, in fulfillment of the requirements for the degree of

Degree of Master of Public Health

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DECLARATION

I, Nyasha Madzudzo, declare that this research report is my original work. All citations, references and ideas have been acknowledged. This research report is submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa in partial fulfillment of the requirements for the degree of Master of Public Health, in the field of Health systems and Policy. None of the work has been submitted before to this or any other University for any degree or examination.

Signature:  Date: 03/04/2018

ABSTRACT

Background: Maternal mortality in developing countries like Zimbabwe is much higher amongst poorer, rural and less educated communities. Poorer or marginalised communities have the highest burden of disease and worst health status, but the least access to health care services. The distribution of health care resources and their use plays a key part in determining health and health outcomes. This study aims to measure inequalities in the utilisation of key maternal health care services in Zimbabwe using the PROGRESS-Plus framework, and to examine how the intersection of these factors create multidimensional advantage and disadvantage.

Methodology: Using Data from the 2015 Zimbabwe Demographic and Health Survey (DHS), the Concentration Index, Slope Index of inequality and Relative Index of Inequality were computed for key maternal health care utilisation outcomes. Bivariate and Multiple Logistic Regressions were computed to determine the PROGRESS-Plus factors associated with utilisation of these services. Multiple Correspondence Analysis was used to investigate the interaction of multiple PROGRESS- Plus factors influencing social position.

Results: The majority of women (93.3%) in the 2015 Zimbabwean DHS survey had a skilled ANC attendant although few of the women (38.5%) had their first ANC visit before four months gestation. Most women (78.1%) had a skilled birth attendant and delivered at a health facility (77.0%). Inequalities were higher in delivery care than antenatal care. The utilisation of maternal health service was higher amongst socially advantaged groups, although the magnitude of the inequality was small. Higher wealth index, educational attainment and health insurance coverage were significantly associated with higher maternal health service utilisation. These factors were closely inter-related with the same group of women having low wealth, low levels of education and no health insurance.

Conclusion: Inequalities in utilisation of maternal health services favour socially advantaged groups. Wealth, education and health insurance where the strongest determinants of use of maternal health care and these factors were interlinked. There is need to consider social protection policies that reduce the vulnerability of disadvantaged groups of women to access education and work opportunities

Keywords: Inequality, Maternal Health, Zimbabwe

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DEDICATION

To my son Tafadzwa Joseph, you are living proof that I can do anything, if I put my mind to it.

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ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Care
CI	Concentration index
FBD	Facility-based delivery
HIV	Human Immunodeficiency Virus
MTCT	Mother to Child Transmission
MRC	Medical Research Council
MDG	Millennium Development Goals
PROGRESS	Place of residence, Race, Occupation, Gender, Religion, Education, Socioeconomic status and Social capital
PNC	Post Natal Care
RII	Relative index of Inequality
SDG	Sustainable Development Goals
SES	Socio-Economic Status
SII	Slope Index of Inequality
SCI	Standard Concentration Index
STI	Sexually transmitted infection
TB	Tuberculosis
WHO	World Health Organization
ZDHS	Zimbabwe Demographic and Health Survey
ZIMSTAT	Zimbabwe Statistics Agency

CHAPTER 1. INTRODUCTION

1.1. Background

Every day over eight hundred women die due to complications of pregnancy and labour globally(1), with the four leading causes of death being severe bleeding, pregnancy-induced hypertension, infections and obstructed labour(2). All of these causes are preventable in the presence of maternal health interventions(3, 4). Women need access to antenatal care (ANC) during pregnancy so that health problems that have an unfavourable outcome on pregnancy can be identified early and treated(4). It is also essential that women have access to a skilled health care worker during delivery to monitor the labour process, detect problems and complications early, and manage emergencies that may arise during and immediately after delivery(3). Improving maternal health was one of the eight Millennium Development Goals (MDG) that were adopted by the one hundred and eight nine member states of the United Nations in 2000(5). MDG number five sought to reduce by three quarters the maternal mortality ratio between 2000 and 2015. The indicators for monitoring progress for MDG-5 were the maternal mortality ratio and the proportion of births attended by skilled health care workers(5). The new agenda set for maternal health in the Sustainable Development Goals (SDGs) aims to reduce the global maternal mortality to less than 70 per 100 000 live births by the year 2030(6).

Health inequalities are differences in health status or the distribution of health between population groups, these differences are often avoidable, and when allowed to persist are unjust and unfair, therefore become inequities (7, 8). Health inequities are differences in health status that are systematic, socially produced, and therefore modifiable and maintained by unjust social arrangements. Not all health inequalities, however, are unfair, for example it is expected that young adults will be healthier than the elderly, therefore health inequalities are not synonymous with health inequities(9). Health inequities focus on the distribution of resources that drive a particular inequality, and grounded on ethical principle of distributive justice(9). Equity in health cannot be assessed directly but is only defined as the absence of disparities in health(10). Assessing inequities in health thus requires comparing health and its social determinates among more and less privileged social groups and making moral judgement of what is fair or unfair(9).

Inequalities in health are universal as evidenced by the global burden of maternal mortality with the maternal mortality in developing countries being more than 20 times that of developed regions(11). Sub-Saharan Africa in 2015 had a maternal mortality rate of 546 compared to an MMR of 12 in developed countries(1, 11). Although there has been some focus on inequalities between regions

and countries, unfair differences in health outcomes also exist within countries. Disparities in health occur amongst population groups due to social stratifying factors (12).

In 2003 the acronym PROGRESS was introduced to highlight the socially stratifying factors that affect health outcomes(13). PROGRESS refers to the Place of residence, Race, Occupation, Gender, Religion, Education, Socioeconomic status and Social capital(13). PROGRESS-Plus takes into account other stratifying factors beyond those emphasised by the acronym(14). This framework has been recommended as a guideline to use when reporting socially stratifying factors that drive variations in health(14). Inequalities are however not a result of single distinct factors but a combination of different social positions, relations of authority and power and other social dynamics that work together(15, 16). In recent research there is an increased focus on the role of multiple factors that produce complex interactions of disadvantage, through what has been termed intersectionality analysis(15-17). These inter-related factors change over time and are dependent on the context and geographic setting(15, 16). The World health organisation created the Commission on Social Determinants of Health (CSDH) who's goal is to advance equity in health by driving action that reduces the health difference amongst social groups, within and between countries.

According to the World Health Organisation, Zimbabwe has made no advances in maternal health outcomes such as maternal mortality (11). The country had a 28% increase in the maternal mortality ratio from 440 per one hundred thousand live births in 1990 to 570 per one hundred thousand live births in 2000(18). The MMR by 2015 had reduced to 443 thus achieving a -0.7% change in MMR between 1990 and 2015(11).

1.2. Literature Review

Literature on the measurement of health inequalities will be presented in this section. It will summarise literature on the different types of measures of inequality and intersectionality analysis, identify studies that have conducted similar analyses, and provide some background on Zimbabwe and the Zimbabwe Demographic and Health Survey (DHS).

1.2.1. Social Determinants of Health

The CSDH framework (Figure 1-1) shows how social, economic and political mechanisms give rise a set of socioeconomic positions where populations are stratified by income, education, gender, race and other factors. These positions shape individuals exposure and vulnerability to health compromising conditions.

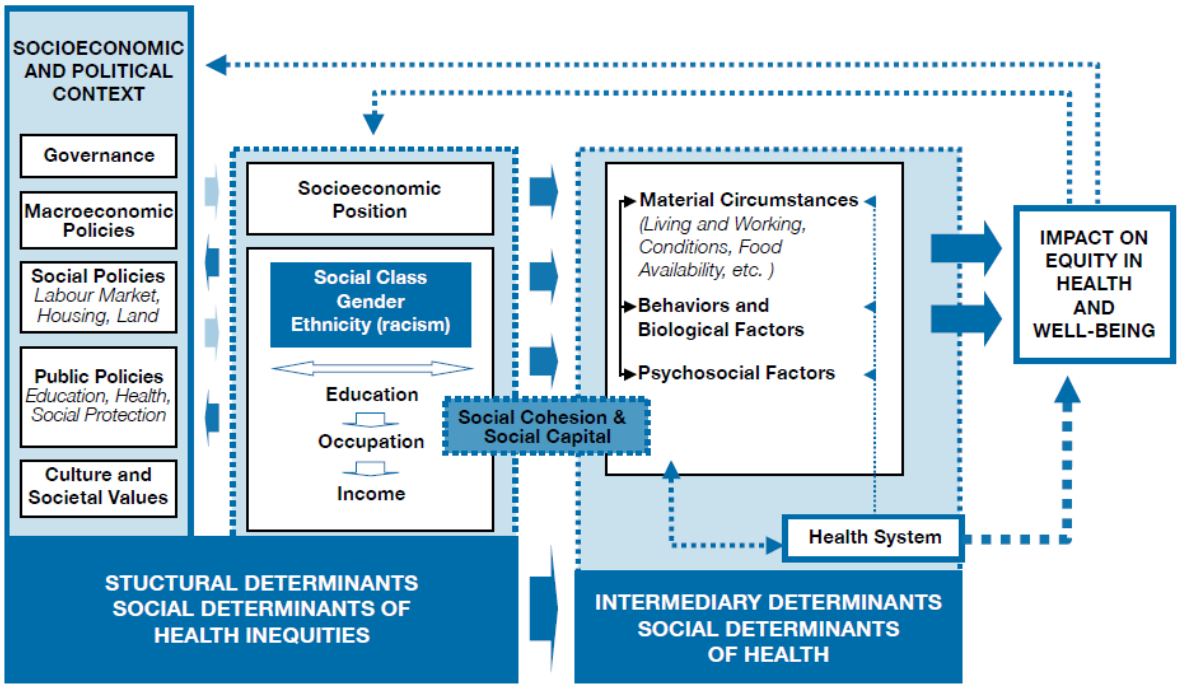

Figure 1-1: The CSDH Conceptual Framework

1.2.2. Measuring Disparities in Health

There are several measures in the literature that have been used for inequalities in health. Mainly these are the Range, Rate Ratio, Index of Dissimilarity, Effect index, Slope Index of Inequality, Relative Index of Inequality, and the Concentration index(19-21). These measures can be divided into simple and complex measures based on the complexity of analysis.

Simple measures

The *range* is a widely used inequality measure and is simply the absolute difference in health status between the most advantaged and least advantaged groups(19, 20). The *rate ratio* expresses this difference as the ratio of the upper value to lower value(19, 20). The related *index of dissimilarity* reflects the uneven distribution of health between groups and is interpreted as the proportion of people that need to be moved from the most advantaged group to the least advantaged group in order to achieve an equal distribution of health(19).

Complex Measures

Simple measures such as the rate difference or rate ratio only compare the experiences of the most disadvantaged to the least disadvantaged but not the population as a whole, thus ignoring inequalities that exist between groups that are not compared(20). The *effect index*, however, does not have this limitation. The effect index is calculated by regressing the dependant variable i.e. morbidity or mortality rate by an independent variable i.e. an indicator of socioeconomic status(22).

If the relationship between these two variables is linear, the slope of the regression line is the absolute effect. The effect index is interpreted as the effect on the dependant variable of modifying the independent variable by one unit(22).

The *slope index of inequality* (SII) and *relative index of inequality* (RII) are used widely in epidemiology to measure absolute and relative socioeconomic gradients(23). These indices are calculated by regression of the dependant variable on a cumulative relative position of the independent variable, an indicator of socioeconomic position (19-21). The SII is the coefficient of the linear regression measuring the association between the occurrence of a health outcome and the ordered ranking of each socioeconomic group on a social scale(19). The SII is thus a weighted measure of inequality representing the absolute difference in the predicted values of a health indicator between the most advantaged and the most disadvantaged, whilst considering other intermediary subgroups(24). The RII is the associated relative inequality measure and reflects the SII as a proportion of the population mean of the health indicator(24). These measures are therefore regarded as the absolute and relative effect on health of shifting from the most disadvantaged to the most advantaged groups(19). A few authors have ordered the rank from highest to lowest, therefore quantifying exposure to a beneficial position(23). The SII and RII produce a single comprehensive value, for easier and more valid comparisons between different populations(23).

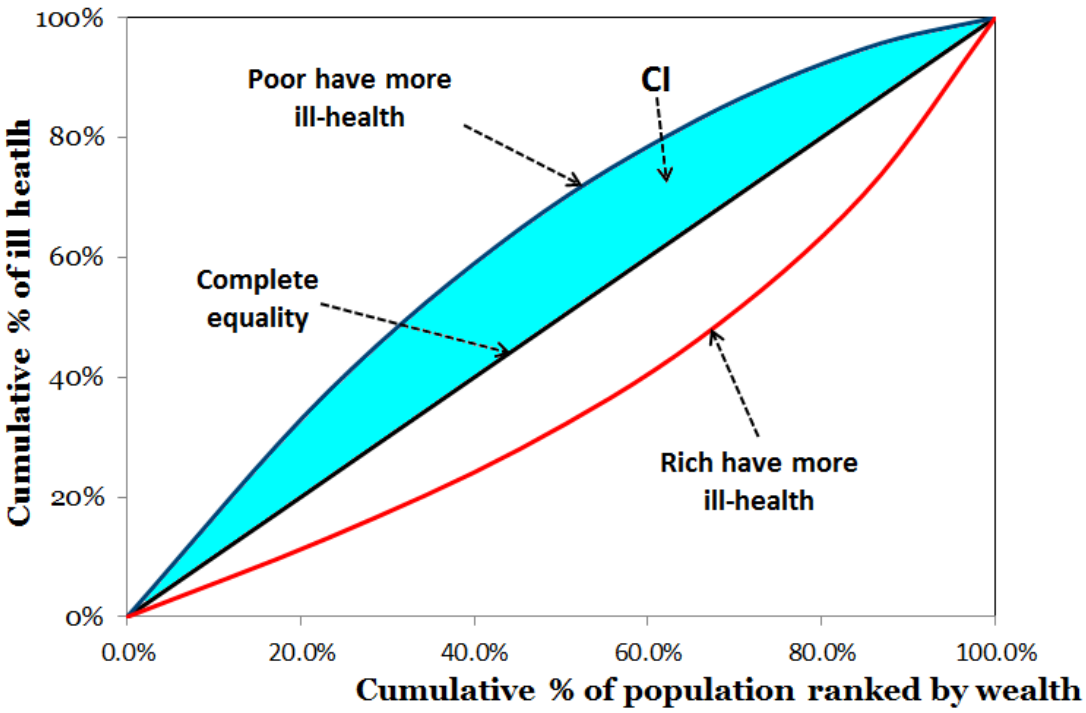

Figure 1-2: Concentration curves and concentration index (CI)

The *concentration index* (CI) is another important measure of health inequality. It indicates the extent to which a health indicator is concentrated among the disadvantaged or advantaged on a socioeconomic scale(24). As shown in Figure 1-2 above, the CI is defined as twice the area between the concentration curve and the line of equality, producing an index which ranges between -1 and +1(19, 25). The concentration curve is constructed by plotting the cumulative proportion of the population from the poorest to the richest against the cumulative proportion of a health outcome variable(19, 25). If the outcome variable is equally distributed in the social groups then the concentration curve will be a 45 degree line (line of equality) from the origin, and the CI=0. If the outcome variable is higher amongst the disadvantaged, the concentration curve lies above the line of equality, and the CI is defined as a value between 0 and -1 (26). Conversely, if the indicator is concentrated in the advantaged, the concentration curve lies below the line of equality, and the CI is a value between 0 and 1 (Figure 1-2).

The standard concentration index (SCI) measures relative inequality. Multiplying the SCI by the population mean gives a measure of absolute inequality, the generalised concentration index (GCI). Variations of the GCI and SCI have been proposed for variables that have distinct measurement attributes(25, 27). Erreygers (28) proposed a modification of the GCI when the variable of interest is bounded i.e. has a finite upper and lower limit, the Erreygers concentration index (ECI). Erreygers argued that the index should reveal the same magnitude of inequality when calculated on the basis of a health variable or ill health variable, since health and ill health mirror each other. The GCI, however, does not have the mirror property. He also argued that health indicators are often not ratio scaled and therefore are not invariant to positive linear transformations that are needed for cardinal health variables. Wagstaff (29) noted that the range of the SCI depends on the mean of the bounded variable therefore suggested rescaling the S CI to ensure that it always lies between -1 and +1 when the variable of interest has finite upper and lower limits, the Wagstaff Concentration Index (WCI)

Reviews on measuring disparities in health suggest that the SI and CI are measures that are best suited to measure socioecomic inequality in health .(19, 30, 31). According to Wagstaff et al (19, 32) and Kakwani et al(30) both these measures reflect the experiences of the entire population, are responsive to the changes of the health outcome in the population, and focus on the socioeconomic dimension of inequality in health.

1.2.3. PROGRESS-PLUS Framework

PROGRESS refers to the Place of residence, Race, Occupation, Gender, Religion, Education, Socioeconomic status and Social capital(13). PROGRESS-Plus takes into account other stratifying factors beyond those emphasised by the acronym(14). This framework has been recommended as a guideline to use when reporting socially stratifying factors that drive variations in health(14).

Place of residence is a key determent of health(33) and within the PROGRESS framework often refers to the rural and urban places of residence but may refer to a particular region in which population group live. Race refers to the race, ethnicity or cultural background. Language can be used as a proxy for race because many definition of ethnicity included shared culture and language (13).Racial inequality arises from the social experience of different racial groups whilst ethnicity is socially constructed and like race it has an impact of health depending on the context(13). Cultural beliefs and values disadvantage certain groups from accessing health information and care and language is a barrier especially when the patient does not speak the same language a s a health care provider(13).

Occupation within the framework encompasses different situation including both formal and informal employment(13). Occupational status is strongly linked to many health outcomes and mortality. Gender refers to the socially constructed roles and associated traits(13). Inequities are driven by gender roles particularly for women(13). Gendered norms affect health seeking behaviour, health status and access to health care. Religious beliefs and practices affect the health seeking behaviour and health practices(13). Education is a major determinant of health because it affects they type of occupation a person is eligible for and thus correlated to income. High levels of education are associated with healthier lifestyles and more knowledge about healthy behaviours and preventive measures. Socioeconomic status is correlated to determinants of health such as living conditions, access to nutrition and financial access to health care.(13)

Social capital, which is the social features of social organisation of that facilitate cooperation and mutual benefit(34), has been argued to be important for the enhancement of government performance and functioning and maintaining of population health(35). Social capital refer to the resources that are as a result of social networking social networks, which advance the sharing of information and advice during pregnancy and childcare(36). Social capital might influence individual health in three plausible pathways. First, social capital may influence the health behaviours of a community by promoting more sharing of health information, increasing the likelihood that healthy norms of behaviour are adopted and exerting social control over deviant health-related behaviour(37) Studies show that individuals are at risk of poor health outcomes if they have limited access to resources such as information(36, 38, 39). Social capital is interrelated with socioeconomic status, as the income inequality increases in a community the social capital within the community decreases(35).

1.2.4. Intersectionality in Health

In most of the traditional literature on social inequalities in health, the dimensions of inequality are regarded as separate(40). There is, however, an increasing literature on intersectionality, that evaluates how various axes of inequality work together in intricate ways to affect individuals' lives, social practices and health outcomes (16, 17, 40). The term *intersectionality* was coined in 1991 by Crenshaw(41) and has been used in different disciplines to understand the relationship between various types of social inequality. Different population groups are endowed different social advantages and disadvantages along various inter-related dimensions(16, 40). Studies in the field of health show, for example, that women's vulnerability to ill health and their access to health services are shaped by social interactions of power that are shaped by race, economic class, gender and ethnicity together(40, 42, 43).

Intersectional analysis attempts to explore these inter-connections, to evaluate, for example, if the burden of inequity borne by the poor is also influenced by race or level of education(17). Quantitative intersectionality analysis is generally based on interacting categorical socioeconomic variables to generate new intersectional variables that can be included in regression models(17).

1.2.5. Measurement of Inequalities in Maternal Health

A number of similar studies have been conducted to evaluate inequalities in maternal health using DHS and other nationally representative data in low- and middle-income countries (44-54). These studies have calculated various measures of inequality including the rate ratio and rate difference (46, 47, 52), concentration index (48, 49, 52-55), slope index of Inequality (50, 51, 55), and relative index of inequality(50, 51, 55).

The outcome variables measured in the studies were more than four antenatal visits (48, 54), skilled antenatal attendant (52), skilled birth attendant (46-49, 53-55), delivery at a health facility (47, 48, 55), use of modern contraception method (53, 55), and caesarean section (49, 52). Most studies assessed outcomes by sociodemographic factors including socio-economic status, mother's age at birth, child's birth order, ethnic group, marital status, level of education, occupation, and health insurance. PROGRESS-Plus was used as a framework in the two studies by Wabiri et al (50, 51)

Makate and Makate (54) examined how inequality changed over time between 1994 and 2010 in Zimbabwe, and decomposed the concentration index to examine how a set of explanatory factors contributed to the measured health inequalities. Their study found a pro-rich distribution of inequality in skilled birth attendance and receiving more than four ANC visits. The study further found a pro-rich distribution of receiving information on gestational complications. The study showed a widening gap in inequality between the rich and poor over time, which was attributed to

the economic crisis causing deterioration in essential sectors such as health, manufacturing, and agriculture, and which worsened the predicament of the poor(54).

The magnitude of inequalities in use of delivery care was generally larger than for antenatal services, with a pro-wealthy distribution (48, 52). In Kenya, Namibia and Ethiopia socioeconomic status measured by wealth index(49, 53) and mothers' educational attainment (49, 52, 53) were the main predictors of use of maternal care service. Poor women were found to face many barriers to using health services such as high cost, poor transportation and inadequate facilities. In Ghana publicly-funded health care interventions were used more by the rich than the poor(55), reinforcing the claim that government health spending benefits the rich more than the poor. Mothers' education was reported to be a major determinant in many studies, and was attributed to education improving the ability of mothers to judge when to seek medical care, and to correctly interpret health messages(55). Education also increased earning opportunities for women which enabled women to access health care services where payment is required(52).

1.2.6. Inequalities in Maternal Health

This section will highlight the findings of studies that measures inequalities in use maternal health services in Sub Saharan African and Asian countries, using Demographic and Health Survey data. The majority of the studies examined change in inequalities over time by comparing finding of successive DHS surveys.

A study that examined the trends in utilisation of antenatal care and facility based delivery in sub-Saharan Africa showed that countries with progress toward the MGD target had an increase in ANC and facility-based delivery (FBD) use over time(44). In countries where there was inadequate progress toward MDG 5, Zimbabwe being one of the countries reported on, there was a decline in the rates of use of ANC and FBD over time(44). The study also showed marked urban-rural disparities in ANC and FBD utilisation rates and wealthier mothers used ANC and FBC in all countries understudy(44).

In South Africa high levels of inequalities persist, with disparities in social determinants of health worsening over in the period between 2008 and 2012(51). There were however advances in the access to maternal health services in the country as a whole as seen by indicators such as early ANC attendance, HIV testing and deliver with a doctor present rising(51). Overall compared to other race group black women had the poorest access to key maternal health services such as early ANC and skilled birth attendance and. Mother's level of education was also found to be linked to all maternal outcomes(51). Rural area were found to have the deficiencies in access to services such as a SBA(51).

There were regional patterns of deficiency of health services in provinces such as eastern cape and North West(51).

Large differences in provincial SBA coverage were observed, with utilisation higher in urban areas in Kenya (49). Wealth, mother's education and ethnic group were found to be significantly associated with SBA however, SBA coverage and magnitude of inequalities did not vary over time (49). In Ethiopia despite an increase in the coverage of maternal health services, inequalities by wealth persisted over time(53). Socioeconomic status and education were found to be the main predictors of use maternal health services(53). In Ghana coverage of maternal health services remains low, with poorest in society having the lowest provision of services(55). There is a pro rich distribution of services such as SBA, delivery at a health facility and use of modern contraceptive methods with a pro poor distribution of home delivery(55).

Antenatal care, facility based delivery and caesarean section use favoured the rich however there are improvements in inequality over time between 2008 and 2013 in Philippines (48). In Namibia there were differences in utilisation of maternal health services such as antenatal care, SBA and caesarean section, by geographic region(52). The region where the capital city is located was where the highest use was observed. Home based deliveries were more common in rural regions(52). Marked inequalities in the use of SBA and provision of ANC by a skilled attendant were observed by mothers level of education, with use favouring the educated(52). A pro rich distribution of use of maternal health was also observed for all maternal health care services of interest measured(52).

The findings from the studies above show that in Sub Saharan Africa there are inequalities in the use and coverage of maternal health services. Some countries have managed to reduce the magnitude of inequalities(48), whilst others have remained the same over time(49, 53) and in other cases increased over time(51). Wealth and mothers level of education was found to be significantly associated with use if maternal health care services in most studies. Geographic region and ethnicity was also found to be liked to use in some countries.

1.2.7. Zimbabwe: Country Overview

The Republic of Zimbabwe is a landlocked country in Southern Africa that achieved independence from Britain in 1980(56). The country had a population of 14.15 million in 2015 with two thirds of the population residing in rural areas (57). The country is divided into 10 administrative provinces and 52 districts. The districts are further divided into wards.

The Shona are the largest ethnic group and located in the eastern and central parts of the country, the Ndebele are the second largest ethnic group and are found in the western parts of the country. Other ethnic groups are the Venda and Shangaan in the south, the Tonga in the north, the Kalanga

and Nambya in the far west and the Ndau in the far east(56). According to the 2014 Labour Force Survey(58) the national literacy rate was 98.0%.

Between independence and the mid-1990s, Zimbabwe developed one of the strongest economies and health systems in southern Africa. However, economic collapse due to high inflation, low reserves of foreign currency and high budget deficits lead to a drop in economic indicators(59). According to The World Bank the GNI per capita fell by 54% between 2000 and 2005, and unemployment was 94% by the end of 2008(60). In 2015 Zimbabwe the GNI was US$13.48 billion with a GNI per capita of US$860(60). The economic collapse over recent years has caused the outmigration of many skilled health workers in search for better wages and working conditions abroad and in neighbouring African countries.

The providers of health care in Zimbabwe are public health facilities, private clinics and hospitals, non-profit organisations and company clinics(56). The public health delivery system, the biggest provider of health care in the country is decentralised into four levels. The primary care level comprises community based clinics, which are nurse-run but supported by village health workers, and represent 78% of all health facilities in the country(56). A medical officer-staffed secondary care level receives referrals from the primary care level and accounts for 3.6% of facilities in the health system(56). Seven provincial hospitals make up the tertiary care level with doctors and a few specialists to manage referrals from the secondary level, and accounting for less than 1% of health facilities(56). The quaternary level consists of six hospitals located in the two largest cities in Zimbabwe. These facilities have the largest staff complement of specialists and have more advanced diagnostic and curative equipment(56). In 2009 the expenditure on health was 0.02% of the country's GDP, with US$5.77 spent on health per capita from public funds(56).

1.2.8. 2015 Zimbabwe Demographic and Health Survey

The most recent DHS in Zimbabwe was conducted in 2015. The study was a nationally representative survey implemented by the Zimbabwe Statistics Agency (ZIMSTAT) between July and December in 2015(61). The primary objective of the survey was to provide current estimates of demographic and health indicators, which are intended to assist policy makers and programme managers to evaluate and design health programmes and strategies to improve the country's health(61).

Chapter Nine of the report presented the results of Maternal Health Care, which are pertinent to the current study. The report presented information on antenatal care (ANC), childbirth and postnatal care. The first section on ANC showed information about antenatal care from a skilled provider, timing and number of first ANC visit, and important components of the ANC. The second section focused on place of delivery, skilled birth attendant and caesarean section deliveries. The final

section presents information about postnatal care of the mother and baby. In each section, a figure showing the trends for coverage of these indicators over the last three DHS surveys is presented. The chapter ends with summary tables that disaggregate each maternal health care indicator by mother's age at birth, birth order of the child, residence i.e. urban and rural, province, mother's educational attainment and wealth quintile(61).

1.3. Statement of Problem

Despite an antenatal coverage of 93.7%, 70.1% of women having at least 4 ANC visits, and a skilled birth attendant rate of 80.0% (62), the maternal mortality has increased in Zimbabwe(18, 62). Maternal mortality in developing countries such as Zimbabwe is much higher amongst the poorer, rural and less educated communities. There is evidence that poorer or marginalised communities have the highest burden of disease and worst health status, but the least access to health care services(63). An inverse care law has been found to apply to health service utilisation where the wealthiest in society use most of the health care services yet have the lowest burden of disease and the least need of health care(64). Because of these potential disparities, it would be important to investigate the socially stratifying factors that drive variations in the utilisation of maternal health services in Zimbabwe between different population groups. Furthermore, populations are becoming progressively diverse, and it would be instructive to move beyond looking at separate analyses of individual factors driving inequalities, to a multi-level focus that investigates the connections between these factors, and how the connections combine to create social advantage and disadvantage for different groups(40).

1.4. Study Justification

Measuring inequalities and examining equity in the area of maternal health is important, as accurate and internationally comparable measures of maternal care are required to ensure adequate planning and prioritise the allocation of resources to effective maternal health interventions in targeted communities and groups that are in most need(10). Health services often contribute to the aggravation of health inequalities(65) thus there is need mainstream the consideration of equity in health policies and programs if countries are to achieve national gaols. Routine health information on use of health services may mask disparities between population groups, therefore there is need to conduct studies that specifically examine these differences(10).

Makate and Makate conducted a study previously that explores inequalities in maternal healthcare utilisation in Zimbabwe, which examined the socioeconomic- related inequalities in attending more than 4 ANC visits and delivery by a skilled attendant(54). The study examined the changes in inequality of these two variable between 1994 and 2010 using just the Concertation Index (CI). Our

study calculated both simple and complex measures of health inequality, that is Rate Ratio (RR), Risk Rate difference(RD), the Slope index of Inequality (SII), Relative Index of Inequality (RII) and Concentration index (CI) of five maternal health outcomes using the PROGRESS- PLUS framework. CI and SII are considered to be most appropriate to measure disparities in health as they reflect the experiences of the whole population, and are sensitive to changes in the distribution of a health outcome in the population(19, 30). Whilst these measures mainly reflect the socioeconomic dimension of disparities in health, health inequalities amongst population groups often connect, interact and overlap depending on the context(15). The study therefore went beyond the one dimensional analysis of inequality by only economic class, but also analysed the interaction of multiple dimensions of socially stratifying factors using the PROGRESS-PLUS framework to identify the key axes of social stratification(14) which was not done in the previous study. PROGRESS-PLUS is a framework that has been widely used to inform socially stratifying influences that drive differences in health outcomes (13, 14, 50). This study therefore generated information about a wider range of factors that impel inequality of more health outcomes than the previous study.

This information will highlight the inequalities that exist in the utilisation of key maternal health services in Zimbabwe and how the interaction of various stratifying factors generate disadvantage along different dimensions. By understanding these factors, how they contribute to inequalities in maternal health utilisation, and how these factors are connected amongst various population groups, the study will help identify the social groups that have the greatest potential to reduce equity gaps(66, 67). This is particularly pertinent to policy makers and designers of health programmes in the area of maternal in order to establish legislative frameworks and interventions that address the multiple dimensions of inequality, lead to improved uptake of maternal health services, and lower maternal mortality. This is necessary to improve Zimbabwe's prospects of achieving the new ambitious SDGs targets for maternal health.(65, 68).

1.5. Study Research Question, Aim and Objectives

Research Question

What socioeconomic inequalities exist in the utilisation of maternal health care services In Zimbabwe and how do these interact across population groups?

Study Aim

To determine the socioeconomic inequalities that exist in the utilisation of maternal health care services and how the factors driving inequalities interact amongst women aged between 15-49 years in Zimbabwe using the PROGRESS-PLUS framework.

Study Objectives

1. To measure the socioeconomic inequalities in utilisation of maternal health care services in Zimbabwe.
2. To determine the PROGRESS-PLUS factors that are associated with the use of maternal health services in Zimbabwe.
3. To determine the intersection of PROGRESS-PLUS factors and how these intersections affect the utilisation of maternal health care services in Zimbabwe.

CHAPTER 2. METHODOLOGY

2.1. Study Design

This study was a secondary data analysis of the Zimbabwe Demographic and Health Survey 2015 (ZDHS), a nationally presentative, cross-sectional household survey.

2.2. ZDHS Study Setting

The Zimbabwe Demographic and Health Survey (ZDHS) is a nationally representative household survey that has been conducted every five years in Zimbabwe since 1999. The most recent DHS was conducted in 2015. This data is accessible on the DHS website (http://www.measuredhs.com).

2.3. ZDHS Study Sample

Using the 2012 Zimbabwe National Population Census as a sampling frame, the ZDHS 2015 sample was identified using a stratified two stage cluster design. In the first phase of sampling, enumeration areas (EA) of the previous census were the sampling units(61). 400 EAs were sampled with 166 being urban and 234 rural(61). For each of the EAs sampled a complete housing list was compiled in March 2015 and maps where drawn of each area(61). The housing lists excluded institutional accommodation such as police and army barracks, boarding schools and hospitals. In the second phase of sampling, households were the sampling units and a representative sample of 11 196 households was selected from the housing lists.

2.4. ZDHS Data Collection and Processing

Three questionnaires were used to collect data during the ZDHS: a household, male and female questionnaire. All females aged between 15-49 years and all males aged 15-54 years who were permanent occupants of the sampled households or guests who had slept in the house the evening before the survey were included for interviewing(61). Interviewers captured responses of participants digitally with personal digital assistants (PDA)(61). This data collection tool was developed by the MEASURE DHS using a mobile version of CSPro software(61). Editing, weighting and cleaning of the primary data were done using CSPro software, which included checking for structural and internal consistency. Of the 11196 households identified for inclusion in the survey, 10657 where found to be inhabited and 10 534 were successfully interviewed thus yielding a 99% response rate.

2.5. Measurement

This study aimed to measure health inequalities in utilisation of health care services amongst pregnant women in Zimbabwe using data from the 2015 Zimbabwe Demographic and Health Survey.

In the DHS report the section on maternal health is mainly descriptive, reporting on the utilisation of many key maternal health service variables and disaggregating these variables by a few social stratifying factors such as urban/ rural residence, education and wealth quintiles(61). The secondary data analysis in this study evaluated more complex measures of health inequalities that were not calculated in the primary study. This study also used the PROGRESS-Plus as a framework in the investigation of socioeconomic inequalities in utilisation of maternal health services. The study aimed to determine which of the PROGRESS-PLUS factors are associated with utilisation of maternal health care services and examine how the interaction of these factors create inequalities amongst population groups.

The variables of interest were drawn from two of the three questionnaires: the household and woman's questionnaires as outlined below.

PROGRESS-PLUS (Predictor) variables

- Mothers age at birth
- Place of residence,
- Region
- Race/Ethnicity,
- Occupation,
- Religion,
- Educational attainment,
- Household wealth,
- Social Capital,
- Health Insurance

Maternal Health Care (Outcome) Variables

- Skilled ANC attendant
- Timing of first ANC visit,
- Number of ANC visits,
- Place of delivery,
- Type of delivery assistance.

Table 2-1 and Table 2-2 respectively show the predictor and outcome variables used in this analysis, indicating how they were presented in the original DHS dataset, and how they were recoded to generate the dataset for the current study.

Table 2-1: PROGRESS-PLUS predictor variables

Variable	DHS Question	DHS Reponses	Inequality Dataset
Mother's age at birth		1. <20 2. 20-34 3. 35-49	1. <20 2. 20-34 3. >34
Place of residence	(Determined using EA the household is located in)	1. Urban 2. Rural	1. Rural 2. Urban
Region		1. Manicaland 2. Mashonaland Central 3. Mashonaland East 4. Mashonaland West 5. Matabeleland North 6. Matabeleland South 7. Midlands 8. Masvingo 9. Harare 10. Bulawayo	1. Manicaland 2. Mashonaland 3. Matabeleland 4. Midlands 5. Masvingo 6. Harare 7. Bulawayo
Race/Ethnicity	Language of interview	1. English 2. Shona 3. Ndebele	1. English 2. Shona 3. Ndebele
Occupation	What is your occupation, that is what type of work to you normally do?	1. Did not work 2. Professional/Technical/ Managerial 3. Clerical 4. Sales and services 5. Skill manual 6. Unskilled manual 7. Domestic Service 8. Agriculture 9. Other 10. Don't not know/ Missing	1. Unemployed 2. Unskilled Labour 3. Skilled Labour
Religion	What is your religion?	1. Traditional 2. Roman Catholic 3. Protestant 4. Pentecostal 5. Apostolic Sect 6. Other Christian 7. Muslim 8. None 9. Other	1. None 2. Apostolic Sect 3. Other Christian 4. Other Religion
Educational attainment	What is the highest level of education you have attended?	1. No education/ preschool 2. Primary 3. Secondary 4. Higher	1. No education 2. Primary 3. Secondary 4. Higher
Wealth index	(Computed using various household asset variables)	1. Poorest (Quintile 1) 2. Poorer (Quintile 2) 3. Middle (Quintile 3) 4. Richer (Quintile 4) 5. Richest (Quintile 5)	1. Poorest (Quintile 1) 2. Poorer (Quintile 2) 3. Middle (Quintile 3) 4. Richer (Quintile 4) 5. Richest (Quintile 5)
Social capital score	(Index calculated using three variables that indicate the frequency of use of TV Radio and Newspaper)	0. Not at all 1. Less than once a week 2. More than once a week	1. Score of 0 2. Score of 1-3 3. Score of 4-6
Health insurance	Are you covered by health insurance	1. No 2. Yes	1. No 2. Yes

Table 2-2: Maternal health outcome variables

Variable	DHS Question	DHS Reponses	Inequality Dataset
Skilled ANC attendant	Who did you see for ANC for this pregnancy?	1. Doctor 2. Midwife 3. Nurse 4. Village Health Worker 5. Traditional birth attendant 6. Relative/Other 7. No one	1. Unskilled (Village Health Worker Traditional birth attendant Relative/Other No one) 2. Skilled (Doctor Midwife Nurse)
Number of ANC visits	How many times did you receive ANC during this pregnancy?	1. 1 2. 2-3 3. 4 4. Don't know	1. Less than 4 visits 2. 4 or more visits
Timing of first ANC	How many months pregnant where you when you first received ANC?	1. Less than 4 months 2. 4-5 months 3. 6-7 months 4. 8+ months	1. Before 4 months 2. After 4 months
Place of delivery	Where did you give birth to your baby?	1. Public sector facility 2. Private sector facility 3. Mission hospital 4. Home 5. Other	1. Not in health facility 2. In health facility
Type of delivery assistance	Who assisted with the delivery of your baby?	1. Doctor 2. Midwife 3. Nurse 4. Village Health Worker 5. Traditional birth attendant 6. Relative/Other 7. No one	1. Unskilled 2. Skilled

This study analysed data collected from women aged between 15-49 years reported to have had a live birth in the five years preceding the survey. Of the 10 351 eligible females identified in households, 9 955 of these females were interviewed, representing a 96.2 percent response rate(61). A total of 6 418 live deliveries were reported by these women in the five years prior to the study. It is data about the place of delivery and presence of a skilled birth attendant of these births that was used for the analysis of those two outcome variables. Women were asked about ANC use for their most recent birth. Therefore, data was analysed for the ANC utilisation of the 4 988 most recent births reported(61).

2.6. Data Management

The data was downloaded from the Measure DHS website (http://www.measuredhs.com) in STATA format. The variables of interest were drawn from the two questionnaires for the each of the 6 418 participants from the merged KR dataset which has data of all women and children. The variables of

interest were recoded using the STATA Version 14 statistical package. New categorical variables were generated as outlined in Table 2-1 and Table 2-2 above.

Table 2-1 shows the predictor variables. Language of interview was used as proxy of ethnicity. 99.3% of the population was black, thus race was not included as a predictor variable. The social capital index was constructed by adding the results of three variables; frequency of watching TV, reading a newspaper, and listening to the radio. The individual variables were coded from 0 to 2 so the total score for the three variables ranged between 0 and 6. This score was re-categorised to a three-level social capital index as follows: 0 for a score of 0; 1 for a score of 1-3; 2 for a score of 4-6.

Table 2-2 shows the outcome variables. All variables were recoded to binary variables using the WHO guidelines for minimal recommended care for pregnant women(6). All responses originally categorised as "do not know" where recoded as missing and excluded from analysis.

2.7. Data Analysis

Data was analysed per study objective using STATA Version 14. The primary study involved stratified two-stage cluster sampling and therefore the STATA svy commands were used for all secondary data analyses in this study as post stratification weighting to adjust the sample data to conform more to population parameters(69). The svy command ensures that point estimates, coefficients and standard errors are produced to adjusted for the sample weighting, stratification and clustering used to randomly select study participants(69, 70). In all analyses, a p-value of <0.05 was considered as statistically significant.

2.7.1. Inequality in Utilisation of Maternal Health Services

To examine the socioeconomic inequality the Difference (range), Rate Ratio, Concentration index (CI), Slope index of inequality (SII) and relative index of inequality (RII) were calculated.

The difference was calculated by subtracting the utilisation rate of the lowest category from the rate of the highest category for all PROGRESS-Plus factors by each outcome variable. Rate ratio was calculated by dividing the utilisation rate of the highest category by the utilisation rate of the lowest category for each PROGRESS-Plus factor by each outcome variable.

The CI was computed using the STATA *conindex* command(25). The generalised concentration index (GCI) was computed together with the Wagstaff (WCI) and Erreygers (ECI) normalised concentration indices, since all maternal health outcome variables of interest are binary and bounded with a lower limit of 0 and upper limit of 1. The formulas for these calculations are shown in Equation 1, Equation 2, and Equation 3 respectively where h_i is the health status of the ith person in the population, R_i is their fractional socio-economic rank, a^{min} is the lower limit of the health variable , a^{max} is the upper

limit of the health variable, and $\bar{a}$ is the average health status. The three CI indices were computed for all outcome variable of interest by all ordinal PROGRESS-PLUS factors.

Equation 1: Standard Concentration Index

$$GC\left(h|y\right) = \frac{1}{n}\sum_{i=1}^{n}\left[h_i\left(2R_i - 1\right)\right]$$

Equation 2: Wagstaff Concentration Index

$$W\left(a|y\right) = \frac{1}{n}\sum_{i=1}^{n}\left[\frac{\left(a^{max} - a^{min}\right)a_i}{\left(a^{max} - \overline{a}\right)\left(\overline{a} - a^{min}\right)}\left(2R_i - 1\right)\right]$$

Equation 3: Erreygers Concentration Index

$$E\left(a|y\right) = \frac{1}{n}\sum_{i=1}^{n}\left[\frac{4a_i}{\left(a^{max} - a^{min}\right)}\left(2R_i - 1\right)\right]$$

Concentration curves were also drawn for selected variables by plotting the cumulative proportion of the population ordered by wealth (x-axis) against the cumulative percentage of the outcome variable (y-axis) e.g. skilled birth attendant (19, 26).

The SII is a coefficient of weighted regression calculated using Equation 4:

Equation 4: Slope Index of Inequality

$$y_i n_i = \beta_0 n_i + \beta_1 R_i n_i + \varepsilon_i$$

where n_i is the quintile population size, R_i is the rank score of the quintile, and β_0 is the health outcome of the lowest quintile. β_1 is then the SII which is the absolute difference in a health outcome between the lowest and highest quintiles.

The slope and relative indices of inequality were calculated using regression models (71). The STATA command *riigen* was used to produce new variables for each of the ordinal PROGRESS-PLUS predictors, representing the ridit scores or midpoint of the cumulative distribution for each category of the PROGRESS-PLUS variable(71). The RII and SII were then calculated using generalised linear model estimation with the log link function to generate the RII, and the identity link function to generate the SII(71). RII and SII were calculated for all outcome variables by all ordinal PROGRESS-PLUS factors.

2.7.2. Logistic Regression

Bivariate logistic regressions were computed for all maternal health outcome variables by each of the PROGRESS-PLUS factor. Multiple logistic regression models were then computed for all outcome variables and including all PROGRESS-PLUS predictor variables.

2.7.3. Intersectionality in Maternal Health Care

This investigation focused only on the skilled birth attendant outcome variable and included only the four PROGRESS-PLUS predictor variables that proved most significant in the inequality analyses and logistic regressions, namely wealth, geographical area, education level and insurance status. To simplify the analysis and interpretation, these were all recoded to binary variables as shown in Table 2-3 below.

Table 2-3 Binary PROGRESS-PLUS variables

PROGRESS-PLUS factor	Categories	New Binary Variable
Wealth	1. Poorest (Quintile 1) 2. Poorer (Quintile 2) 3. Middle (Quintile 3) 4. Richer (Quintile 4) 5. Richest (Quintile 5)	0. Poor (Q1-Q2) 1. Rich (Q3-Q5)
Residence	1. Rural 2. Urban	0. Rural 1. Urban
Education	1. No education 2. Primary 3. Secondary 4. Higher	0. Low (No education & Primary) 1. High (Secondary & Higher)
Health Insurance	1. No 2. Yes	0. No 1. Yes

A new multi-dimensional socio-economic status variable was then calculated to indicate each individual's position in relation to the combination or intersection of these four binary variables. For example, the most advantaged group would be expected to be rich women, with high education and health insurance, from urban areas. In theory this would produce 16 potential sub-groups (2^4 possible combinations of four binary variables), but in practice not all of these sub-groups were represented in the DHS sample (there were no poor women in urban areas, for example). The skilled birth attendant rates were then compared between the subgroups of the multi-dimensional status variable.

To further investigate the pattern of relationships between the wealth index, place of residence, educational attainment and health insurance variables, multiple correspondence analysis (MCA) was used. The MCA plot was drawn to show the relationship of these four factors on the first two MCA dimensions.

2.8. Research Ethics

Approval to conduct the study was obtained from the University of Witwatersrand Human Research Ethics Committee. A copy of the clearance letter is attached in APPENDIX A. Permission to download and use the ZDHS data was obtained from Measure DHS. The downloaded dataset is already anonymised, with each participant allocated a unique study number. Individual households were also not identifiable from the dataset due to the geospatial displacement of households during sampling as well as the large size of the study sample(61).

CHAPTER 3. RESULTS

This chapter present the results of the study. Firstly the demographic characteristics of the study participants are presented then the utilisation rates for all maternal health care services of interest disaggregated by PROGRESS-PLUS factors are presented. The simple and complex measures of inequality are presented then the logistic regression analyses are shown which investigate the PROGRESS-PLUS factors associated with the utilisation of maternal health care services. Finally, the results of the intersectionality analysis of the skilled birth attendant indicator are reported.

3.1. Demographic Characteristics

Table 3-1 Demographic Characteristics of study participants

		Antenatal Care (ANC) N (%)	Delivery Care (DC) N(%)
Age (years)	<20	775 (15.6)	1074 (16.7)
	20-34	3535 (70.9)	4572(71.2)
	>34	678 (13.6)	772(12.0)
Residence	Rural	3351(67.2)	4392(68.4)
	Urban	1637(32.8)	2027(31.6)
Region	Manicaland	708(14.2)	966(15.1)
	Mashonaland	1603(32.1)	2084(32.5)
	Matebeland	434(8.7)	526(8.2)
	Midlands	678(13.6)	866(13.5)
	Masvingo	583(11.7)	764(11.9)
	Harare	761(15.3)	950(14.8)
	Bulawayo	220(4.4)	262(4.1)
Language	English	4325(86.2)	5609(87.4)
	Shona	461(9.2)	566(8.8)
	Ndebele	202(4.1)	243(3.8)
Occupation	Unemployed	2322(47.1)	3025 (47.7)
	Unskilled Labour	1192(24.2)	1518(23.9)
	Skilled Labour	1415(28.7)	1804(28.4)
Education Attainment	No Education	57(1.2)	76(1.2)
	Primary	1530(30.7)	2038(31.8)
	Secondary	3125(62.7)	3962(61.7)
	Higher	274(5.5)	342(5.3)
Religion	None	305(6.1)	398(6.2)
	Apostolic Sect	2408(48.3)	3228(50.3)
	Other Christian	2225(44.6)	2732(42.6)
	Other Religions	50(1.0)	60(1.0)
Wealth Index	Poorest	1082(21.7)	1477(23.3)
	Poorer	956(19.2)	1252(19.5)
	Middle	860(17.2)	1098(17.1)
	Richer	1183(23.7)	1504(23.4)
	Richest	908(18.2)	1087(16.9)
Social Capital	None	1316(26.4)	1748(27.2)
	Low	2509(50.3)	3259(50.8)
	High	1162(23.3)	1411(22.0)
Health Insurance	No	4550(91.2)	5888(91.7)
	Yes	438(8.9)	530(8.3)
	TOTAL	**4988(100)**	**6418(100)**

Table 3-1 above shows the demographic characteristics of study participants disaggregated by PROGRESS- PLUS factors. There table shows that 4988 women reported to have had antenatal care for their most recent pregnancy and 6418 women reported to have had a live birth in the five years prior to the study. Most women were in the 20-34 year age group (70.9%- ANC, 71.2%- DC) and resided in urban areas (67.2-ANC, 68.4- DC). The majority of women (86.2%-ANC , 87.4%-DC) used English as the language for the interview. The largest proportion of women interviewed where unemployed (47.1%- ANC, 47.7%-DC), had attained secondary education (62.7%-ANC, 61.7%-DC) and had no health insurance (91.2%-ANC, 91.7%-DC).

3.2. Maternal Health Care Utilisation Rates by PROGRESS-PLUS Factors

Table 3-2 shows the utilisation rates of maternal health services disaggregated by PROGRESS-PLUS factors. The utilisation rate of a skilled ANC attendant was very high (93.3%), however, very few women (38.5%) attend their first ANC before four months gestation. Most women (78.1%) have a delivery with a skilled birth attendant and at a health facility (77.0%).

Women who attained higher education (99.6%), those with health insurance (99.5%) and those in the richest wealth quintile (98.6%) had the highest skilled antenatal attendant rates. Women who belonged to the Apostolic Sect (88.9%) and those that resided in Manicaland (86.4%) had the lowest skilled antenatal attendant rates.

The highest proportion of women attending their first ANC visit before four months gestation were women who attained higher education (54.2%) , those that reside in Masvingo region (48.1%) and women aged above 34 years at the time of birth (46.7%). The lowest proportion of women having their first ANC visit before four months gestation were in other religions (31.5%), richer wealth quintile (30.9%) and from the Harare region (27.5%) sub groups.

Overall 76.0% of women (N=4988) had more than four ANC visits. Women with health insurance (90.4%), those who attained higher education (90.2%) and those in the richest wealth quintile (86.2) had the highest proportion of women with more than four ANC visits during pregnancy. The subgroups with the lowest percent of women with more than four ANC visits during pregnancy were women in the poorest wealth quintile (71.4%), women in Midlands region (69.2%) and women with no religious affiliation (69.1%).

The subgroups with the highest skilled birth attendance rate were women who attained higher education (99.9%), those with health insurance (96.9%) and women in the richest wealth quintile (95.7). The lowest skilled birth attendance rate was amongst the women with no education (49.7%), the poorest wealth quintile (61.7%) and the no social capital (69.5%) subgroups.

Table 3-2 Utilisation Rates by PROGRESS-PLUS factors

	Skilled ANC Attendant % (N=4988)	First ANC visit before 4 months % (N=4988)	More than four ANC visits % (N=4988)	Skilled Birth Attendant % (N=6418)	Delivery at a Health Facility % (N=6418)
Age (years)					
<20	94.6	35.9	73.3	77.2	76.9
20-34	93.3	37.5	76.1	78.9	77.6
>34	93.1	46.7	77.9	74.7	72.9
Residence					
Rural	92.1	40.7	75.1	71.3	70.0
Urban	95.7	33.9	77.6	92.9	92.1
Region					
Manicaland	86.4	37.6	74.6	69.8	69.5
Mashonaland	93.7	40.7	78.4	69.8	68.8
Matebeland	97.4	40.4	79.1	86.0	83.2
Midlands	95.3	38.7	69.2	81.2	80.8
Masvingo	92.8	48.1	78.2	80.1	78.0
Harare	94.1	27.5	73.3	91.3	91.1
Bulawayo	96.4	33.4	78.7	94.8	90.2
Language					
English	92.8	38.9	75.4	76.7	75.8
Shona	97.2	37.1	78.2	88.7	85.7
Ndebele	94.4	33.4	81.8	85.1	82.8
Occupation					
Unemployed	93.7	38.2	74.9	77.5	76.4
Unskilled Labour	92.2	38.5	74.6	72.9	71.4
Skilled Labour	93.4	38.9	78.4	83.2	82.3
Education Attainment					
No Education	93.1	39.1	79.2	49.6	51.5
Primary	89.6	38.9	73.2	65.8	63.7
Secondary	94.5	36.9	75.9	83.1	82.3
Higher	99.6	54.2	90.2	99.9	99.4
Religion					
None	94.3	38.7	69.1	73.2	71.8
Apostolic Sect	88.9	35.6	72.5	69.5	68.8
Other Christian	97.8	41.7	80.6	88.9	88.0
Other Religions	96.6	31.5	72.0	79.7	77.0
Wealth Index					
Poorest	90.1	38.0	71.4	61.7	60.8
Poorer	91.8	42.6	72.7	70.1	68.2
Middle	93.2	42.1	79.1	77.5	76.1
Richer	93.3	30.9	72.4	88.5	87.5
Richest	98.6	41.3	86.2	95.7	95.2
Social Capital					
None	89.5	37.5	71.8	69.5	68.3
Low	93.4	38.3	75.4	77.1	75.9
High	97.1	40.0	81.7	91.0	90.0
Health Insurance					
No	92.6	37.1	74.5	76.4	75.2
Yes	99.5	53.2	90.4	96.9	96.8
TOTAL	**93.3**	**38.5**	**76.0**	**78.1**	**77.0**

Overall 77.0% of the women (N=6418) had a delivery at a health facility. The highest proportions of women having deliveries at a health facility were in the higher education (99.4%), health insurance (96.8%) and richest wealth quintile subgroups. Women with no education (51.5%), primary education (63.7%) and from the poorest wealth quintile (60.8%) had the lowest proportion of deliveries at a health facility.

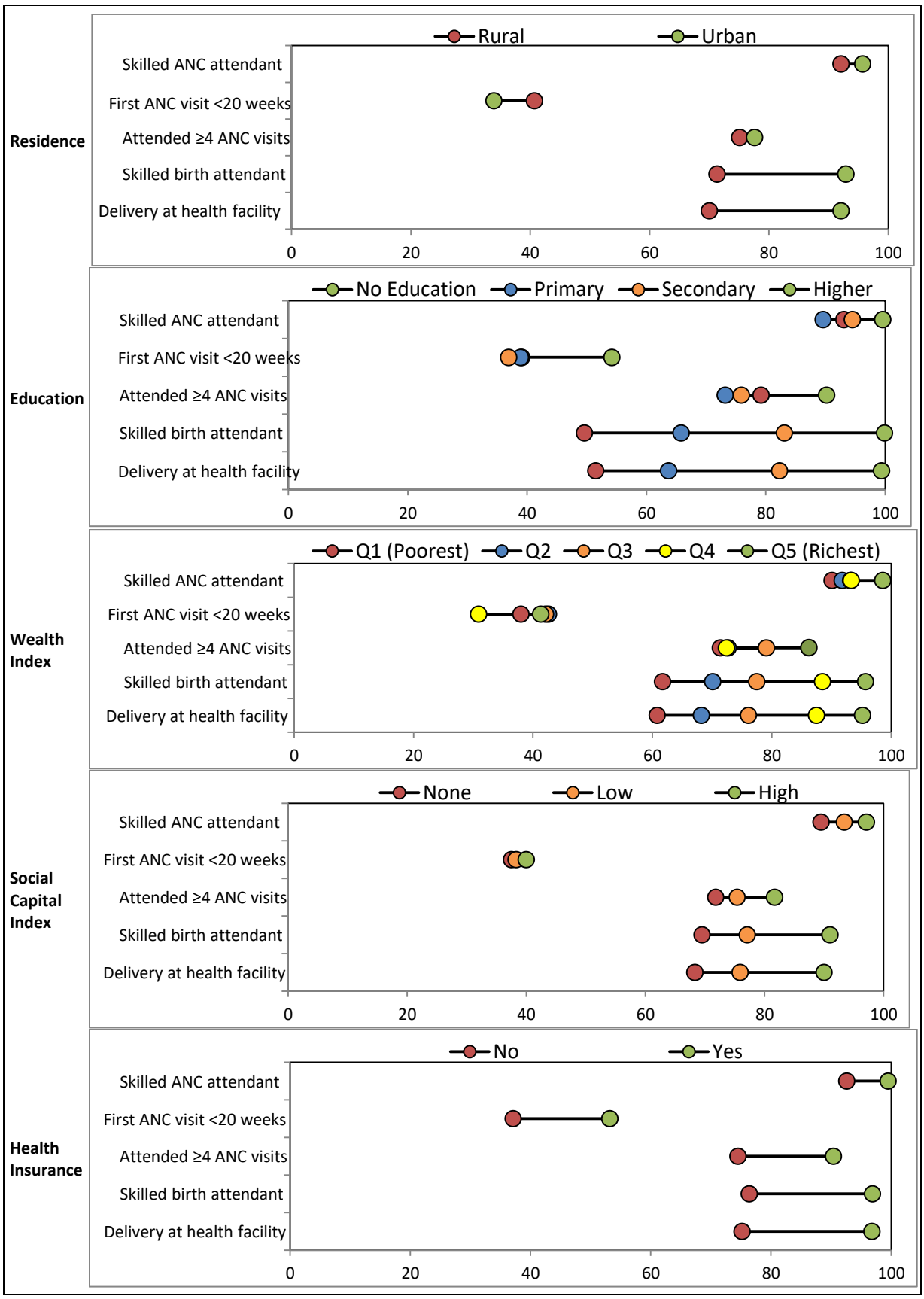

Figure 3-1: Differentials in utilisation rates of maternal health care services

Figure 3-1 graphically shows the distribution of maternal Health care services utilisation rates disaggregated by place of residence, educational attainment, wealth index, social capital and health insurance status. In general, education and wealth are the factors that show the largest variation in utilisation rates. The maternal health services that show the widest variation in utilisation are skilled birth attendant and delivery at a health facility for most of the PROGRESS-PLUS factors outlined.

3.3. Simple Measures of Inequality

Table 3-3 shows the PROGRESS-PLUS sub-groups with the lowest and highest utilisation rates for each maternal healthcare service indicator, the rate difference and rate ratio of those values with standard errors, and the p-value testing for a significant difference between the highest and lowest rates. Overall, small differences were observed in antenatal care related indicators and larger differences in delivery related care. The ratio of highest to lowest category ranged from 1.01 to 2.00.

The largest difference in skilled ANC rate was between women in Matebeland region and Manicaland region (difference= 11.0) with women in Matebeland having 1.13 times the skilled ANC attendant rate of women in Manicaland. The least difference in skilled attendant rate was by age and occupation. The biggest difference in proportion of women attending their first ANC before four months is by educational attainment (17.3). Women with higher education had attended their first ANC visit early 1.47 times more frequently than women with secondary education. The least difference in attending first ANC by four months was by occupation. Women with higher education attended more than four ANC visits 1.23 times more the women with primary education (difference=17.0). The least difference for this indicator was observed by age.

The skilled birth attendant rate of women with higher education and those with no education (difference=49.8) was the greatest difference in utilisation rates overall, with women that have attained higher education having twice the skilled birth attendant rate of those with no education. The least difference in skilled birth attendant rate was observed by maternal age. Large differences in skilled birth attendant rates were observed by wealth (difference=34.0), region (difference= 21.6), social capital (difference=21.5), health insurance (difference=20.5) and religion (difference=19.4). The greatest difference in delivery at a health facility rate was by education (difference=47.9) with women with a higher education having deliveries at a health facility 1,93 times more frequently than women with no education. Large differences where observed in the delivery at a health facility rate by wealth (difference=34.4), region (difference= 22.0), social capital (difference=21.7), health insurance (difference=21.7) and religion (difference=19.7).

Table 3-3 Simple measures of inequality

		Lowest Category	Value	Highest Category	Value	Ratio (SE)	Difference (SE)	p-valve
Skilled ANC Attendant	Age	>35	93.1	<20	94.6	1.02 (0.02)	1.5 (1.5)	0.302
	Residence	Rural	92.1	Urban	95.7	1.04 (0.01)	3.6 (1.3)	**0.005***
	Region	Manicaland	86.4	Matabeleland	97.4	1.13 (0.05)	11.0 (3.5)	**0.002***
	Language	English	92.8	Shona	97.3	1.05 (0.01)	4.5 (1.1)	**<0.001***
	Occupation	Unskilled Labour	92.2	Unemployed	93.7	1.02 (0.01)	1.5 (1.2)	0.232
	Education	Primary	89.6	Higher	99.6	1.11 (0.02)	10.0 (1.7)	**< 0.001***
	Religion	Apostolic Sect	88.9	Other Christian	97.8	1.10 (0.02)	8.9 (1.5)	**<0.001***
	Wealth	Poorest	90.0	Richest	98.6	1.10 (0.02)	8.6 (1.8)	**<0.001***
	Social Capital	None	89.6	High	97.2	1.08 (0.02)	7.6 (1.5)	**<0.001***
	Health Insurance	No	92.7	Yes	99.5	1.07 (0.01)	6.8 (0.9)	**<0.001***
First ANC Before 4 Months	Age	<20	35.9	>35	46.8	1.30 (0.10)	10.9 (3.1)	**<0.001***
	Residence	Urban	34.0	Rural	40.8	1.20 (0.07)	6.8 (2.0)	**0.001***
	Region	Harare	27.6	Masvingo	48.0	1.74 (0.19)	20.5 (3.8)	**<0.001***
	Language	Ndebele	33.4	English	38.9	1.16 (0.12)	5.5 (3.4)	0.112
	Occupation	Unemployed	38.2	Skilled Labour	39.0	1.02 (0.06)	0.7 (2.2)	0.742
	Education	Secondary	36.9	Higher	54.3	1.47 (0.12)	17.4 (4.2)	**<0.001***
	Religion	Other Religions	31.6	Other Christian	41.8	1.32 (0.33)	10.2 (7.9)	0.195
	Wealth	Richer	30.9	Poorer	42.7	1.38 (0.10)	11.7 (2.5)	**<0.001***
	Social Capital	None	37.6	High	40.0	1.07 (0.07)	2.5 (2.4)	0.308
	Health Insurance	No	37.1	Yes	53.2	1.43 (0.11)	16.1 (3.7)	**<0.001***
4 or more ANC Visits	Age	<20	73.4	>35	78.0	1.06 (0.04)	4.5 (2.8)	0.103
	Residence	Rural	75.1	Urban	77.6	1.03 (0.02)	2.5 (1.8)	0.160
	Region	Midlands	69.2	Matabeleland	79.1	1.14 (0.04)	9.9 (2.7)	**<0.001***
	Language	English	75.4	Ndebele	81.8	1.08 (0.04)	6.4 (2.8)	**0.022***
	Occupation	Unskilled Labour	74.6	Skilled Labour	78.5	1.05 (0.03)	3.8 (2.0)	0.057
	Education	Primary	73.3	Higher	90.3	1.23 (0.04)	17.0 (2.6)	**<0.001***
	Religion	None	69.1	Other Christian	80.6	1.17 (0.06)	11.5 (3.5)	**0.001***
	Wealth	Poorest	71.5	Richest	86.2	1.21 (0.04)	14.7 (2.5)	**<0.001***
	Social Capital	None	71.9	High	81.7	1.14 (0.03)	9.9 (2-1)	**<0.001***
	Health Insurance	No	74.6	Yes	90.5	1.21 (0.03)	15.9 (2.0)	**<0.001***
Skilled Birth Attendant <0.001	Age	>35	74.7	20-34	78.9	1.06 (0.03)	4.2 (2.0)	**0.035***
	Residence	Rural	71.3	Urban	92.9	1.30 (0.03)	21.6 (1.9)	**<0.001***
	Region	Mashonaland	69.8	Bulawayo	94.8	1.36 (0.05)	25.0 (2.6)	**<0.001***
	Language	English	76.8	Shona	88.7	1.16 (0.03)	12.0 (2.0)	**<0.001***
	Occupation	Unskilled Labour	73.0	Skilled	83.3	1.14 (0.03)	10.3 (2.1)	**<0.001***
	Education	No Education	49.7	Higher	99.9	2.01 (0.32)	50.2 (7.8)	**<0.001***
	Religion	Apostolic Sect	69.6	Other Christian	88.9	1.28 (0.03)	19.3 (1.9)	**<0.001***
	Wealth	Poorest	61.7	Richest	95.8	1.55 (0.06)	34.1 (2.6)	**<0.001***
	Social Capital	None	69.5	High	91.1	1.31 (0.04)	21.5 (2.3)	**<0,001***
	Health Insurance	No	76.4	Yes	96.9	1.27 (0.03)	20.5 (1.7)	**<0.001***
Delivery At A Health Facility	Age	>35	72.9	20-34	77.7	1.07 (0.03)	4.8 (2.1)	**0.021***
	Residence	Rural	70.0	Urban	92.1	1.31 (0.03)	22.0 (2.0)	**<0.001***
	Region	Mashonaland	68.8	Harare	91.1	1.32 (0.05)	22.3 (2.9)	**<0.001***
	Language	English	75.9	Shona	85.8	1.13 (0.03)	9.9 (2.1)	**<0.001***
	Occupation	Unskilled Labour	71.4	Skilled	82.3	1.15 (0.03)	10.9 (2.1)	**<0.001***
	Education	No Education	51.5	Higher	99.4	1.93 (0.26)	47.9 (7.0)	**<0.001***
	Religion	Apostolic Sect	68.3	Other Christian	88.0	1.29 (0.04)	19.7 (1.9)	**<0.001***
	Wealth	Poorest	60.8	Richest	95.2	1.57 (0.07)	34.4 (2.7)	**<0.001***
	Social Capital	None	68.4	High	90.1	1.32 (0.04)	21.7 (2.3)	**<0,001***
	Health Insurance	No	75.2	Yes	96.8	1.29 (0.03)	21.6 (1.7)	**<0.001***

p values < 0.05 are shown in bold and marked with an asterisk (*)

Figure 3-2 graphically represents the utilisation rates of the highest and lowest PROGRESS-PLUS subgroups for each maternal indicator. It shows that skilled ANC attendant, first ANC before four months and 4 or more ANC visit had the least variation between the lowest and highest PROGRESS-PLUS subgroups whilst skilled ANC attendant and delivery at a health facility had the largest differences.

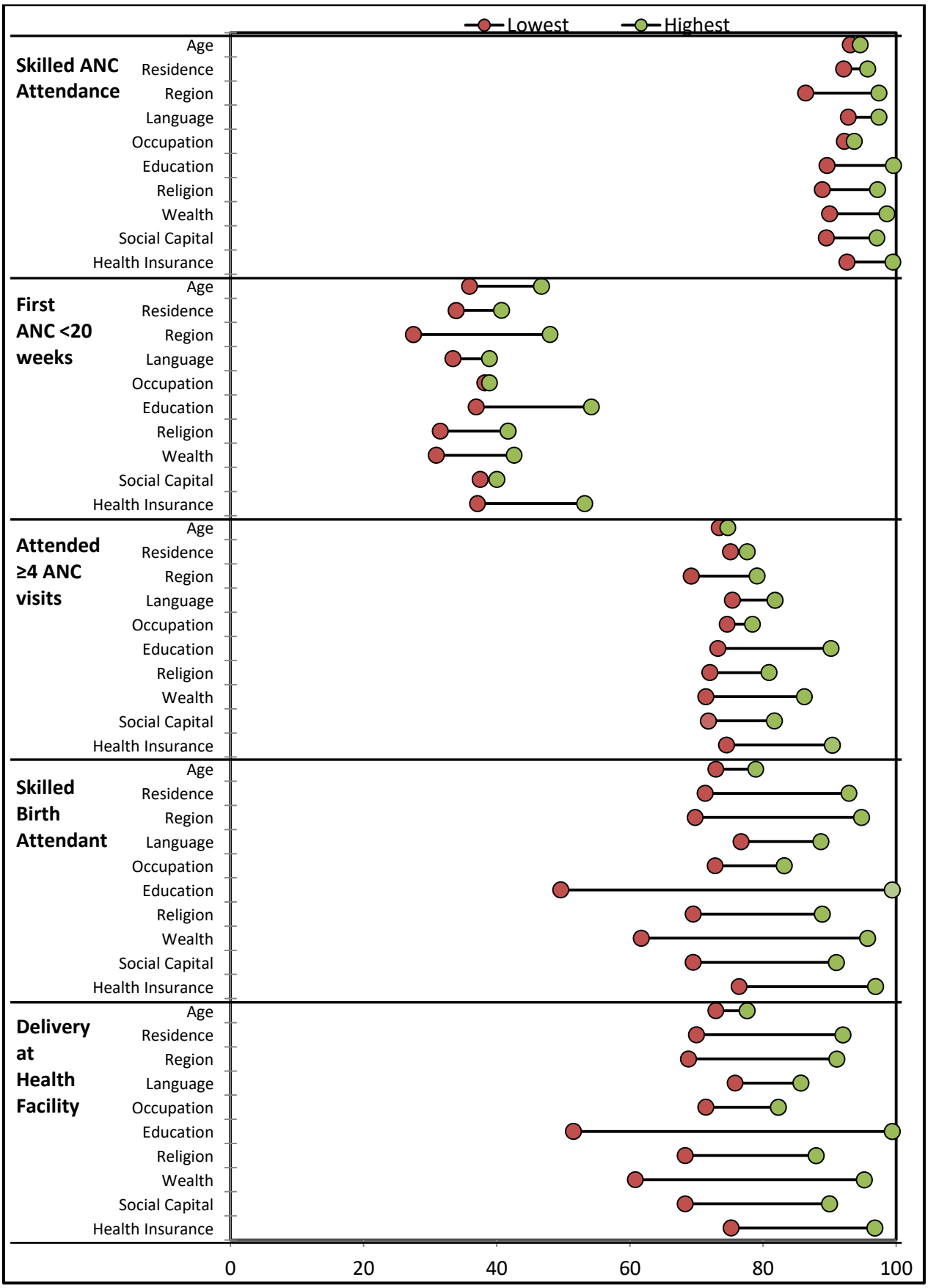

Figure 3-2: Rate differences for maternal care indicators by PROGRESS-PLUS factors

Figure 3-2 also shows that utilisation rates for maternal health services were generally above 60% except for first ANC visit before four weeks gestation. Mother's age at birth and occupation were the PROGRESS-PLUS factors with the least variation across all outcome variables. Generally the most variation was observed for educational status, especially for skilled birth attendant and delivery at a health facility. Large variations are also observed by wealth index, health insurance and region for all outcomes.

3.4. Complex Measures of Inequality

Figure 3-3 presents the concentration curves for each of the maternal health utilisation indicators by wealth index. It shows that the magnitude of inequality of utilisation of antenatal care services is very small as the concentration curves lie very close to the line of inequality, but there is more inequality observed for the maternal delivery variables. The first curve for first ANC visit before four months actually crosses the line of inequality in the intermediate wealth index groups indicating higher utilisation rates in those groups. The concentration curves for skilled ANC attendant and having more than four ANC visits lie below the line of equality indicating that higher utilisation of these services is concentrated amongst the advantaged, although the magnitude of the inequality is very small. The concentration curves for skilled birth attendant and delivery at a health facility show that utilisation is also concentrated amongst the advantaged but the magnitude of inequality is larger.

Table 3-4 outlines the complex measures of inequality of all maternal health outcomes by all ordinal PROGRESS-PLUS factors. The concentration index is a measure showing the extent to which utilisation of a service concentrated amongst the advantaged or disadvantaged in the population on a scale from -1 (completely concentrated in the disadvantaged) to 1 (completely concentrated in the advantaged). The slope index of Inequality is the absolute difference in utilisation rates, whilst the relative index of inequality is the relative difference in utilisation rates, between the most disadvantaged and the most disadvantaged. The RII is thus the SII as a proportion of the average utilisation rate of the population. Numbers that are highlighted in bold indicate indices with significant p-values (<0.05) when tested for deviations from equality.

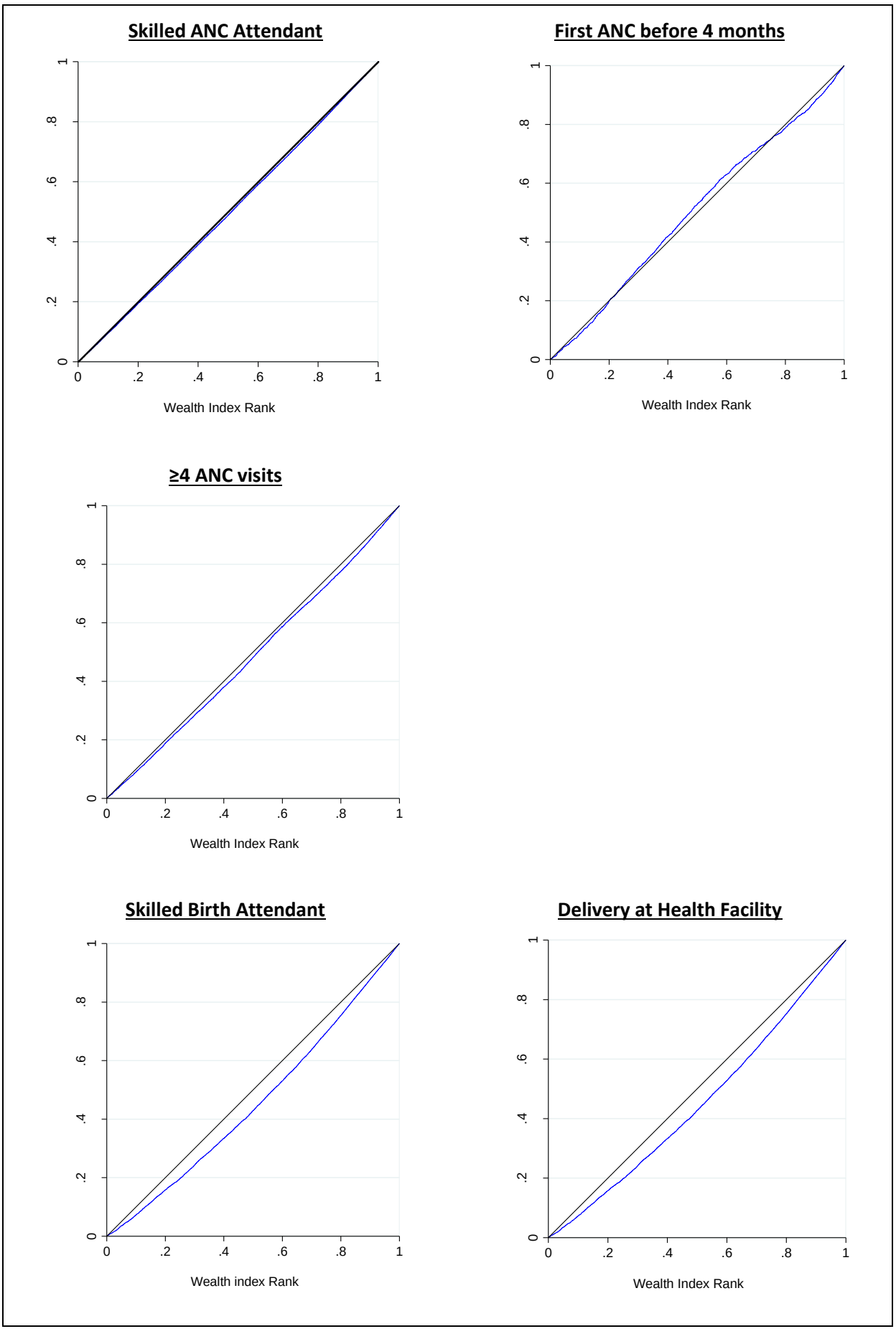

Figure 3-3 Concentration curves for maternal indicators by wealth index

Table 3-4 Complex measures of inequality

	Ranking Variable	Concentration Index (se) Standard Index	Wagstaff Index	Erreygers Index	Slope Index of Inequality	Relative Index of Inequality
Skilled ANC Attendant	Age	-0.002 (0.002)	-0.03 (0.028)	-0.02 (0.007)	-0.02 (0.01)	-0.02 (0.06)
	Residence	**0.008* (0.003)**	**0.13* (0.045)**	**0.03* (0.011)**	**0.06*** (0.01)	0.07 (0.06)
	Occupation	-0.001 (0.002)	-0.02 (0.038)	-0.004 (0.009)	-0.001 (0.01)	-0.002 (0.06)
	Education	**0.01* (0.003)**	**0.02* (0.054)**	**0.05* (0.013)**	**0.09*** (0.01)	0.09 (0.06)
	Wealth	**0.02* (0.004)**	**0.23* (0.059)**	**0.06* (0.014)**	**0.08*** (0.01)	0.08 (0.05)
	Social Capital	**0.02* (0.003)**	**0.23* (0.046)**	**0.06* (0.011)**	**0.08*** (0.01)	0.09 (0.06)
	Health Insurance	**0.006* (0.001)**	0.09 (0.011)	**0.02* (0.002)**	**0.10*** (0.01)	0.10 (0.10)
First ANC before 4 months	Age	**0.03* (0.010)**	**0.05* (0.016)**	**0.05* (0.015)**	**0.11*** (0.03)	**0.28* (0.10)**
	Residence	**-0.04* (0.012)**	**-0.01* (0.018)**	**-0.06* (0.017)**	**-0.06*** (0.03)	-0.17 (0.10)
	Occupation	0.004 (0.013)	0.07 (0.020)	0.01 (0.019)	0.04 (0.03)	0.12 (0.09)
	Education	0.01 (0.012)	0.02 (0.019)	0.02 (0.018)	0.04 (0.03)	0.10 (0.10)
	Wealth	-0.01 (0.014)	-0.02 (0.022)	-0.02 (0.021)	-0.01 (0.02)	-0.04 (0.08)
	Social Capital	0.01 (0.012)	0.02 (0.018)	0.02 (0.017)	0.04 (0.03)	0.11 (0.09)
	Health Insurance	**0.03* (0.008)**	**0.05* (0.012)**	**0.05* (0.011)**	**0.29*** (0.05)	**0.67* (0.13)**
4 or more ANC Visits	Age	0.007 (0.005)	0.03 (0.0180	0.02 (0.013)	**0.05*** (0.03)	0.07 (0.07)
	Residence	0.007 (0.005)	0.03 (0.021)	0.02 (0.015)	**0.10*** (0.02)	0.13 (0.07)
	Occupation	0.01 (0.005)	0.04 (0.021)	0.03 (0.015)	**0.07*** (0.02)	0.09 (0.06)
	Education	**0.02* (0.005)**	**0.07* (0.022)**	**0.05* (0.016)**	**0.11*** (0.03)	**0.13* (0.07)**
	Wealth	**0.03* (0.006)**	**0.12* (0.026)**	**0.09* (0.019)**	**0.13*** (0.02)	**0.16* (0.06)**
	Social Capital	**0.02* (0.005)**	**0.10* (0.021)**	**0.07* (0.015)**	**0.13*** (0.02)	**0.17* (0.06)**
	Health Insurance	**0.02* (0.002)**	**0.07* (0.008)**	**0.05* (0.006)**	**0.28*** (0.03)	**0.34* (0.10)**
Skilled Birth Attendant	Age	-0.002 (0.004)	-0.01 (0.019)	-0.01 (0.013)	-0.03 (0.02)	-0.04 (0.06)
	Residence	**0.06* (0.005)**	**0.27* (0.024)**	**0.20* (0.016)**	**0.42*** (0.02)	**0.50* (0.06)**
	Occupation	**0.01* (0.005)**	**0.06* (0.021)**	**0.04* (0.014)**	**0.07*** (0.02)	0.08 (0.05)
	Education	**0.06* (0.005)**	**0.28* (0.024)**	**0.20* (0.016)**	**0.40*** (0.01)	**0.47* (0.06)**
	Wealth	**0.09* (0.007)**	**0.41* (0.031)**	**0.28* (0.021)**	**0.41*** (0.01)	**0.53* (0.05)**
	Social Capital	**0.05* (0.006)**	**0.23* (0.026)**	**0.16* (0.017)**	**0.28*** (0.02)	**0.33* (0.05)**
	Health Insurance	**0.02* (0.002)**	**0.09* (0.007)**	**0.06* (0.005)**	**0.35*** (0.02)	**0.39* (0.09)**
Delivery at a Health Facility	Age	-0.005 (0.004)	-0.02 (0.019)	-0.02 (0.013)	**-0.04*** (0.02)	-0.06 (0.06)
	Residence	**0.06* (0.005)**	**0.27* (0.023)**	**0.19* (0.016)**	**0.42*** (0.02)	**0.52* (0.06)**
	Occupation	**0.01* (0.005)**	**0.54* (0.021)**	**0.04* (0.015)**	**0.07*** (0.02)	0.08 (0.05)
	Education	**0.07* (0.005)**	**0.29* (0.023)**	**0.20* (0.016)**	**0.40*** (0.02)	**0.50* (0.06)**
	Wealth	**0.09* (0.007)**	**0.40* (0.031)**	**0.28* (0.021)**	**0.41*** (0.02)	**0.54* (0.05)**
	Social Capital	**0.05* (0.006)**	**0.40* (0.025)**	**0.16* (0.017)**	**0.29*** (0.02)	**0.35* (0.05)**
	Health Insurance	**0.02* (0.002)**	**0.22* (0.007)**	**0.07* (0.005)**	**0.37*** (0.02)	**0.42* (0.09)**

p values < 0.05 are shown in bold and marked with an asterisk (*). Standard errors in brackets.

Generally the concentration indices were positive indicating that higher utilisation of maternal health care services was concentrated among the advantaged in the population. Age, however, had negative CI values for skilled ANC attendant, skilled birth attendant and delivery at a health facility indicating that utilisation of services was concentrated more amongst younger women. The largest inequality in utilisation rates is observed by residence, educational attainment, wealth and health insurance.

In comparing the different CIs, the standard index generally shows the smallest inequality measure of the three indices. The Erreygers and Wagstaff correction results in larger values indicating more inequality. Overall, the Wagstaff Index has the highest values of the three indices across all PROGRESS-PLUS and maternal health outcomes

The largest inequalities in the skilled ANC attendant rates are by wealth and social capital. The SII shows that there is an 8% increase in the skilled ANC attendant rate when we move from the poorest to the richest women and from the women with no social capital to the women with the highest

social capital. The table shows that younger women and women who are unemployed have higher skilled ANC attendant rate than old women and those who are employed respectively.

With regards to attending first ANC before four months, women who reside in rural areas are better off than those residing in urban areas (SCI=-0.04, WCI=-0.01, ECI=0.06). The SII and RII shows that there is a 6% absolute and 17% relative increase in attending first ANC before four months gestation when we move from women in urban areas to women in rural areas. Older women and women with health insurance are however better off. The largest inequality in women attending first ANC by four months gestation is by health insurance, there was a 29% absolute and 67% relative increase in rate attending first ANC by four months from women without health insurance to women with health insurance.

With respect to attending more than four antenatal care visits, the CIs were all positive indicating higher utilisation among women with higher level of education, more wealth, higher social capital, and health insurance. The greatest inequality in attending 4 or more ANC visits is by health insurance (SII 0.28, RII 0.34) and the least inequality is by age (SII 0.05 RII, 0.07)

The results show that women residing in urban areas, and those with skilled employment, higher levels of education, richer, higher social capital and with health insurance were better off in having a skilled birth attendant during delivery. The largest inequality of skilled birth attendant was by wealth. There was a 41% absolute and 53% relative increase in skilled birth attendant rate when moving from the poorest to the richest woman. The least inequality was by occupation, with a 7% absolute and 8% relative increase in skilled birth attendant rate from unemployed to skilled labourers.

Younger women were better off than older women with regards to having a delivery at a health facility with a 4% absolute and 6% relative decrease in the delivery at health facility rate among older women. Fairly large inequalities were again observed by wealth index, education level, and health insurance status for this indicator.

3.5. PROGRESS-PLUS Factors Associated with Utilisation of Maternal Health Care Services

The section presents the results of the bivariate logistic regression and the multiple logistic regression models for each indicator.

3.5.1. Skilled Antenatal Care Attendant

Table 3-5 shows that women residing in urban areas were 1.92 times more likely to have a skilled ANC attendant (p=0.004) in the bivariate analysis. However, after adjusting for all other PROGRESS-PLUS factors the odds ratio decreases such that women in urban areas were 14% less likely to have a

skilled ANC attendant than women in rural areas, although this finding is not statistically significant (p=0.686).

Table 3-5 Predictors of skilled ANC attendance

	Bivariate Logistic Regression		Multiple Logistic Regression	
	Odds Ratio	**P-Value**	**Odds Ratio**	**P-Value**
Age (years)				
<20	—		—	
20-34	0.76	0.193	0.76	0.200
>34	0.77	0.280	0.75	0.224
Residence				
Rural	—		—	
Urban	**1.92***	**0.004**	0.86	0.686
Region				
Manicaland	—		—	
Mashonaland	**2.33***	**0.028**	**2.33***	**0.029**
Matebeland	**5.88***	**<0.001**	**2.87***	**0.009**
Midlands	**3.25***	**0.002**	**2.82***	**0.009**
Masvingo	2.02	0.089	1.80	0.143
Harare	**2.49***	**0.017**	1.11	0.791
Bulawayo	**4.21***	**<0.001**	1.07	0.900
Language				
English	—		—	
Shona	**2.77***	**<0.001**	1.96	0.099
Ndebele	1.31	0.481	1.35	0.477
Occupation				
Unemployed	—		—	
Unskilled Labour	0.80	0.213	0.77	0.172
Skilled Labour	0.96	0.801	**0.69***	**0.048**
Education Attainment				
No Education	—		—	
Primary	0.64	0.412	0.47	0.147
Secondary	1.28	0.664	0.67	0.470
Higher	**19.29***	**0.001**	4.51	0.108
Religion				
None	—		—	
Apostolic Sect	**0.48***	**0.019**	**0.49***	**0.017**
Other Christian	**2.69***	**0.010**	1.80	0.127
Other Religions	1.72	0.576	2.10	0.444
Wealth Index				
Poorest	—		—	
Poorer	1.25	0.316	1.13	0.586
Middle	1.53	0.103	1.28	0.344
Richer	1.54	0.088	1.09	0.825
Richest	**7.87***	**<0.001**	**3.53***	**0.018**
Social Capital Score				
0	—		—	
1	**1.66***	**0.002**	**1.45***	**0.036**
2	**3.97***	**<0.001**	**2.17***	**0.009**
Health Insurance				
No	—		—	
Yes	**15.79***	**<0.001**	**3.56***	**0.013**

Coefficients with p values < 0.05 are shown in bold and marked with an asterisk (*)

Women residing in Mashonaland (OR=2.33), Matebeland (OR=5.88), Midlands (OR=3.25), Harare (OR=2.49) and Bulawayo (OR=4.21) were more likely to have a skilled ANC attendant than women in Manicaland. After adjusting for all PROGRESS-PLUS factors the likelihood decreases and the findings were not significant for women residing in Harare and Bulawayo region. Unskilled labourers (OR=0.86) and skilled labourers (OR=0.96) were less likely to have a skilled ANC attendant than unemployed women. After adjusting for all PROGRESS-Plus factors this finding is statistically significant for skilled labourers who were 31% less likely to have a skilled birth attendant than

unemployed women (p=0.048). Women affiliated to the Apostolic Sect were 42% less likely and those belonging to other Christian denominations were 2.69 times more like to have a skilled ANC attendant than women with no religious affiliation. After adjusting for all factors this finding is statistically significant for women in the Apostolic Sect (OR= 0.49).

The likelihood of having a skilled ANC attendant increased with an increase in the wealth index. This is statistically significant for women in the richest quintile who were 7.87 times more likely to have a skilled ANC attendant than women in the poorest wealth quintile. After adjusting for all PROGRESS-PLUS factors women in the richest wealth quintile were 3.53 times more likely to have a skilled ANC attendant than women in the poorest wealth quintile (p=0.018). The odds of having a skilled ANC attendant increases with an increase in social capital, after adjusting for all PROGRESS-PLUS factors. This finding is statistically significant for women with low social capital (OR=1.45) and high social capital (OR=2.17. Women with health insurance were 15.79 times more likely to have a skilled ANC attendant than women without health insurance (p=<0.001). After adjusting, women with health insurance were 3.56 times more likely than women with no health insurance (p=0.013).

3.5.2. First Antenatal Care Visit before Four Months Gestation

Table 3.5 below shows that women aged above 34 years were 1.57 times more likely to have their first ANC visit before four months than women aged below 20 years and after adjusting for all PROGRESS-PLUS factors the odds ratio was 1.47. Women residing in urban areas were 25% less likely to attend their first ANC visit before four month gestation compared to women residing in rural areas. After adjusting for all PROGRESS-PLUS factors this finding (OR= 0.80) is not statistically significant. Women residing in the Harare region were 37% less likely to have their first ANC visit before four months than women residing in Manicaland, whilst women in Masvingo were 1.53 times more likely to have their first ANC visit before four months. After adjusting for confounding women in Harare were 42% less likely to have their first ANC visit before four months than women in Manicaland region. Women that are Ndebele speaking were 2% less likely to have their first ANC visit before four months than women who are English speaking after adjusting for all PROGRESS-PLUS factors. Women in the richer wealth quintile were 27% less likely to have their first ANC visit before four months than women in the poorest wealth quintile. This finding (OR=0.86) is not statistically significant after adjusting for all PROGRESS-PLUS factors. Women with health insurance were 1.92 times more likely to have their first ANC visit before four months than women with no health insurance, this finding is statistically significant (OR=1.78) after adjusting for all PROGRESS-PLUS factors.

Table 3-6 Predictors of first ANC visit before four months

	Bivariate		Multiple Logistic Regression	
	Odds Ratio	**P-Value**	**Odds Ratio**	**P-Value**
Age (years)				
<20	—		—	
20-34	1.07	0.458	1.05	0.613
>34	**1.57***	**0.001**	**1.47***	**0.003**
Residence				
Rural	—		—	
Urban	**0.75***	**0.001**	0.80	0.136
Region				
Manicaland	—		—	
Mashonaland	1.14	0.419	1.04	0.798
Matebeland	1.12	0.474	1.38	0.115
Midlands	1.04	0.802	0.95	0.771
Masvingo	**1.53***	**0.021**	1.36	0.092
Harare	**0.63***	**0.015**	**0.58***	**0.003**
Bulawayo	0.83	0.267	0.96	0.849
Language				
English	—		—	
Shona	0.93	0.406	**0.71***	**0.024**
Ndebele	0.79	0.124	**0.59***	**0.002**
Occupation				
Unemployed	—		—	
Unskilled Labour	1.02	0.861	1.02	0.843
Skilled Labour	1.03	0.741	0.98	0.807
Education Attainment				
No Education	—		—	
Primary	1.00	0.993	1.08	0.787
Secondary	0.91	0.749	1.04	0.884
Higher	1.85	0.065	1.66	0.129
Religion				
None	—		—	
Apostolic Sect	0.88	0.345	0.79	0.078
Other Christian	1.13	0.389	1.06	0.701
Other Religions	0.73	0.406	0.66	0.208
Wealth Index				
Poorest	—		—	
Poorer	1.21	0.078	1.21	0.078
Middle	1.18	0.122	1.14	0.231
Richer	**0.73***	**0.004**	0.86	0.352
Richest	1.15	0.251	1.13	0.549
Social Capital Score				
0	—		—	
1	1.03	0.671	1.04	0.630
2	1.11	0.307	1.20	0.109
Health Insurance				
No	—		—	
Yes	**1.92***	**<0.001**	**1.78***	**0.001**

Coefficients with p values < 0.05 are shown in bold and marked with an asterisk (*)

3.5.3. Four or more than Antenatal Care Visits

There was an increase in the rate of women attending more than four antenatal visits by wealth with women in the middle wealth quintile (OR=1.51) and the richest (OR =2.65) more likely to have more than four ANC visits than women in the poorest wealth quintile (Table 3-7). The likelihood increased (OR=2.68) for women in the richest wealth quintile after adjusting for all PROGESS factors. The odds of having more than four ANC visits increased with an increase in social capital score, with women with the highest score 1.75 times more likely to have more than four ANC visits than those with the lowest social capital. The results showed the women with health insurance were 3.24 times more likely to have more than four ANC visits than those without and after adjusting for all PROGRESS-PLUS factors the likelihood decreased to 1.87 times.

Table 3-7 Predictors of four or more ANC Visits

	Bivariate		Multiple Logistic Regression	
	Odds Ratio	**P-Value**	**Odds Ratio**	**P-Value**
Age (years)				
<20	—		—	
20-34	1.15	0.161	1.11	0.312
>34	1.28	0.108	1.18	0.282
Residence				
Rural	—		—	
Urban	1.15	0.160	0.76	0.146
Region				
Manicaland	—		—	
Mashonaland	1.24	0.318	1.25	0.310
Matebeland	1.28	0.236	1.16	0.540
Midlands	0.76	0.202	0.72	0.119
Masvingo	1.22	0.438	1.18	0.506
Harare	0.93	0.752	**0.63***	**0.035**
Bulawayo	1.25	0.339	0.72	0.226
Language				
English	—		—	
Shona	1.17	0.180	1.12	0.575
Ndebele	**1.47***	**0.038**	1.21	0.425
Occupation				
Unemployed	—		—	
Unskilled Labour	0.89	0.872	0.93	0.516
Skilled Labour	1.22	0.043	1.04	0.708
Education Attainment				
No Education	—		—	
Primary	0.72	0.430	0.69	0.379
Secondary	0.83	0.664	0.68	0.365
Higher	2.44	0.081	0.91	0.854
Religion				
None	—		—	
Apostolic Sect	1.18	0.284	1.16	0.338
Other Christian	**1.86***	**<0.001**	**1.60***	**0.008**
Other Religions	1.15	0.723	1.18	0.681
Wealth Index				
Poorest	—		—	
Poorer	1.06	0.604	1.03	0.788
Middle	**1.51***	**0.003**	**1.46***	**0.008**
Richer	1.05	0.707	1.28	0.179
Richest	**2.50***	**<0.001**	**2.68***	**<0.001**
Social Capital Score				
0	—		—	
1	1.20	0.046	1.05	0.579
2	**1.75***	**<0.001**	1.26	0.080
Health Insurance				
No	—		—	
Yes	**3.24***	**<0.001**	**1.87***	**0.006**

Coefficients with p values < 0.05 are shown in bold and marked with an asterisk (*)

3.5.4. Skilled Birth Attendant

The results in Table 3.7 show that women who reside in urban areas were 5.27 times more likely to have a skilled birth attendant than women in rural areas but after adjusting for all PROGRESS-PLUS factors this finding was not statistically significant.

Table 3-8 Predictors of skilled birth attendance

	Bivariate		Multiple Logistic Regression	
	Odds Ratio	**P-Value**	**Odds Ratio**	**P-Value**
Age (years)				
<20	—		—	
20-34	1.11	0.358	1.01	0.907
>34	0.87	0.352	0.85	0.325
Residence				
Rural	—		—	
Urban	**5.27***	**<0.001**	1.45	0.196
Region				
Manicaland	—		—	
Mashonaland	0.10	0.992	0.97	0.902
Matebeland	**2.66***	**<0.001**	1.49	0.188
Midlands	**1.87***	**0.036**	1.65	0.075
Masvingo	1.74	0.057	**1.87***	**0.025**
Harare	**4.53***	**<0.001**	1.10	0.757
Bulawayo	**7.89***	**<0.001**	1.05	0.904
Language				
English	—		—	
Shona	**2.38***	**<0.001**	**2.02***	**0.011**
Ndebele	1.73	0.056	1.43	0.228
Occupation				
Unemployed	—		—	
Unskilled Labour	**0.78***	**0.024**	**0.79***	**0.039**
Skilled Labour	**1.45***	**<0.001**	0.88	0.274
Education Attainment				
No Education	—		—	
Primary	**1.95***	**0.038**	1.55	0.203
Secondary	**4.99***	**<0.001**	**2.31***	**0.014**
Higher	**159.35***	**<0.001**	**195.02***	**<0.001**
Religion				
None	—		—	
Apostolic Sect	0.83	0.275	0.77	0.101
Other Christian	**2.93***	**<0.001**	**1.47***	**0.027**
Other Religions	1.43	0.352	0.96	0.928
Wealth Index				
Poorest	—		—	
Poorer	**1.46***	**0.001**	**1.46***	**0.001**
Middle	**2.15***	**<0.001**	**2.01***	**<0.001**
Richer	**4.81***	**<0.001**	**2.66***	**<0.001**
Richest	**14.11***	**<0.001**	**4.25***	**<0.001**
Social Capital Score				
0	—		—	
1	**1.48***	**<0.001**	1.16	0.172
2	**4.46***	**<0.001**	**1.44***	**0.024**
Health Insurance				
No	—		—	
Yes	**9.69***	**<0.001**	1.36	0.403

Coefficients with p values < 0.05 are shown in bold and marked with an asterisk (*)

Women in Matebeland (OR=2.66), Midlands (OR=1.74), Masvingo (OR=1.74), Harare (OR=4.53) and Bulawayo (OR=7.89) have greater odds of having a skilled birth attendant than women in Manicaland. After adjusting for all confounding variables only the women in Masvingo were 1,87 times more likely to have a skilled birth attendant than women in Manicaland (p=0.025). Unskilled labourers, however, were 22% less likely to have a skilled birth attendant than women who are unemployed; this is statistically significant after adjusting for all PROGRESS-PLUS factors (OR=0.79)

Skilled birth attendant rates increase with an increase with level of education, wealth index, social capital score and health insurance. Women with higher education were 159.3 times more likely to have a skilled birth attendant than women with no education and the findings were statistically

significant after adjusting for all PROGRESS-PLUS factors. Women in the richest wealth quintile were 14.1 times more likely to have a skilled birth attendant than women in the poorest wealth quintile. The odds of having a skilled birth attendant decreased after adjusting for all PROGRESS-PLUS factors. Women with the highest social capital score were 4.46 times more likely to have a skilled birth attendant than those with the lowest score, and those with health insurance were 9.69 times more likely than those with no health insurance. The likelihood decreased (OR=1.44) and (OR=1.36) for social capital and health insurance respectively after adjusting for confounders.

3.5.5. Delivery at a Health Facility

Table 3-9 Predictors of delivery at a health facility

	Bivariate		Multiple Logistic Regression	
	Odds Ratio	**P-Value**	**Odds Ratio**	**P-Value**
Age (years)				
<20	—		—	
20-34	1.04	0.708	0.93	0.579
>34	0.81	0.144	0.77	0.107
Residence				
Rural	—		—	
Urban	**4.96***	**<0.001**	1.43	0.190
Region				
Manicaland	—		—	
Mashonaland	0.97	0.887	0.93	0.780
Matebeland	**2.17***	**0.002**	1.14	0.627
Midlands	**1.85***	**0.034**	1.61	0.081
Masvingo	1.55	0.121	1.57	0.095
Harare	**4.49***	**<0.001**	1.09	0.780
Bulawayo	**4.06***	**<0.001**	0.51	0.056
Language				
English	—		—	
Shona	**1.92***	**<0.001**	**2.10***	**0.001**
Ndebele	1.53	0.100	1.34	0.274
Occupation				
Unemployed				
Unskilled Labour	**0.77***	**0.016**	**0.77***	**0.018**
Skilled Labour	1.43	0.001	0.87	0.223
Education Attainment				
No Education	—		—	
Primary	1.66	0.077	1.27	0.432
Secondary	**4.40***	**<0.001**	**2.02***	**0.025**
Higher	**158.20***	**<0.001**	**19.65***	**<0.001**
Religion				
None	—		—	
Apostolic Sect	0.84	0.292	0.78	0.098
Other Christian	**2.87***	**<0.001**	**1.47***	**0.018**
Other Religions	1.31	0.457	0.90	0.780
Wealth Index				
Poorest	—		—	
Poorer	**1.39***	**0.004**	**1.37***	**0.008**
Middle	**2.06***	**<0.001**	**1.90***	**<0.001**
Richer	**4.54***	**<0.001**	**2.56***	**<0.001**
Richest	**12.80***	**<0.001**	**4.28***	**<0.001**
Social Capital				
None	—		—	
Low	**1.46***	**0.001**	1.14	0.246
High	**4.20***	**<0.001**	1.36	0.054
Health Insurance				
No	—		—	
Yes	**10.07***	**<0.001**	1.57	0.214

Coefficients with p values < 0.05 are shown in bold and marked with an asterisk (*)

Women residing in urban areas were more likely to have a delivery at a health facility (OR=4.96) but after adjusting for confounding this was not statistically significant. Shona speaking women were 1.92 times more likely to have a delivery at a health facility than English speaking women and the odds increased after adjusting for al PROGRESS-PLUS factors (OR=2.10).

Women belonging to other Christian denominations were more likely to have a delivery at a health facility than women with no religious affiliation. The likelihood decreased (OR= 1.47) after adjusting for all PROGRESS-PLUS factors. Delivery at health facility rates increased with an increase with level of education, wealth index social capital score and health insurance. This was statistically significant after adjusting for confounding factors.

3.6. Intersectionality

3.6.1. Skilled Birth Attendant Rates for the Intersection of Four PROGRESS-PLUS Factors

Table 3-10 shows the skilled birth attendant (SBA) rates for the multi-dimensional social status variable constructed by intersecting the four most influential PROGRESS-PLUS factors. The combinations produced 10 different sub-groups, which are ordered in Table 3-10 from the most disadvantaged to the most advantaged.

It shows that the utilisation rate ranges from 60.4% amongst the most disadvantaged sub-group to 97.4% in the most advantaged women. Not surprisingly the most disadvantaged sub-group were poor women residing in rural areas with a low level of education and no health insurance, while rich women living in urban areas with a high level of education and with health insurance made up the most advantaged sub-group.

The intersectionality analysis is instructive in comparing different sub-groups. For example, having higher education increases the skilled birth attendant rate from 60.4% (sub-group 1) to 71.4% (sub-group 2) among poor, rural women without health insurance. Similarly, an increase in SBA utilisation rates is observed by the addition of health insurance among rich, urban areas with lower education (sub-group 7- 85.8% compared to sub-group 8- 95.6%). Also, poor women in rural areas with high level of education and health insurance have higher utilisation rates (sub-group 3- 73.8%) than rich women in rural areas with low level of education and no health insurance (sub-group 4- 71.3%). Utilisation rates also increase with the attainment of higher education amongst women classified as rich, residing in urban areas, and without health insurance (sub-group 7- 85.8% compared to sub-group 9- 92.5%).

Table 3-10 Skilled birth attendant utilisation rates by multidimensional social status

Sub-Group	Wealth	Residence	Level of Education	Health Insurance	n	SBA (%)
1	Poor	Rural	Low	No	1216	60.4
2	Poor	Rural	High	No	1097	71.4
3	Poor	Rural	High	Yes	5	73.8
4	Rich	Rural	Low	No	404	71.3
5	Rich	Rural	High	No	1003	83.3
6	Rich	Rural	High	Yes	89	96.6
7	Rich	Urban	Low	No	235	85.8
8	Rich	Urban	Low	Yes	12	95.6
9	Rich	Urban	High	No	1598	92.5
10	Rich	Urban	High	Yes	471	97.4

3.6.2. Multiple Correspondence Analysis

Figure 3-4 below shows the plot of the results of the multiple correspondence analyses (MCA) of the four PROGRESS-PLUS factors.

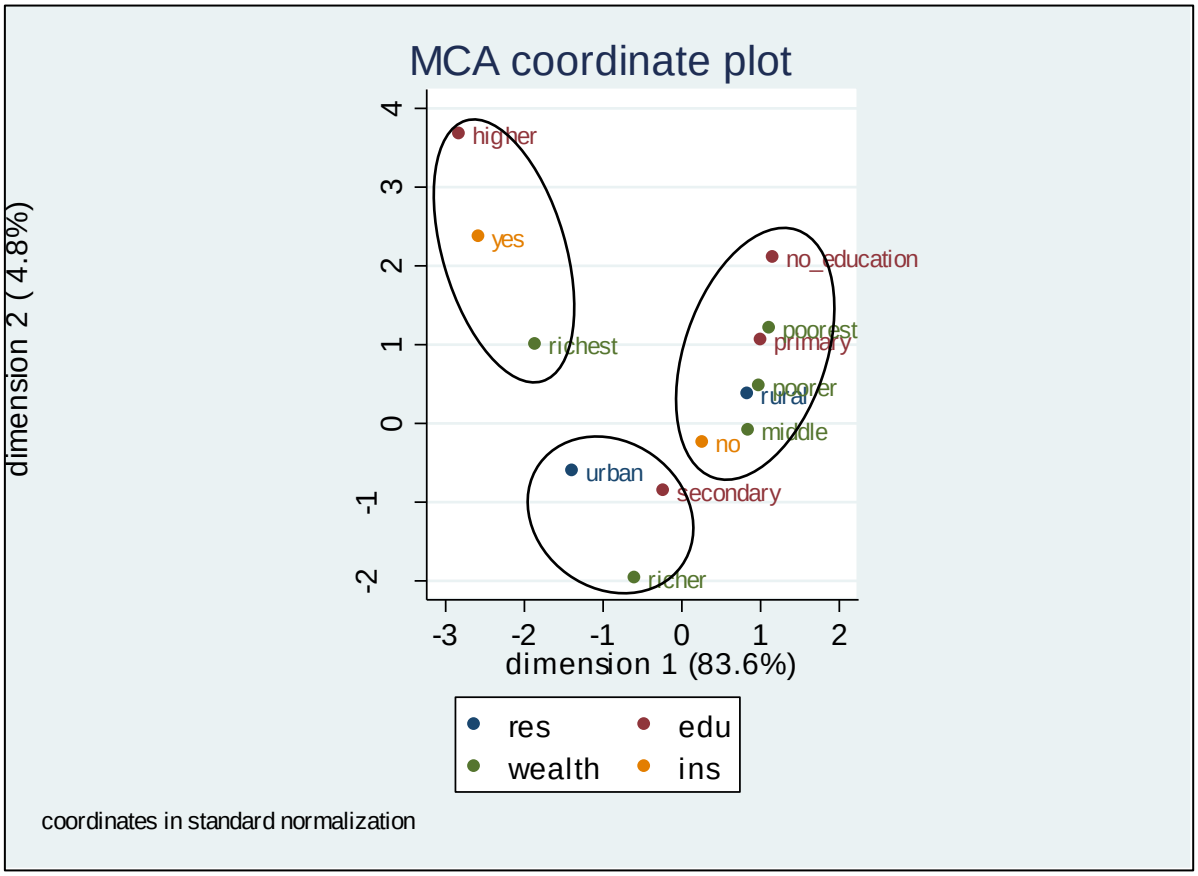

Figure 3-4 Multiple correspondence analysis of place of residence, educational attainment, wealth index and health insurance

The figure above shows three distinct clusters of women, the most disadvantaged cluster around a score of 1 on dimension 1 includes women with no education, from wealth quintiles 1-3, residing in rural areas, and without secondary education. A second cluster is formed around a score of -1 and is made up of women residing in urban areas, with secondary education and in wealth quintile 4. These women are intermediary in terms of their relative disadvantage. The third cluster, formed around the score of -2 is made up of women in wealth quintile 5, with higher education and with health insurance. Women with these characteristics are the most advantaged in the population.

These findings indicate that these socially stratifying factors are closely inter-related. Multiple dimensions of disadvantage such as low level education, low wealth index and rural residence occur together, whilst the multiple axes of advantage such as urban residence, high level of education and richer wealth quintiles also appear together. Therefore, social position is construed by multiple factors which are not separate but work together to social advantage and disadvantage.

CHAPTER 4. DISCUSSION

This chapter will summarise our key findings, highlight the limitations of the study as well as compare the results of this study with other inequality studies conducted in Zimbabwe and similar studies from other low- and middle-income countries.

4.1. Key Findings

This study sought to measure the socioeconomic inequalities that exist in the utilisation of maternal health care services in Zimbabwe using PROGRESS-PLUS as a framework. Skilled ANC attendance rate was very high whilst skilled birth attendant, delivery at a health facility rate and 4 or more antenatal visits rate were intermediary. Very few women had their first visit before four months gestation.

The greatest differences in utilisation rates overall were by level of education, wealth index, health insurance and geographical region, and the least differences were by mother's age and occupation. Generally women with higher levels of education, richer wealth quintiles and women with health insurance utilised maternal health services more than women from less advantaged groups. However, younger women appeared slightly better off than the older women in the use of maternal health care services.

Complex inequality measures showed that the magnitude of inequalities between the most advantaged and most disadvantaged was generally small for all maternal health outcome variables available in the DHS dataset. However, inequality was significantly greater in delivery care than for antenatal care use. Maternal health care services utilisation favoured the expected advantaged group for all PROGRESS-PLUS variables, except for mother's age at birth in which service utilisation is slightly more concentrated among younger than older women.

The geographical region, occupation, religion, wealth index, social capital and health insurance status were significantly associated with the likelihood of having a skilled birth attendant in logistic regression analyses, with educational attainment and wealth index being the strongest predictors. Mother's age at birth, language and health insurance predicted the odds of having the first ANC visit before four months gestation whilst religion, wealth index, social capital score and health Insurance predicted the likelihood of women attending more than four ANC visits. Wealth index and educational attainment were the strongest predictors of delivery with a skilled birth attendant and delivery at a health facility, with women in higher wealth quintiles and with higher levels of education utilising these services more. Overall utilisation of maternal health services was found to

increase with high wealth index, higher levels of educational attainment, and having health insurance.

The intersectionality analysis in this study suggested that the spectrum of advantage and disadvantage was a construct resulting from the complex interaction of a number of social factors, especially wealth, educational attainment, place of residence and health insurance.

4.2. Study Limitations

The study was a secondary data analysis and therefore the researcher had no influence on the variables collected and the quality of the primary data. However, the DHS is a national level study in which various quality control measures are employed to ensure good quality data is collected. To enable complete use of the acronym PROGRESS in the secondary study proxies were used for some of the variables which were not measured in primary. Language of interview was used as a proxy for ethnicity and a composite score of media use was used as a proxy for social capital. Media use is shown in literature to contribute to the diversity of peoples networks which improves individuals social capital(72, 73)

Because the primary study is cross-sectional, the observed associations between PROGRESS-PLUS predictors and maternal health inequalities have not been proven as causal in this study. Stronger experimental designs would be required to investigate these relationships more thoroughly.

The primary study aimed to measure indicators of key maternal health outcomes and health behaviours, amongst other indicators. Therefore, the survey sample size was not sufficiently powered to enable comparisons of very small sub-groups. This would be necessary for more robust analyses of intersectionality, for example(17). We had intended to include such interaction variables in the logistic regressions but the sample size was not sufficient for stable estimation. The stratified two stage cluster sampling method employed in the primary study, however, ensured a nationally representative sample which was large enough to draw conclusions on the intersection of PROGRESS-PLUS factors using more simple methods. Furthermore, we were able to show how this intersection affects the utilisation rates of key maternal health services, such as skilled birth attendance.

Maternal mortality was not analysed as an outcome measure in our study because of the method used to calculate maternal mortality in DHS studies. The sisterhood method, which uses the proportion of adult sisters dying prenatally, during childbirth, or postnatally, reported by adults in the survey was used to calculate maternal mortality by factoring the number of reported deaths by age(74). Although this analysis provides a national estimate of maternal mortality in the absence of

reliable data from death registers, such data cannot be disaggregated by the PROGRESS-Plus factors used for the analysis of inequality in this study.

Nevertheless, key process indicators of maternal health are available in the DHS dataset, and were analysed in this study. They are useful in understanding key issues in the delivery of maternal health services In Zimbabwe. Furthermore, maternal health service utilisation data was self-reported through face to face interviews and is thus directly measured, unlike maternal mortality which was measured indirectly.

4.3. Maternal Health Inequality in Zimbabwe

A similar study was previously conducted in Zimbabwe(54). Makate and Makate (54) sought to examine the wealth-related inequalities in maternal health care utilisation in Zimbabwe between 1994 and 2011, using the Errygers concentration index for antenatal care, skilled birth attendance, and receiving information about the pregnancy. This study, like ours, examined inequality using the Zimbabawe DHS, but focused only on wealth-related inequality, whilst we examined inequality for all PROGRESS-Plus factors. Unlike our study, Makate and Makate (54) examined how inequality changed over time between 1994 and 2010, and decomposed the concentration index to examine how a set of explanatory factors contributed to the measured health inequalities. Their study found a pro-rich distribution of inequality in skilled birth attendance and receiving more than four ANC visits, which was corroborated in our analysis. The study further found a pro-rich distribution of receiving information on gestational complications, an outcome which our study did not measure. The earlier study showed a widening gap in inequality between the rich and poor over time, which was attributed to the economic crisis causing deterioration in essential sectors such as health, manufacturing, and agriculture, and which worsened the predicament of the poor(54).

This upward trend in inequality was also observed in other studies for antenatal care use(44) and skilled birth attendant(75). The decomposition analysis by Makate and Makate (54) showed that wealth, education, place of residence and health insurance contribute the largest share of observed inequalities. Although we did not perform a decomposition analysis, our study also showed that the greatest inequality was observed in these variables, when complex measures of inequality where computed, or when these variables were used as predictors of utilisation in the multiple regression analyses.

4.4. Maternal Health Inequality in other Low- and Middle-Income Countries

The analysis of socioeconomic inequalities in maternal health service utilisation data has been performed using DHS data in a number of other low- and middle-income countries(48, 49, 52, 53,

55). Various maternal health outcome variables were measured such as skilled birth attendant (48, 49, 53), skilled antenatal attendant (52), more than four antenatal visits (48), and facility based delivery (53, 55) - outcomes which were also measured in our study. Other outcome variables measured, which we did not include in our analysis, were use of modern methods of contraception(53, 55), postnatal care(52), and birth by caesarean section(48, 52, 55).

Most studies used the concentration index to measure the magnitude of inequality(48, 49, 52, 53), as well as the slope index of inequality(55), and the relative index of inequality(55). The magnitude of inequalities in use of delivery care was generally larger than for antenatal services, with a pro-wealthy distribution (48, 52), which is similar to our findings. Similarly, in Kenya, Namibia and Ethiopia socioeconomic status measured by wealth index(49, 53) and mothers' educational attainment (49, 52, 53) were the main predictors of use of maternal care service. Poor women were found to face many barriers to using health services such as high cost, poor transportation and inadequate facilities. In Ghana publicly-funded health care interventions were used more by the rich than the poor(55), reinforcing the claim that government health spending benefits the rich more than the poor. Mothers' education was reported to be a major determinant in many studies, and was attributed to education improving the ability of mothers to judge when to seek medical care, and to correctly interpret health messages(55). Education also increased earning opportunities for women which enabled women to access health care services where payment is required(52).

4.5. Determinants of Inequality in Zimbabwe

The health delivery platform in Zimbabwe may influence the inequality of service utilisation between the poor and the rich. Wealthier patients have been shown to use higher levels of care such as provincial and central hospitals more frequently, therefore benefitting more from public health subsidies which are biased towards higher levels of care(76). Historically central and provincial hospital are funded by central government whilst community-based clinics and mission hospitals are donor-funded or financed by the consumers of the services through user fees(56, 76). As a result, central hospitals located in urban areas are better resourced than rural health centres.

Also, due to the economic crisis in Zimbabwe, many skilled health workers left to work in neighbouring countries and overseas, in response to lower wages and worsening working conditions(56). Doctors in provincial hospitals and nurses in rural health centres, areas that service the poor, were the most likely to leave their positions. Although the government, mainly through donor support, implemented various financial incentives to retain skilled workers in rural areas, retention allowances offered were not as competitive as salaries abroad. Furthermore these allowance where unfortunately frequently neither paid in full nor on time(56).

Similar to our results, women's education has emerged as a key factor in the utilisation of maternal health services in Zimbabwe in other studies, particularly for more than four antenatal care visits and for skilled birth attendance(54, 77). Zimbabwe has relatively high levels of literacy and primary school attendance compared to other sub-Saharan countries, but secondary school attendance continues to be low(78). Although the literacy rate of Zimbabwe was 98% in 2014 only 50.4% of children between 15-19 years were attending school(58). Moreover the calculation of literacy is based on completion of grade three(58) which is a very low level of education, and was associated with relatively low utilisation rates in our analyses. Education is not free in Zimbabwe and many families struggle to send their children to school(79). The economic climate of the 2000s also saw the out-migration of teachers and frequent industrial action leading to a drop in school attendance and a deterioration in the quality of education, with schools in marginalised areas most affected(79).

Education plays a key role in the development of a society and according to Grossman(80) education is said to cause changes in health outcomes by three main ways. Firstly, education makes people more adherent to treatment through knowledge of impacts of their health behaviour. Secondly, it makes people more aware of different treatments therefore impacting their preventative behaviour and choice of care. Thirdly, education leads to a higher income which increases one's purchasing power, therefore greater access to better health care services. These theories have been tested in Zimbabwe for the impact of maternal education on child survival, which is closely linked to maternal health(81). This study showed an increase in child survival for every extra year in a mother's education (82). Our study showed an increase in the likelihood of maternal health service utilisation with increasing educational attainment, especially secondary and higher education. This suggests that ensuring women attain secondary and higher education might be an effective way to improve maternal health outcomes.

The Zimbabwean Economic Structural adjustment Programme (ESAP) was introduced in 1991. ESAP saw the introduction of cost sharing and user fees in both health and education(83). This became a barrier to access for both health care and education and affecting the poor the most. Service delivery and access to health was worsened by the economic crisis of the 2000s, characterised by hyperinflation, low foreign currency reserves and high budget deficits, which lead to poor health financing and enormous budget cuts(84). The economic climate in Zimbabwe may explain out multiple correspondence analysis findings in which low wealth index, low education, no health insurance and rural residence characterises the same group of disadvantaged women on a social scale.

Although our study did not find religion as a major determinant of maternal health care utilisation, a previous study conducted in Zimbabwe showed that affiliation to the Apostolic sect is associated

with a reduced likelihood of accessing maternal health services, including attending four ANC visits and having a skilled birth attendant(77). Women in the Apostolic sect were worse off than women from other religions despite the services being available at little to no cost, and when other socioeconomic factors were considered (77). Religious teaching in the Apostolic sect shapes health seeking behaviour by emphasising strong doctrines of faith healing and strict adherence to church belief and practices which decrease the use of modern healthcare services(85). Apostolic sect membership has also been found to be correlated with a poor socioeconomic status(77), although this was not identified in our analyses. However, the apostolic faith does not represent one homogenous group but rather three subgroups with varying emphasis on faith healing and adherence to church beliefs against the use of modern medicine(85), but we did not have data on these distinctions to explore in our study.

CHAPTER 5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

This study sought to measure the socioeconomic inequalities that exist in the utilisation of maternal health care services in Zimbabwe using PROGRESS-PLUS as a framework. Measuring inequalities in maternal health is essential, as accurate and internationally comparable measures of maternal care are required to ensure adequate planning and prioritise the allocation of resources to effective maternal health interventions in targeted communities and population groups which are in most need. The more complex methods used in this study to measure disparities are more suitable because they reflect the experiences of the whole population.

Skilled ANC attendance rate was very high whilst skilled birth attendant, delivery at a health facility rate and 4 or more antenatal visits rate were intermediary. Very few women had their first visit before four months gestation. The magnitude of inequalities between the most advantaged and most disadvantaged was generally small for all maternal health outcomes, however inequality was significantly greater in delivery care than for antenatal care use. Health care during delivery is closely linked to maternal mortality. The greater inequalities in delivery care observed in this study may explain why maternal mortality is still very high in Zimbabwe.

The spectrum of advantage and disadvantage was revealed as a multi-dimensional construct resulting from the complex interaction of a number of social factors, especially wealth, educational attainment, place of residence and health insurance. Maternal health care services utilisation favoured the expected advantaged group for all PROGRESS-PLUS variables, except for mother's age at birth in which service utilisation is slightly more concentrated among younger than older women. Generally women with higher levels of education, richer wealth quintiles and women with health insurance utilised maternal health services more than women from less advantaged groups.

5.2. Recommendations

The study findings suggest a number of recommendations for maternal health delivery, human and economic development, as well as future research.

The lowest utilisation rates observed in this study were for attending antenatal care before four month, therefore in terms of maternal health services and the health system in Zimbabwe, policy and strategies that address the barriers to early antenatal care are required. Early antenatal care is linked to institutional delivery which is associated with better maternal outcomes and removing barriers to early antenatal care could possibly result in further gains in the observed facility delivery and delivery by a skilled attendant rates. A potential strategy could be the removal of user fees for

pregnant women at primary health care facilities, thus enabling poorer women without health insurance to access health care services earlier during pregnancy. This perhaps may be augmented by redirecting some government subsidies from urban located central hospitals, which are located in urban areas only, down to primary facilities which are more accessible to poor and marginalised women, who showed the lowest utilisation rates in this study.

Initiatives are also required to support the personal and economic development of women in Zimbabwe. A woman's level of education is a major factor determining the use of maternal care. Improvement in the education level of women has been shown to be beneficial for both maternal and child health outcomes. The government therefore needs to explore ways to improve the education of women. Due to the complexities around the construct of disadvantage related to economic challenges the country faced over the last two decades, there is need to for a multi sectoral approach beyond just the health sector to develop human capital in the country. The inequalities in maternal health by both income and education highlight the importance of the broader social and economic environment, thus strategies should aim to address these various axes of inequality that affect women in Zimbabwe(86).

This study was an initial descriptive study but also suggests priorities for future research. We were able to draw nationally representative conclusions on the intersection of PROGRESS- PLUS factors using simple methods, however, in future larger samples are required to conduct robust analysis of intersectionality. Data from the national census could possibly be used for such an analysis if key questions on maternal health are incorporated into the survey. Furthermore, although PROGRESS-Plus is a framework to identify the most important factors that drive inequalities in health, the extent to which the acronym characterises disadvantage depends on the country context(13). It may be useful to explore for further study the effect of other factors, such as distance travelled to health facility and mother's health status, to determine country specific factors that drive utilisation inequality in the Zimbabwean context.

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APPENDIX A: HUMAN RESEARCH ETHICS CLEARANCE CERTIFICATE

R14/49 Miss Nyasha Madzudzo

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M151026

NAME: (Principal Investigator)	Miss Nyasha Madzudzo
DEPARTMENT:	School of Public Health University of the Witwatersrand
PROJECT TITLE:	Inequalities in Utilisation of Maternal Health Services in Zimbabwe
DATE CONSIDERED:	30/10/2015
DECISION:	Approved unconditionally
CONDITIONS:	South African Human Research Ethics Committees (HRECs) have no standing outside South Africa. Ethics approval is also required from local HRECs in the Country in which research will be done.
SUPERVISOR:	Duan Blaauw
APPROVED BY:	Professor P Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	20/11/2015

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004, 10th floor, Senate House/2nd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES