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**Patterns and determinants of subsequent birth amongst the
ethnic groups in the black population of South Africa**

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DECLARATION

I, Glender Amantle Mothelesi, hereby declare that the research titled “Patterns and determinants of subsequent birth amongst ethnic groups in the black population of South Africa” is my own work and that I have acknowledged all sources used. No part of this work has been previously submitted for a degree or examination at this or any other university.

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ABSTRACT

Background: Progression to the next child (subsequent birth) forms a vital part of fertility as this determines fertility behavior for women or couples. This also contributes to the country's population size, growth, and structure. Women from different population groups have different fertility behavior which affects demographic variables. In South Africa, the black population has over the years been having the highest fertility levels. In the contemporary world, fertility levels of the black population have remained the highest even though these levels were declining. Therefore, the main objective of this study was to compare and contrast fertility patterns specifically focusing on progression to the next child (subsequent birth) in different main ethnic groups within the black population in South Africa.

Methods: The study focused on women aged 15-54 in the selected ethnic groups namely, Zulus, Xhosas, Sothos, Pedis and Tswanas with the total population 726 855. Fertility was measured using the Parity Progression Ratio (PPR) and the Binary Regression (Odds Ratio). These methods were used to analyze the patterns and to determine progression to the third and more children.

Results: The results of this study identified that among the African ethnic groups, Zulus have more children than Sotho, Pedi, Xhosa, and Batswana. The mean parities of women in these ethnic groups range from 1 to 3. Two models were used in both adjusted and unadjusted versions. In the adjusted model, most variables like the province of residence were statistically significant but on the unadjusted odds ratio some variables changed to not being statistically significant like ethnicity

Conclusion: Zooming on fertility from ethnicity levels rather than population group gives more clarity on the fertility behavior of women within the black population. The decision taken by a couple and women to begin their fertility and progress to the next child is influenced by various factors such as marriage type and religion. Therefore, women progressing to the next child during their childbearing ages determine how many children they would ultimately have at the end of their childbearing ages (15-49). Given the above, the study recommended that the government strengthen the policy to reduce the fertility of these ethnic groups and keep it below the replacement level.

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ABBREVIATIONS

ASFR

Age-Specific Fertility Rate

PPR

Parity Progression Ratio

STATS SA

Statistics South Africa

TFR

Total Fertility Rate

CHAPTER 1: INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

Fertility constitutes part of the demographic processes which in turn influences the size and composition of the population. Sayi (2009:9) contends that establishing the link between the start and pace of fertility change and the corresponding traits in birth interval dynamics gives a clear understanding of the relationship between fertility and birth spacing. The differences in fertility are influenced by many factors such as postponement of birth or birth spacing, which for example shapes the current Sub-Saharan fertility transition. The current fertility differs fundamentally from earlier transitions (Moultrie *et al*, 2013:17).

South Africa has had one remarkable demographic achievement, which is the decline in fertility in the past decades (StatsSA, 2015: 41; Palamuleni *et al*, 2007: 113). Moreover, this decline varies distinctly by population groups. Amongst these population groups, there has been a sluggish decline within the black population from 1970 to 1995 (Zuberi *et al*, 2005: 50). The total fertility rate (TFR) of Blacks was the highest in 1970 by 5.4 as compared to Coloureds (5.1), Indians/Asians (4.1) and Whites by 3.1. In 1974, TFR for Blacks declined to 5.1 whereas other populations groups were below 4.2. By 1995 the TFR for Blacks was 3.6 whereas for Coloureds it was (2.8), Indians/Asians (2.5) and Whites (2). From 1996 to 2011, the trend changed with the Blacks experiencing a decline in TFR, more significantly between 2001 and 2011. In 1996, Blacks had a TFR of 3.49 whereas for Coloureds was 2.64, Indian/Asians (2.45), and Whites was 2.02. In 2011, Blacks had TFR of 2.82 from 3.04 which was established for 2001. For Coloureds, it was 2.41, Indian/Asian 1.98 and White 1.82. (StatsSA, 2015:42). Given the fact that fertility has been higher among the Black population as compared to other racial groups, there is a need to understand the relative contribution of the different ethnic groups to the additional births in the population. Moreover, most demographers do not use the method used in this study being PPR but rather use the common ones as elaborated above. Demographers, academics and researchers need to know and familiarise themselves with this method so that it can be one of the main methods used in the discipline of demography.

1.1.1 Parity Progression Ratio method

1.1.2 What is Parity Progression Ratio

The fertility process can be represented by cohort, but it is not limited to this, it can also be represented by the movement of women from one parity to the next (Preston, 2001: 104). This movement can be represented by Parity Progression Ratio (PPR). A woman's parity is the number of her live births, therefore PPR from parity i to parity $i + 1$ is the proportion of a cohort who had at least i live births who went on to have at least one more. PPR are sensitive indicator of the family building process because it reflects the sequential nature of fertility decisions (Kibet, 2015: 30).

PPR is an interesting, important and robust measure of fertility (Spoorenberg:2015), which gives insight of the pace of the fertility transition from one child to the next. Spoorenberg and Dommaraju (2012:1) outline the three-main importance of PPR. Firstly, PPRs outline the liable nature of fertility behavior, meaning that the decision of subsequent birth is influenced by previous births. Secondly, PPRs can be used to measure family size specifically looking at the total number of children ever born which are common. Lastly, the decomposition of PPR can be used to estimate the relative contribution of the reduction of births at different orders to overall fertility decline.

1.1.3 The evolution of Parity Progression Ratio

Across the world, people make decisions about having children. Some decide on the number of children they want to have whereas others decide not to have children at all and others cannot have children due to physiological and biological reasons. Based on this, Hinde (2014:107) contends that it is desirable to study fertility by analyzing it in terms of the number of children a woman has already had. Therefore, PPR is one of the ways of analysing fertility by looking at the total number of children women or a couple had.

According to Hinde (2014: 110), the logic of calculating PPR was first coined by Loius6 Henry in the 1950s who was a French demographer. During the 1980s, PPR's were independently rediscovered by Feeney, Yu and Ni Bhrolchain. PPR have been very useful in the field of demography; therefore, demographers explored the possibility of estimating this measure on a period basis. This means working out PPRs which apply to particular time periods. Adding to this, McDonald *et al* (2015:1584) suggests that there are several approaches in which one can use PPR. These approaches include parity progression for birth or marriage cohorts, true parity cohorts, and synthetic parity progression.

1.1.4 How has PPR been used.

Many demographers and scholars have explored using PPR in different ways. Yadava *et al* (1992) used PPR in a population from a truncated distribution of open and closed birth intervals. On the other hand, Mutakwa (2012:3) used a method that uses the current distribution of age- order-specific fertility rates to estimate PPR. This method estimates the future PPR which are commonly known as projected PPR. This method was used for estimating projected PPR of four African counties namely, Malawi, Zimbabwe, Cambodia, and Panama using data from two censuses. The results of this study showed a good estimation of the PPR.

Contemporarily, PPR are used for various reason such as tracking fertility decline given the importance of this measure. Yadava and Sharma (2009:50) undertook a study which showed that unless PPR values at parity 2 to 4 are reduced, fertility decline will not be achieved. Another study undertaken by Moraa (2007) showed that about 92% of women in Kenya who had one child progressed to the second while the proportion of progressing to the third child increased to 93%. The results further showed that the proportion of women who progressed to the fourth child decreased.

In South Africa, Stats SA uses PPR over time to have a better understanding of factors influencing fertility (StatsSA, 2012:30). This is done specifically for the preference in the number of children desired in the country. The 2011 census fertility report outlines the pattern and trend of fertility over time in South Africa. The results are shown by 1996 census, 1998 DHS, 2007 community Survey and 2001 census. The report showed that cumulative PPR for parity 0-1 for all data sets except the 2011 census was over 0.9 whereas for 2011 it was below 0.9. PPRs showed a great decline from parity 2-3 in 2011 as the PPRs fell below 0.8 and in parity 6-7 the PPRs were below 0.6. This pattern shows that fertility is declining in South Africa.

StatsSA also calculates incomplete PPR. These are called incomplete PPR because they are for women who are still of childbearing age and who may therefore still have children (StatsSA, 2012:33). The results of this report showed a fluctuating pattern of incomplete PPRs. Age group 45-49 had a PPR of approximately 0.9 for parity 0-1 whereas for the age group 15-19 was between 0.1 and 0.2. Age group 15-19 PPRs were only recoded up to parity 3-4 and this is the indication of incomplete ratios.

1.2 Problem statement

Total fertility rate in South Africa has been declining among the different racial groups, however, different studies have indicated that fertility of the Black population has remained the highest among other racial groups since 1950s (Swartz, 2004). As a result, compared to other racial groups in South Africa, Black population has had a relatively bigger number of a youthful population and the extent to which this differs with other ethnic groups in the context of South Africa is not clear (StatsSA, 2018: 10). Different studies have highlighted the effect of the youthful structure of a population. The youthful structure could result in population momentum which has a positive effect on future population growth; provision of services such as schooling; employment and other effects such as a demographic dividend. Thus, Wasserman (2016) states that “the higher the percentage of young people (especially those under age 15), the more the population will continue to rise as this large cohort of the population enters their reproductive years (15-49)”.

While fertility by different racial groups gives insight on the levels and patterns of fertility behaviour on these racial groups, it does not show the differences in fertility within each ethnic group. Because of the differences in language and other cultural aspects, the fertility behaviour is likely to differ significantly between the different groups within each racial groups, especially within the Black population where the differences are more pronounced. For example, a study by Zuberi *et al.*, (2005: 65) shows that the mean age at first birth among the different ethnic groups in the Black population differs significantly. Another study quantified these differences by indicating that, in 1996, Xhosas had a mean age at first birth of 20.55 which was the highest, followed by Southern Sotho and Tswana (20.53). In 2011, Zulus had the highest mean age at first birth by 23.1 %, followed by Xhosas by 16.4 %. (StatsSA, 2015:52). While the measure for fertility outlined above tends to simply indicate the age of transition to first birth, it is crucial that there is also a concurrent understanding of the percentages of women in different parities who go on to have an additional birth, and how that is influenced by the one's ethnicity. Additional births contribute to the changes in the population size and also the structure of the population.

Besides, the other commonly used measurement of fertility, such as age-specific fertility rates and total fertility rates, are to some extent, not able to detect real changes in fertility in the short term, as they are affected by the timing of births (Sloggett,2015). PPR is one particular method that is able to overcome the above shortcoming in the measurement of fertility due to the fact that it can measure fertility of women even at the end of their childbearing ages (StatsSA,2015:7).

1.3 Rationale of the study

There are many measures of fertility that are commonly used to examine patterns, levels, and trends of fertility such as age-specific fertility rate, which is expected to be consistent with what is known about the fertility behaviors of a country's women (StatsSA, 2015:39). Such behaviors include subsequent birth which means progressing to the next child, given that you already have a previous live birth. This study is influenced by lack of fertility data on ethnic groups and poor usage of PPR as a measure of fertility. Spoorenberg (2015) argues that despite the usefulness of common measures such as Age-Specific Fertility Rate, these constructs are unable to detect real changes in fertility in the short term. The researcher argues that this happens as these measures are affected by the timing of births, also known as Tempo Effects. The usage of PPRs in this study foregrounds the advantage of PPRs as these are insensitive to the Tempo Effects. Furthermore, PPR provides a deeper and more significant understanding of the distribution of cohort fertility which is defined as the proportion of women in a cohort who end up with exactly no children, exactly one and exactly two children at the end of the childbearing years. This study will provide an insight into the differences of fertility transition within the black population, different ethnic groups and by so doing the policy makers will be able to identify the groups which are most at risk of having higher levels of fertility. Therefore, proper action can be taken with consideration to such ethnic groups.

Again, it is an established fact that the black population is significantly more in the South African population. Statistics show that the South African population grew from 44.8 million in 2001 to 51.77 million in 2011 whereby 76.4 % of this population were black (Mikva:2015). The pattern has remained stable and Blacks still constitute the highest in 2018 statistics, showing that the total population of South Africa is 57 725 600 whereby 80.9% are black people. This pattern outlines population growth which is, amongst others, influenced by high fertility. Therefore, among this black population, the study identified which ethnic groups have high levels of fertility by looking at the main ethnic groups. Mikva (2015) states that Zulus are 28% of black population, Xhosas (20%), Pedis (11%), Tswanas (9.7%), Sothos (9.5%), Tsongas (5.5%), Swazis (3.1%), Vendas (2.9%), and Ndebeles (2.6%). Therefore, this study focused on the first five ethnic groups since each accounts for the most significant population numbers more than others.

1.4 Main objective of the study

The main objective was to compare and contrast fertility patterns and progression to the next child (subsequent birth) in different main ethnic groups within the black population in South Africa.

1.4.1 Specific objectives

- To examine the Age-Specific Fertility Rate and Total Fertility Rate of main ethnic groups within the black population in South Africa.
- To examine the mean parities of the main ethnic groups within the black population in South Africa.
- To examine how the PPR differs within selected Black ethnic groups in SA among ever-attaining parities of the main ethnic groups within the black population in South Africa
- To estimate, in general, the proportion of women of particular parity who go on to have an additional birth
- To determine how the different socio-economic factors, affect the transition of progressing to the third child

CHAPTER 2: THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Introduction

This chapter consists of a review of the literature that was undertaken within a specific framework. Firstly, there is an urgent need to understand fertility from a broader perspective than has hitherto been the practice. Therefore, this study outlines the determinants of fertility, meaning what the driving factors for fertility in South Africa are. Lastly, for a woman or couple to progress, there must be significant influential factors. Therefore, the study investigates such factors determining progression to the next child which is subsequent birth based on the previous studies in the literature on parity and fertility patterns.

As fertility behavior of women differs, these factors affect them differently and shape their fertility differently during their childbearing ages. Therefore, women or couple that has begun their fertility with having one child, they are likely to progress to the next child and subsequently have more children. There are many factors again influencing subsequent birth.

2.2. Factors associated with fertility decline

2.2.1 Demographic factors

2.2.1.1 Age

Age as a demographic factor plays a significant role in fertility, this is because there are measures of fertility that are calculated based on age such as age at first birth. This refers to the age of a woman when she had her first birth. Childbearing ages are from 15 to 49. According to StatsSA (2012:21), median age gives a clearer understanding of whether the population is young, old or intermediate. Furthermore, a young population is when it has a median of less than 20 and when it has a median of 30 and above is considered old. The 2011 census shows the median age of black Africans was 24 which increased over the years whereby in 1996 census was 21 and census 2001 was 22.

2.2.1.2 Ethnicity-Language

South Africa is one of the countries with a diverse population in the world classified according to four population groups namely; Black Africans, Whites, Coloureds, and Indians/Asians. These four population groups consist of different ethnic groups namely; Zulu, Xhosa, Tswana, Pedi (also known as Northern Sotho), Tswana, Sotho (also known as Southern Sotho), Tsonga, Swazi, Venda, Southern Ndebele, Coloureds, Afrikaner, English South Africans and Indians (Mikva:2015). Most of these ethnic groups constitute the black African population. On the other hand, StatsSA (2012:52) 2011 figures show

that Zulus begin their childbearing earlier than other ethnic groups and these are followed by the Xhosas. Their median age at first birth ranges from 20-21.

2.2.2 Socioeconomic factors

2.2.2.1 Sex Preference

The family building consists of many factors women or couple consider before or during their childbearing age. Desired family size and gender preferences are part of such factors. According to StatsSA (2015: v), there has been a decline from 1996 to 2001 in PPR and fertility preference of two children in South Africa. Even though this is the case, the preference of two children has been significant in South African fertility and this began in 2007 and was most evident in 2011. This preference has been experienced across women of all population groups, women with the same educational level, and marital status.

Previous studies that were based on parental gender preferences, found that parents with sex preference either divorce or progress to the next child (Saarela and Finnäs, 2014:49). The results of the study conducted by these two authors show that parents prefer boys more than girls and that parity progression is high amongst couples who only have girls than boys. These boy preferences are associated with economic productivity and social organizational system of patrilineal families.

2.2.2.2 Marital Status

StatsSA (2015:69) defines marriage as “the act, ceremony or process by which the legal relationship of husband and wife is constituted”. Therefore, Majumder and Ram (2015:3) see marriage as the legal and cultural institution that seals approval or permits childbearing. Thus, marriage is considered an important determinant of fertility. Again, marriage is important as it increases the risk of conception for those women who are married (Rampagane, 2016:38). In South Africa, marriages are categorized as civil, religious and traditional or customary.

In most cases when demographers look at marriage in the context of fertility they look at age at first marriage. According to Rampagane (2016:2) studies on age at first marriage are important due to the close link between marriage and the beginning of childbearing and fertility. Thus, Kumchulesi (2011) states that “marriage signifies the beginning of the reproductive cycle of women, and various studies point to the high correlation between age at first marriage and age at first birth”. In South Africa it has been established that age at marriage is increasing, the marriage rate is decreasing, and the prevalence of cohabitants and marriage dissolution is increasing (Rampagane, 2016:2).

Based on the above, Amoateng (2004) argues that the decline of fertility in South Africa is explained from patterns and changes occurring in the marital unions. One can, therefore, associate fertility declines with decreasing marriage patterns. Another factor that has contributed to the fertility decline in South Africa is non-marital fertility.

Fertility is directly related to marriage in most population groups and this comes from the cultural perspectives that suggest marriage initiates child-bearing. The perception is that married women, normally have more children than unmarried women. Traditionally and culturally births to unmarried women were not accepted in most societies and this led to women beginning their childbearing after marriage and continued throughout their reproductive lifetime as long as they were married. Women who get married earlier turn to have on average a longer period of being exposed to the risk of falling pregnant and having a greater number of lifetime births. This implies that married women have children more often regardless of their age at first birth. Pressat (1993) contends that knowledge of PPR allows the description of the marital fertility of a group of women.

StatSA (2012:38) outlined the PPR by marital status in the 2011 census for women aged 45-49. These were women who reached the end of their childbearing ages. The results showed that childlessness is higher among women aged 45-49 who have never been married as compared to those women who are married. This supports the statement made above that, marriage influence fertility. The PPRs were higher amongst those women with 0-2 children and started to decline from parity 2-3.

2.2.2.3 Religion

Religion is also one of the social factors that are part of human socialization and to some extent affect fertility patterns. Religion plays a vital role in demography, including fertility, as it forms part of the various social institutions, cultural norms, economic and environmental conditions which comprise the indirect determinants of fertility. Rampagane (2016:84) states that religion has been “an important factor in influencing the prevention of non-marital childbearing.” In South Africa, the pervasive religion is Christianity whose outlook is that childbearing can only commence as an aftermath of marriage. The other ones include traditionalism and Islam.

2.2.2.4 Education

Education is one of the human rights which every human being must attain. It is also considered one of the best tools for human empowerment and development thus it is emphasized and prioritized in the Millennium Development Goals and Sustainable Development Goals (StatsSA, 2012:30). In 2011, 35% of the black population had some secondary school as their highest level of education attained. On the other hand, 10.5% had no schooling, 13.9% had some primary schooling, 4.9% completed primary school, 26.9% had Grade 12.

A number of studies have investigated the relationship between fertility and education. But still, the relation between education and PPR remains limited (Wood *et al*, 2014:1395). Results of a study done by Wood *et al* shows that women who are highly educated are less likely to enter motherhood as compared to those who have low and basic education. Despite this, the results further show that progression to the third child has declined among low and middle educated women whereas highly educated women have shown more contentious variations.

2.2.2.5 Place of residence

In South Africa, there are three main types of a residential dwelling, (referred to as the geographical residence) namely, urban, farm and traditional areas. These types of residence play a significant role in the daily lives of South Africans. In terms of fertility (specifically PPR), the 2011 census statistics show that the proportion of women living in urban areas progressing to the third child is far lower than of those women in non-urban areas (StatsSA, 2012:36). Even though this is the case, there was a gradual decline within the women who are living in farms and traditional areas who are opting for higher birth orders. Furthermore, the median age of first birth is higher (65.9%) for those women residing in urban areas as compared to those living in non-urban areas (35.2%).

2.2.2.6 Province of residence

South Africa is made up of nine provinces which are composed of different populations as well as ethnic groups. According to Mikva (2015), the majority of Zulu people live in KwaZulu Natal, whereas some of them live in Mpumalanga and Gauteng. Xhosas mostly live in Eastern Cape province, Pedis in Limpopo, Tswanas in the North West and Northern Cape and Sothos in the Free State. The 2011 census report suggests that women from Limpopo tend to have a higher number of children ever born in their lifespan as compared to women from the other eight provinces (StatsSA, 2012:58). The 2011 census shows that in South Africa there are provincial differences on fertility. For example, Limpopo has the lowest proportion of childless women (8%). Even though this is the case, the province has higher PPRs across parity 1 through 5. On the other hand, the proportion of women progressing from parity 5 to 6 is higher in Mpumalanga (60%), Kwa Zulu Natal (62%) and Eastern Cape (63%).

One can, therefore, conclude that fertility is influenced by all the above-mentioned determinants. These are normally the common and broad mechanisms that define fertility patterns. Fertility is one of the main components in demography that contributes to an understanding of probabilities in population growth, aging and the structure of the population in various ways. This study unpacked fertility by looking at PPR within the major ethnic groups of the black population in South Africa. Therefore, to narrow the study, the factors that determine or influence women or a couple to progress to the next child are examined in significant detail.

2.3 The evolution of fertility decline in South Africa

South Africa displays demographic management that characterizes both developed and developing countries and this management is directly linked with socio-economic indicators along racial lines. This is because standards of living are patently associated with race in South Africa. Furthermore, South Africa's fertility transition experience is one of the most advanced in Sub-Saharan Africa (Swartz, 2004:539). The fertility decline in South Africa is explicated as a demographic achievement because South Africa has one of the lowest fertility levels on the continent (Palamuleni *et al*, 2007:113). This fertility decline varies by population groups. Among all the population groups in South Africa, a decline in fertility has been observed from as early as the 1960s. Prior to that, fertility for South Africa as a whole was high and stable between 1950 and 1970 with an estimated average of 6 to 7 children per women.

These variations were influenced by the apartheid era. Palamuleni *et al* (2007:113) contend that the observed fertility decline has not been the same in the South African nation, which before 1994 was dominated by a smaller political administration that was committed to racialization, classification, and ethnification of society. Therefore, these differences in fertility are a reflection of socio-economic and general imbalances of the past in terms of standard of living and were influenced by apartheid policies. Palamuleni *et al* (2007) further contend that the correlation between levels, trends, and differentials in South African fertility and apartheid ideology and policies is complex and therefore cannot be easily concluded. Although this is the case, one clear thing is that demographic concerns were central to many apartheid policies.

Camlin *et al* (2004) argue that during the apartheid era, official population policies were intended to reduce African fertility and this was influenced by White South Africa's fear of being swamped by the black population. Other policies ensured that African people were systematically denied access to education, health care, and urban residence. These factors were important in determining the pace of fertility decline in a variety of settings for both developed and developing countries.

Adding to these characteristics, delays in childbearing contributed to the decline in fertility as African women in white areas first gave birth later in life and had longer intervals between births. Again, it is essential to understand that the proportion of women who want to have another child soon decreases sharply with the number of living children (StatsSA, 2017: 13). Swartz (2004:540) submits that the results of the provision of family planning were impressive as by 1983 over half the eligible women in South Africa were practicing contraception.

In South Africa, the choice of contraception method follows racial stratification whereby whites, who make the least use of public family planning services, choose from a wider range of contraceptive methods. On the other hand, Africans and Coloureds, who comprise the bulk of contraceptive client of

organized public family planning services, tend to predominantly use injection. This goes back to the issue of information sharing and widening of reproductive choices as well as the issue of women's control over their own bodies and sexuality. The use of contraceptives thus has an influence on the country's levels of fertility.

2.3.1 Trends of fertility levels within South African population groups

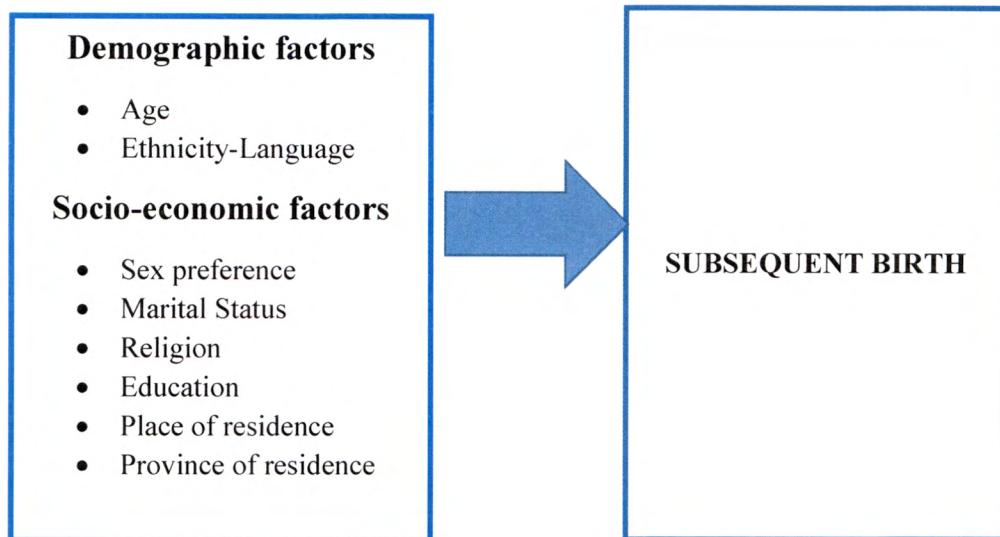
The great decline in South African fertility is explained by the trends of Total Fertility Rates (TFR). As outlined earlier, between 1950 and 1970 South Africa had high and stable fertility. From the end of the 19th century, Whites experienced a long-sustained fertility decline until achieving below-replacement fertility by 1989 with a TFR of 1.9. In tandem, Asian fertility also declined gradually from a TFR of about 6 in the 1950s to 2.7 in the late 1980s. As for Coloureds, fertility declined amazingly from 6.5 in the late 1960s to approximately 3 by the late 1980s. Lastly, African fertility was estimated to have decreased from a high TFR of 6.8 to a low TFR of about 3.9 between the mid-1950s and the early 1990s. Although African fertility continues to decline it is still substantially higher than other population groups (Swartz, 2004: 540). The TFR of South Africa Blacks stood at 2.9 during the 1990s (SADHS: 1999).

StatsSA (2015:41) explains the fertility trends from 1985 to 2011 as documented by various authors. The trend shows that South Africa TFR was between 4.5 and 2.5 from 1985 to 2011. Moreover, South African TFR declined from 2.84 children per woman in 2001 to almost 2.67 children per woman in 2011. Even though this is the case, the level of decline in TFR from 1996 to 2001 is striking.

The census indicates a decline from 3.23 in 1996 to 2.67 in 2011. Looking at the 2011 census, the variations in fertility amongst population groups are as follows: black African women have a TFR of 2.82, Coloured women is 2.57 and has remained the highest (it increased from 2.41 in 2001 to 2.57 in 2011), and Whites and Indian/Asians women have a below replacement with a rate of 1.70 and 1.85 respectively. The accelerated decline in TFR from 2001 to 2011 seems the highest amongst black African women (StatsSA, 2015:41).

These variations also overlap to total fertility rates by provinces and therefore support variations of population groups. TFRs for 2011 suggest that fertility is high in Limpopo (3.25), Mpumalanga (2.90), Eastern Cape (2.87) and Kwa Zulu Natal (2.73) and the lowest has been recorded in Western Cape (2.28) and Gauteng (2.27). Northern Cape showed an increase in TFR from 2.43 in 2010 to 2.75 in 2011 and this may be influenced by an increase in the TFR of Coloured women. North West also showed a slight increase from 2.77 in 2001 to 2.83 in 2011. One can, therefore, argue that the provincial TFR is also influenced by the population group living there, particularly women.

2.4 Theoretical Framework



There are many factors that influence a couple and women to begin their fertility and among those are the well-known direct and indirect determinants of fertility such as contraceptive use. The Bongaarts came up with a well-known and commonly used theory that underpins the determinants of fertility. According to Bongaarts and Potter (1983), when one makes a detailed and comprehensive analysis of factors influencing fertility, they must make a distinction between two classes of determinants being: 1. Proximate variables and 2. Socioeconomic and environmental “background” variables. Fertility revolves, is influenced and dependent on these factors. Proximate determinants consist of all biological and behavioural factors and socioeconomic consist of social, cultural, economic, institutional, psychological, health and environmental factors. The main relationship between these factors is that socioeconomic factors operate through proximate factors to affect fertility (Bongaarts *et al*, 1984:515). From the theory of Bongaarts, socioeconomic factors namely; age and language (referred to as demographic factors in this study), sex preference, marital status, religion, education, place of residence and province of residence came out in this study as factors associated with fertility decline and factors influencing progression to the next child (subsequent birth).

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter details the methodology used for this study, including the sources of secondary data used, a sample of the study, methods of analysis, software used and the variables that were deemed critical use for this study. The study examined two factors which are patterns and determinants of fertility amongst different ethnic groups within the black population in South Africa. Therefore, the PPR were used to analyze the patterns and the odds ratio were used for determining progression to the third and more children.

3.2 Data sources

This study used the data from the 2016 Community Survey in South Africa. This data was collected by Statistics South Africa and it was national representative and was the most recent data that contained the most relevant variables for the study especially fertility levels among the different ethnic groups in the black population. According to StatsSA (2016:8), the 2016 Community Survey was the second such survey conducted by Statistics South Africa and it bridges the data gap between census 2011 and the upcoming census 2021.

3.3 Sampling Method

The sample design for 2016 Community Survey was stratified single stage sample design. The geo-reference dwelling frame was used as a sampling frame for Community Survey 2016 and only the points classified as Dwelling Units (DU) were considered for sampling as these included households that are part of the target population. The number of DUs at a point is used for the selection of DUs within an EA and the geo-reference point is used to locate the sampled DUs within an EA. Community Survey 2016 was based on a single-stage sample design whereby all eligible Census 2011 EAs were included in the initial frame and a selection of DUs within the eligible EAs was taken based on the sample design. Furthermore, the Community Survey 2016 DU sample was drawn using the systematic sampling technique (SYS) to identify the household from which individuals were numerated.

3.4 Study population

The total population enumerated in the survey was 1 763 060 for all ages. For the purpose of the study a total of 726 855 women in age group 15-54 was selected from the, Zulus, Xhosas, Sothos, Pedis and Tswanas, ethnic groups.

3.5 Methods of Analysis

The study employed different measures of fertility which are chronicled as steps of calculating PPR:

- Mean parities- $\frac{\text{Children ever born}}{\text{Number of women}}$
- Age-Specific Fertility Rate- $\frac{B_x}{Pf_x} * 1000$
- Total Fertility rate = Sum of ASFR * 5
- The proportion of women ever-attaining parities- $5^w x(i) = \sum_{j=i}^{\pi} 5N_x(j)$
- Parity Progression Ratio (PPR)- $5^a x(i) = \frac{5M_x(i+1)}{5M_x(i)}$
- The odds ratios
- Observed PPR

Moultrie *et al* (2013) argue that the examination of fertility data by parity using PPR and their equivalents gives additional information on childbearing patterns and can be used to assess changes in the parity distribution of fertility. Hinde (2014:107) argues that it seems desirable to analyze fertility in a way which takes account of the number of children a woman has already had. Therefore, PPR fills the gap in probability trends and estimating the population patterns.

Data required for calculating PPR are Parity by age group of women aged 45-49 or more and the number of children born during the year preceding the census classified by mother's age and children ever born.

To obtain the observed PPR, there are several steps and formulas that were followed which are as follows:

The application of this method starts with the extraction of data for children ever born by parity, i , and age group. From this, mean parities were calculated using the following formula

$$\text{Mean parity} = \frac{\text{Children ever born}}{\text{Number of women}}$$

Thereafter, the number of births by parity in the 12 months prior to the census date is also extracted. These tabulations are then used to calculate the proportions of women who have ever attained each specific parity, i . To achieve this, the number of women in each five-year age group who have given birth to i or more children is initially calculated. Then ASFR and TFR were calculated

$$\text{ASFR} = \frac{B_x}{P_f x} * 1000$$

$$\text{Pf x}$$

$$\text{TFR} = \text{Sum of ASFR} * 5$$

The proportion of women who have attained parity i or more, $5M_x$, is then given by dividing the total number of women with i 5x children or greater by the total number of women in that age group.

From this, we can now derive the proportions of women who have progressed from parity i to $i+1$, which are the PPR.

These are obtained by dividing the proportion of women with $i+1$ children by that with i children (Moultrie *et al*, 2013:70)

3.5.1 Correction to parity (Children ever born) data

According to the United Nations (1983:230) during the collection and processing of data on children ever born, there were errors such as misclassification of women with zero parities as women whose parities are not stated. This error is normally made by the interviewer during the time of the survey. The 2016 Community Survey data on children ever born have the following responses: 1-14 children, never had children born alive which is women with zero parities, not applicable, women, who did not specify on ever given birth, and women who did not know if they had children born alive. According to United Nations (1983:230), there might be a mistake of having a greater proportion of childless women under the category of parity not stated, therefore excluding these women in the denominator when calculating mean parities would result in overestimated parities. On the other hand, excluding women who did not state their parity would make the denominator too large and result in an underestimation of true average parities. To correct these errors, the El-Badry correction method was used. This method outlines the

procedure to estimate the proportion of women belonging to the category "parity not stated" who should logically have been classified as childless.

3.5.2 Binary Regression (The odds ratios)

Binary regression method was employed in this study to model the probability of a women progressing to the third child given that's has already had 2 children. The motivation of selecting the third birth was based on fertility replacement level which is 2.1. The dummy variable was coded 1 if a women progressed from second to the third child and 0 if she did not.

In this case, the independent variables used in the model were ethnicity, education, marital status, religion, provinces and place of residence. The analysis was carried out in two different methods namely Method 1: Unadjusted odds ratios and Method 2: Adjusted odds ratios with the aim of outlining the probability differences in the selected variables.

3.6 Variables

3.6.1 Dependent variable

Children Ever Born- This will be used as it outlines the incremental number of children that a woman of particular parity goes on to have.

3.6.2 Independent Variables

5-year age groups- This is the age of the respondents grouped by 5-year age group. The study uses age groups from 15 to 45 as they are childbearing ages and 50 to 85 plus for completed fertility in order to measure parity progression from x-n parity.

Language most spoken in the household- This variable is used as a proxy for ethnicity. The respondents were asked to state the language they mostly speak within their household. For this study, the main spoken languages within the black African population namely; IsiZulu, IsiXhosa, Sepedi, Sesotho, and Setswana will be used. These are referred to as the main ethnic groups as outlined in the rational of the study. These groups comprise the greater population in the black population.

Births in the last 12 months- Respondents were asked whether they have had any birth in the last 12 months and the expected answers were yes and no.

3.7 Limitations of the study

3.7.1 Language Variable

In the 2011 census nor 2016 Community Survey, there is no specific question asked respondents on ethnicity. Therefore, for this study language was used as a proxy for ethnicity as supported by StatsSA (2015:53). The report states that “language is a proxy indicator of the different ethnic groups that reside in South Africa”. Furthermore, one must take note of the limitation present in this variable. The first language spoken in the household may not necessarily reflect their culture or ethnicity. The question was asked as the most spoken language in the household, therefore this also covers the marriage context.

CHAPTER 4: ANALYSIS AND PRESENTATION OF RESULTS

4.1 Introduction

The chapter presents the results showing fertility differentials among the Zulu, Xhosa, Pedi, Sotho, and Tswana ethnic groups in South Africa. Firstly, the El-Badry method was used to correct data on children ever born. Secondly, study calculated the total mean parities for the total population followed by mean parities for different ethnic groups. Thirdly, age-specific fertility rates for different ethnic group were calculated from which total fertility rate. The study went further to calculate the proportion of women i number of parity and went on to have parity $i+1$ and calculate.

4.2 El-Baldry correction for data on children ever born

The El-Baldry method was proposed in 1961 to rectify the errors that may appear on the data of children ever born as discussed in chapter three. The method was based on the high observed correlation that exists between the proportion childless and proportion of parity not stated. The method may be calculated using the following formulas:

Data requirement

- a) The number of Zulu, Xhosa, Pedi, Sotho and Tswana women in the zero-parity category meaning those who are childless classifies by five-year age group.
- b) The number of Zulu, Xhosa, Pedi, Sotho and Tswana women in the category parity no stated classified by five-year age group.
- c) The total number of Zulu, Xhosa, Pedi, Sotho and Tswana women classified five-year age group.

Step 1: *Calculation of proportion with parity not stated*

$$NS(i) = FNS(i) / FP(i)$$

Step 2: *Calculation of proportion childless*

$$Z(i) = FZ(i) / FP(i)$$

Table 1 shows the total number of women, women who were childless and those who did not state their parity of the selected ethnic groups. The results show that within all the ethnic groups that were selected 88% of women aged 15-19 were childless, followed by age group 20-24. The proportions of childless women decrease as age increases. Again, across all ages, the proportion of women who did not state their parity was below 400. However, the proportions of women who did not state their parity were all below 2%. According to Moultrie *et al* (2013:36), if the proportion of parity not stated is less than 2%,

the correction of data on children ever born will not be necessary needed but if it was more the data needs to be corrected with further steps of the correction method.

Table 1: Total Proportions of childless and parity not stated

Age group	Total FP(i)	Childless FZ (i)	Parity not stated FNS (i)	Childless Z (i)	Parity not stated NS(i)
15-19	115240	100934	174	0.140	0,002
20-24	114921	59365	230	0.932	0,004
25-29	111395	34617	323	0,453	0,004
30-34	98900	22194	280	0,290	0,004
35-39	82018	15850	249	0,240	0,004
40-44	74098	12425	226	0,202	0,004
45-49	66700	10798	301	0,194	0,005

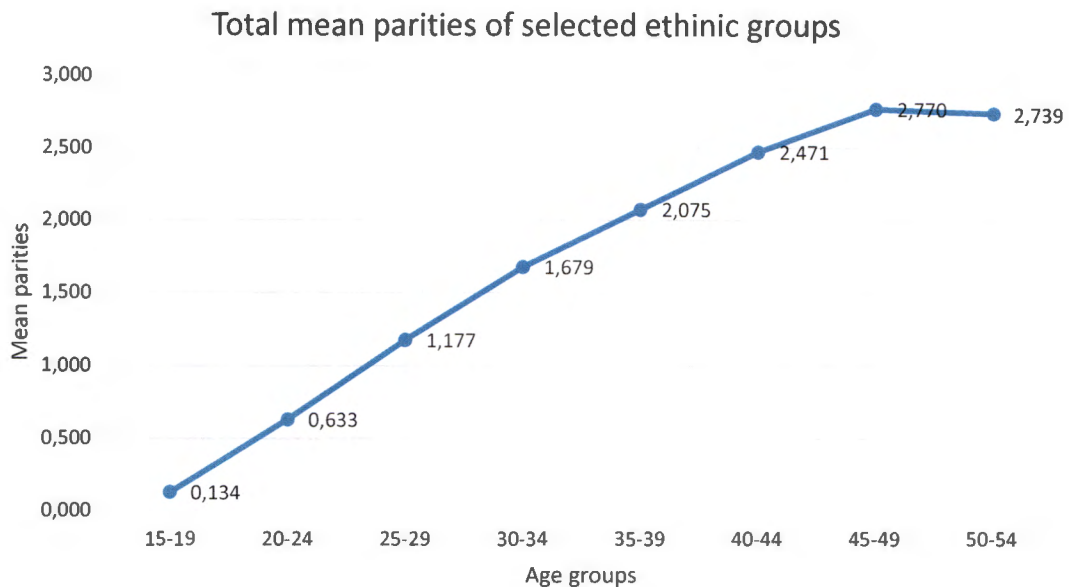
4.3 Parity Progression Ratio

As stated in chapter three, calculating PPR consists of several steps. From these steps, there are other measures of fertility namely mean parities and age-specific fertility rates. Therefore, before reaching the final and main method of analysis of the study which is the PPR mean parities, ages specific and women ever-attaining parity will be calculated.

4.3.1 Mean parity for all women

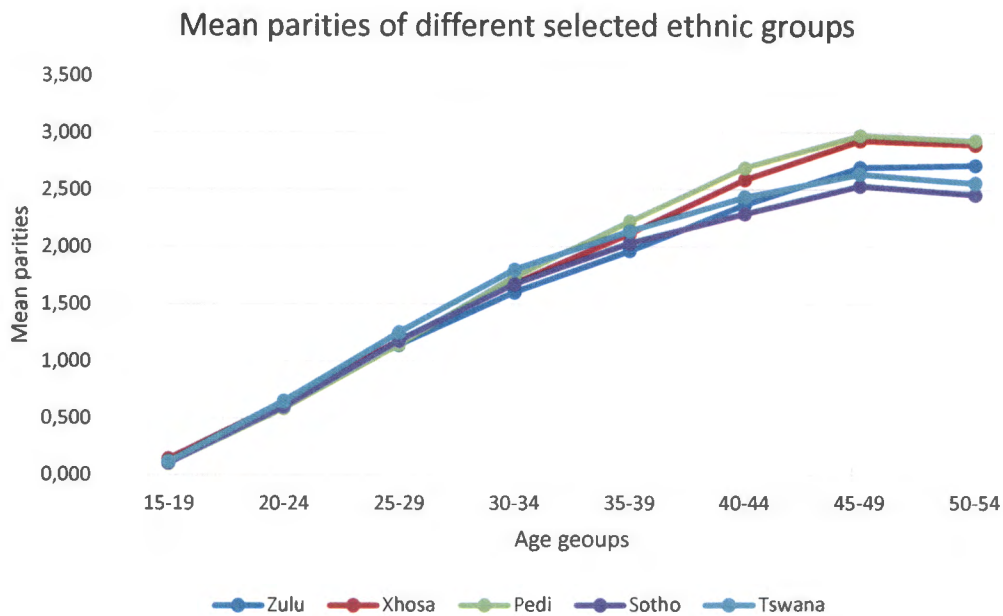
Figure 1 below presents the mean parities for all ethnic groups combined. The results show that the average parity increased with the age group. Consequently, the mean parities increased gradually and reached a peak at age group 45-49 at a parity of 2.78. However, the average number of children declines slightly thereafter to 2,73 in the age group 50-54. This simply means women who reached the end of childbearing ages have lower parities than those who are at the exact end of childbearing age (49). The lower reported fertility among the older age cohort is not consistent with fertility patterns in South Africa where fertility has been decreasing in the recent period. This can simply mean that women in this age group have not reported some of the children they had in the past.

Figure 1: Total mean parities of selected ethnic groups



The results in Figure 2 are slightly different from figure 1 as these ones show the mean parity of different age cohorts disaggregated by ethnic groups. The pattern of reported mean parity shows that the mean parity is gradually increasing with age in all ethnic groups until it reaches age group 45-49. But there are differences in this case. For age groups 15-19, 20-24, and 25-29 women of all selected ethnic groups had a similar mean parity. Fertility started to differ from the age group 30-34 up to 50-54. For example, Tswana women had higher mean parity at age group 30-34 compared to other ethnic groups and however it started to decline to the point where it is the second lowest at the end of age group 50-54. The results further showed that, from age 35 the highest mean parity is observed among Pedi women followed by Xhosas. On the other hand, the Sotho women had the lowest mean parity. As noted in figure 1, the same pattern is observed where women in age group 50-54 had lower reported fertility than younger age cohorts. This implies that misreporting of children by older age cohort was common in all the ethnic groups

Figure 2: Mean parities by different ethnic groups



4.3.2 Age-Specific Fertility Rate of all ethnic groups

The figure shows that the Age Specific Fertility Rate (ASFR) of all women selected in the study had a concave pattern whereby women in the age group 15-19 had the least number of live births and peaks at the age group 20-24 and decreases thereafter. This is normally expected as younger women do not have more children but mostly start their childbearing at age 20 and above. Women aged 50 and above are normally expected to have completed their fertility, thus the least rates of live births.

Figure 3: ASFR of selected ethnic groups

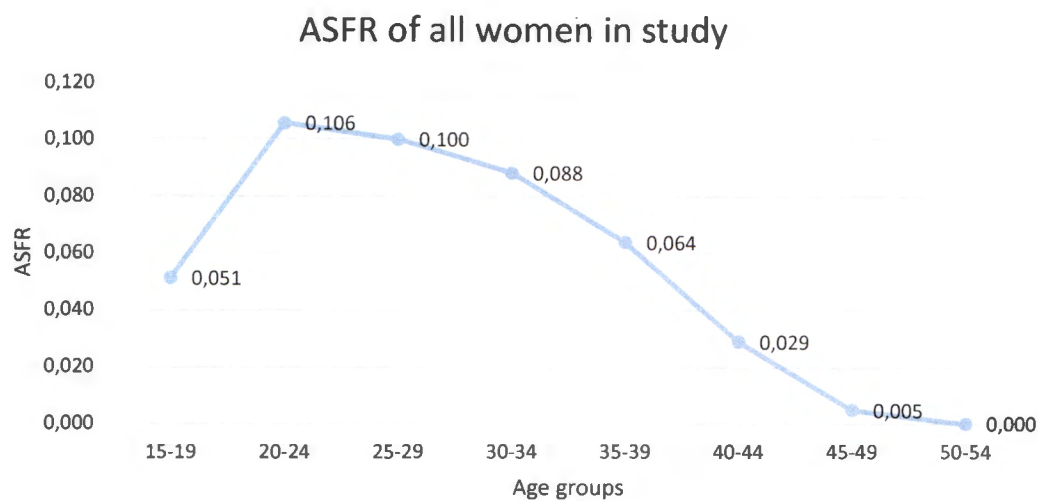
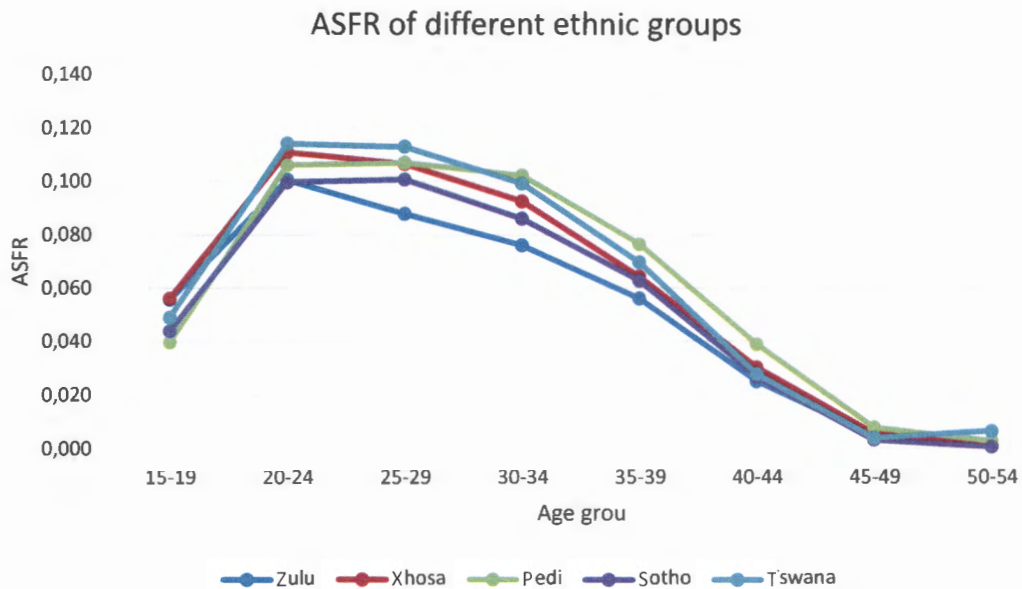


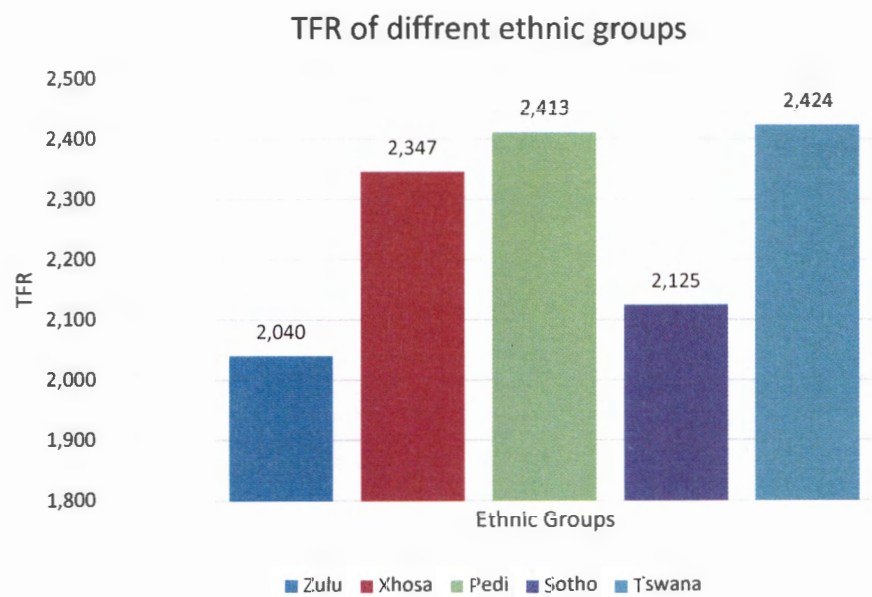
Figure 4 presents the ASFRs disaggregated by different ethnic groups. The Figure shows that the Xhosas and Tswanas had an early transition to childbearing in the year the survey was conducted compared to other ethnic groups. For example, while those under age of 20 (15-19) among the Pedi and Sotho had a rate of 0.040 and 0.044 respectively, the Xhosas and Tswanas had the highest rates of 0.056 and 0.049 respectively. With the exception of Sothos, the fertility rates in the year reached a peak in age group 20-24 where the Tswanas had the highest rate. While the rates for all age groups declines thereafter, the rates for Pedis remains the highest in subsequent age groups.

Figure 4: ASFR of different ethnic groups



The ASFR above was used to calculate the expected number of children that a woman will have at the end of the reproductive life by different ethnic groups. Figure 5 shows that fertility rate and pattern of Pedi and Tswana are familiar as they TFR are both 2.4 and are the highest among all the selected ethnic groups. Zulus had the lowest TFR of 2.0 which is below the replacement.

Figure 5: Total Fertility Rates of selected ethnic groups



4.3.3 Proportions ever attaining parity i

Table 4 below shows women of selected ethnic groups who progress to having the next child. The table shows that 78% of women aged 50-54 had at least 1 child as they are assumed to have completed their fertility. On the other hand, those women who are aged 15-19 which are women starting their childbearing 12% of them had at least one child and only 1% of them had the second child. Women in the early ages of childbearing 15-29 did not have more children thereafter but those who were aged 30-49 had the eighth child. In the age group, 30-34 86% of women had four children while 2.65 had the fifth child.

Table 4: Total proportions ever attaining parity

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	1	1	1	1	1	1	1	1
1	0,123	0,481	0,686	0,773	0,804	0,829	0,834	0,777
2	0,010	0,127	0,348	0,538	0,635	0,696	0,724	0,685
3	0,001	0,021	0,110	0,246	0,366	0,462	0,526	0,515
4	0,000	0,003	0,026	0,086	0,164	0,251	0,322	0,337
5	0,000	0,000	0,005	0,026	0,065	0,125	0,178	0,200
6	0,000	0,000	0,001	0,008	0,025	0,059	0,094	0,110
7	0,000	0,000	0,000	0,002	0,010	0,027	0,047	0,056
8	0,000	0,000	0,000	0,001	0,004	0,012	0,024	0,031
9	0,000	0,000	0,000	0,000	0,001	0,005	0,012	0,016
10	0,000	0,000	0,000	0,000	0,000	0,002	0,005	0,008
11	0,000	0,000	0,000	0,000	0,000	0,001	0,002	0,002
12	0,000	0,000	0,000	0,000	0,000	0,000	0,001	0,001
13	0,000	0,000	0,000	0,000	0,000	0,000	0,001	0,001
14	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
15	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
16	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
17	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

4.3.4 Parity Progression Ratio

The table below displays the overall PPR of selected ethnic groups (Zulu, Xhosa, Pedi, Sotho, and Tswana). Women aged 15-19 progress up to the fourth child and only 15% did progress. The table shows that as the ages increase for younger age groups, the parity decrease. In contrast, when the age increase for older age groups the parity increases. The table shows only 12% of women in the age group 15-19 progressed to have the first child and this was the least across all age groups. The highest proportion were women aged 45-49 whereby 83% of them progressed to their first child. In the older age groups, greater proportions of women progressed to the second child. Age group 40-44 (83%), 45-49 (86%) and 50-54 (88%). For younger age groups, the proportions were lower whereby the age group 15-19 it was only 8%, 20-24 (26%) and 25-29 (50%). The pattern shows that as parity increases over parity 4 the progression proportions decreases.

Table 5: Total Parity Progression Ratio of selected ethnic groups

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	0,123	0,481	0,686	0,773	0,804	0,829	0,834	0,777
1	0,084	0,264	0,507	0,696	0,789	0,839	0,868	0,882
2	0,09	0,164	0,317	0,457	0,577	0,664	0,727	0,751
3	0,15	0,134	0,235	0,349	0,448	0,543	0,613	0,654
4	0	0,122	0,209	0,307	0,399	0,499	0,552	0,594
5		0,231	0,214	0,299	0,390	0,470	0,526	0,551
6		0	0,202	0,269	0,381	0,454	0,507	0,511
7			0,231	0,301	0,376	0,456	0,508	0,549
8			0	0,333	0,363	0,441	0,49	0,53
9				0,286	0,376	0,451	0,455	0,459
10				0	0,268	0,356	0,45	0,32
11					0,545	0,359	0,491	0,5
12					0	0,348	0,468	0,438
13						0,25	0,541	0,429
14						0	0,3	0,667
15							0,333	1
16							0,5	0,5
17							0	0

The figure shows that from approximately 80% to approximately 1% of women progress from childless to the eighth child. The pattern of this progression shows a decline from the age group of women who completed their fertility 50-54 to those who are starting their fertility 15-19. Those younger ages are not likely to progress to the ninth child and above. The graph shows that it is women in the older age

groups who progress to those parities. The pattern of that progression fluctuates from 0% to less than 60%. Below is figure 5 of the plotted graph of table 25 above. The graph displays the PPR of the selected ethnic groups within the black population.

Figure 6: Parity Progression Ratio of selected ethnic groups

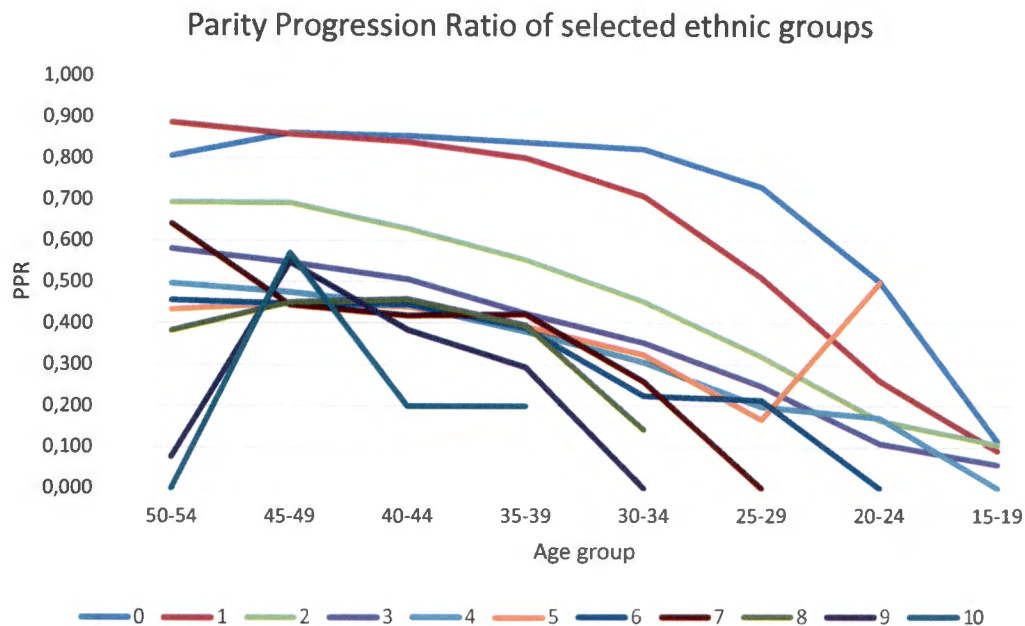
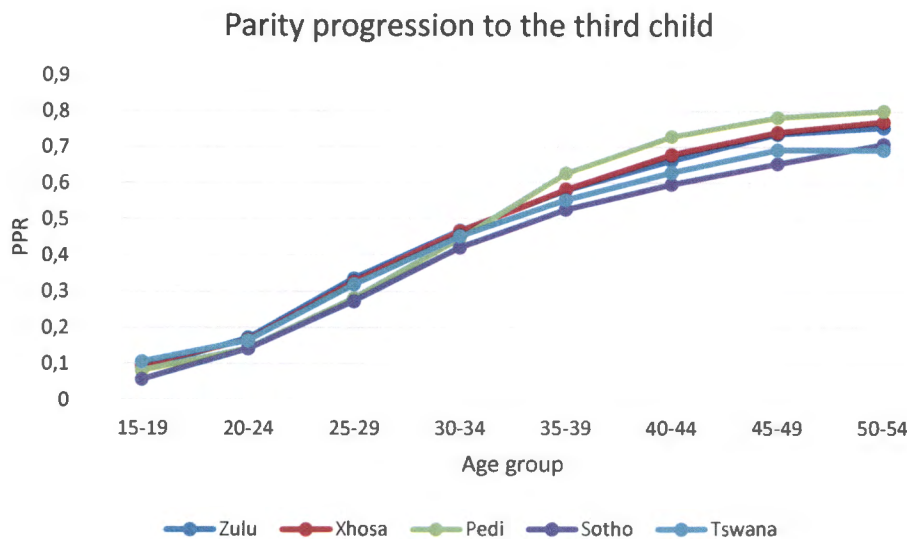


Figure 7 below shows the PPR to the third child by women in different ethnic groups. The figure shows that Sotho women in age group 15-19 are less likely to progress to the third child. However, the progression ratios increase by age for all the ethnic groups. Pedis are more likely to progress to the third child as compared to the other ethnic groups. For example, 63% of Pedi women progressed to the third child while for Tswanas it was only 55% who progressed.

Figure 7: Parity Progression Ratio to the third child



4.4 Odds Ratio-Factors associated with the transition to the third parity

This section presents the results of the logistic regression method showing the likelihood that a woman who had a parity of two, will proceed to third and higher-level parity. The results are presented both an unadjusted odds ratio while model 2 present the results adjusted for by other socio-economic factors

Table 5 below shows the odds ratios of those women who have the second child and progressed to three and more children. **Model 1** in the table shows that women with no schooling and those who had primary school were 3 times more likely to progress to the third and more than those with tertiary education. Those with the secondary school were 1.3 times more likely to progress to the third child and more. These results were statistically significant. However, the same results persisted when the variables were controlled with other socio-economic variables in model 2.

The table further shows that within the selected ethnic groups, women who are widowed are 3.2 times more likely to progress to the third child and more followed by those who are legally married than those who are single and never lived with a partner. Furthermore, women who were living together, divorced, and single but been living with a partner were 1.7 times more likely to progress to the third child and more. All these results were statistically significant. When this variable was controlled with other variables in model 2 there were changed.

Looking at religion, the table shows that women who are Christians were 12 times less likely to progress to the third child than those who were Traditional African, and this was statistically significant. However, this changed when it was controlled by other variables. Model 2 shows that Christian were 1.0 times more likely to progress as compared to the traditional African religion. This was not statistically significant. Islam women were 1.0 times more likely to progress to the third child and more and this was not statistically significant. Furthermore, only Sotho women were 12 times less likely to progress to the third child and more than Tswana's. All other ethnic groups were 1 time more likely to progress. These were statistically significant. However, in model 2 Sotho women were 9 times less likely to progress and this was not significant.

Women who lived in urban areas were 38 less likely to progress to the third child and more as compared to those who resided at farm areas. On the other hand, who resided traditional areas were 4 times less likely to progress to the third child and these was not statistically significant. In model 2, women who lived in traditional areas were 1.0 times more likely to progress to the third and more children as compared to those who resided in farm areas.

When looking at the provinces, women of all provinces were less likely to progress to the third and more children as compared to women from Limpopo and these were statistically significant. Women who stayed at KZN were 20 times less likely, from 23 times less likely and those from Eastern Cape were 8 times less likely. Lastly, women who progress to the second child and preferred boys were not likely and this was not statistically significant.

Table 6: The odds ratios by different socio-economic variables in the study.

Variable	Model 1: Unadjusted odd ratios		Model 2: Adjusted odd ratios	
	Significance	Exp (b)	Significance	Exp (b)
Education				
<i>Tertiary Education (R)</i>		1.00		
No schooling	0.000	3.396	0.000	3.284
Primary school	0.000	3.768	0.000	3.793
Secondary school	0.000	1.307	0.000	1.493
Marital status				
<i>Single and never lived with a partner(R)</i>		1.00		1.00
Legally married	0.000	2.545	0.000	2.658
Living together	0.000	1.759	0.000	1.679
Divorced	0.000	1.883	0.000	2.280
Separated	0.000	2.347	0.000	2.429
Widowed	0.000	3.218	0.000	3.012
Single but been living with a partner	0.000	1.601	0.000	1.481
Religion				
<i>Traditional Africa religion(R)</i>		1.00		1.00
Christianity	0.000	0.886	0.576	1.020
Islam	0.957	1.006	0.848	1.044
Ethnicity				
<i>Setswana (R)</i>		1.00		1.00
IsiXhosa	0.000	1.147	0.000	1.197
IsiZulu	0.000	1.064	0.030	1.089
Sepedi	0.000	1.223	0.062	1.085
Sesotho	0.000	0.885	0.025	0.915
Place of residence				
<i>Farm Areas(R)</i>		1.00		1.00
Urban Areas	0.000	0.625	0.000	0.843
Traditional Areas	0.122	0.962	0.160	1.071

Province of residence				
<i>Limpopo(R)</i>		<i>1.00</i>		<i>1.00</i>
Western Cape	0.000	0.617	0.000	0.676
Eastern Cape	0.000	0.926	0.000	0.801
Northern Cape	0.000	0.765	0.022	0.842
Free State	0.000	0.639	0.000	0.756
Kwa Zulu Natal	0.000	0.804	0.109	0.926
North West	0.000	0.770	0.014	0.879
Gauteng	0.000	0.632	0.000	0.838
Mpumalanga	0.000	0.781	0.011	0.876
Boys Sex preference				
<i>3 and above boys(R)</i>		<i>1.00</i>		<i>1.00</i>
2 boys	0.922	0.000	0.920	0.000

4.5 Summary of results

This chapter presented the fertility behavior of Zulu, Xhosa, Pedi, Sotho and Tswana women who form part of the black population in South Africa. The analysis was based on PPR that calculates the subsequent possibility of women in the black population progressing to the second and other children. The analysis started with the correction of data on children ever born by El-Baldry. The results reveal that in all women of selected ethnic parity not stated were less than 2%. Therefore, the data did not need the corrections and it was therefore used in calculating the PPR.

The first step in calculating PPR was to derive data on children ever born by five-year age group and calculating the mean parities. The results showed that age group 15-19 has the highest total number of children ever born as compared to other age groups. Zulu women have the highest (24 883) children ever born followed by Xhosa (102 912). The least was Sotho women by 85 623. The mean parities increase as the age groups increase. Again, parity differs from 14 to 17 as per ethnic group

The second step was to derive births in the previous year prior to the survey as well as the age-specific fertility rate. For the selected ethnic groups within the black population, there were 100 366 births a year before the 2016 community survey. Age group 30-34 having the greater percentage whereby Zulu women were the ones who had many births. In almost all the selected ethnic group's women aged 20-24 had the highest births a year before the survey. One can argue that these are age groups where most women have completed their tertiary education, are married and some starting employment and therefore see it good to increase their parities. All the ethnic groups follow the same pattern of PPR in the first child whereby its mostly approximately 80% of women who have at least one child. The age-specific fertility ratios of women from different ethnic groups differ and range from 0.001 to 0.117. Across all ethnic groups, age group 50-54 had the least ASFR. This is probably because these women are completing their fertility.

The step was to establish women who are ever attaining parity. The results show that as the parity and age groups increase to up to 17 children, the proportions decrease. Mostly women who are aged 44-49 are the ones who normally attain parity up to 17 children. The last and the main step of the study was calculating PPR of different ethnic groups within the black population. The results show that 12 % of women aged 15-19 were childless while for the age group 45-49 was 83%. The results show a pattern of declining ratios as parity increases. For example, from 77% of women aged 30-34, only 69% progressed to the first child, 45% to the second child and 34% to the third child. In conclusion, the results show that Zulu followed by Xhosa women account for the higher fertility within the black population. Again, women who are aged 15-19 and 30-34 are the one who has higher fertility levels like children ever born.

The odds ratio shows variations in the results. Two models were used in both adjusted and unadjusted versions. In the adjusted model, most variables like the province of residence were statistically significant but on the unadjusted odds ratio, some variables changed to not being statistically significant like ethnicity. Even though this is the case, some variables like education showed consistency in both models. The results further showed that women who obtained higher levels of education were less likely to progress having more than two children as compared to those who only had primary or no schooling at all.

CHAPTER 5: DISCUSSIONS AND RECOMMENDATIONS

5.1 Introduction

In estimations and analysing fertility, many studies have been using common well-known measures of fertility such as Age-Specific Fertility Rates and Total Fertility Rate which are inclusive of the tempo effect. PPR have been neglected more specifically when analysing subsequent birth. As a result, there is no information on how different groups progress to higher levels of parity as observed by recent studies including Palamuleni (2014; Kolk *et al* (2014) and StatsSA (2015).

5.2 Discussion

While different studies in South Africa have indicated that fertility levels differ with different racial groups, no other study known to the author has looked into the differences between the ethnic groups among the Black population. The purpose of the study was to estimate the levels of fertility among the main ethnic groups in South Africa which are Tswana, Sotho, Pedi Zulu, and Xhosa groups. The study used mean parity, age-specific fertility rate, and PPR to estimate the differences in fertility patterns. The following section presents the discussion based on the findings in the study.

Firstly, the results outlined that there is a consistent pattern of declining mean parities for age group 50-54 which is not consistent with fertility patterns in South Africa. This is unusual, thus StatsSA (2012:54) contends that women who give birth at an early age experience a highest number of births in their childbearing lifespan. This means women who completed their fertility are out to have higher mean parities. The declining mean parities of women aged 5-54 may be due to the misreporting of date by respondents. On the other hand, a study done by StatsSA (2012:52) in 2011 showed that Zulus begin their childbearing earlier than other ethnic groups followed by the Xhosas, the findings in this study indicated that higher portion of women among Tswana in the age group 15-19 had childbearing earlier than other age groups.

The analysis showed that the fertility between the ethnic group tend to differ, and are more pronounced in the advanced age groups where the Pedi and Xhosa had the highest mean parity while the Sothos and Tswana had the lowest parities. The possible reason for this could be emanating from the cultural differences within these groups. The subsequent analyses showed that Pedi, Xhosa, and Zulu were more likely to progress to the third parity compared to other ethnic groups. A study by Zuberi *et al*, (2005) has shown similar results indicating that the number of children differs between groups.

Secondly, the study indicated that the pattern of Age-Specific Fertility rates differed according to ethnic groups. It is evident from the results that there are fertility differences among different ethnic groups within the black population. This is observed in the ASFR of different ethnic groups as Xhosas and

Tswanas has higher ASFR at age group 15-19 as compared to other age groups. 2011 Census outlined that ASFR of black population ranged from 0.007 to 0.159 across all ages of childbearing. Moreover, it was indicated in the literature that fertility has been declining on South Africa. In 2011, the South African TFR was 2.67 and the study results shows that TFR within selected ethnic groups range from 2.040 to 2.424.

Lastly, women of the selected ethnic groups progress up to the eighth child whereby Xhosas are the highest and this is observed among women aged 50-54 which are women assumed to have completed their fertility. As stated in the literature that inception of the first birth is mostly likely to result in more births, it is also evident in this study. Fertility gradually increases after the first birth, whereby Xhosas and Pedis are still the highest. Sothos are the least to progress to the third child.

In conclusion, zooming on fertility from ethnicity levels rather than population group give more clarity on the fertility behavior of women within the black population. Knowing how women progress from one parity to the next is critically vital as it outlines the fertility of women at the end of their childbearing ages. Fertility levels of the black population remain slightly above the replacement level.

5.3 Recommendations

Given the findings in the study, the following are recommendations:

- i. Given the transition to higher parity levels differed between different ethnic groups, the study recommends that cultural issues influencing differentials in the transition to higher be investigated.
- ii. Furthermore, the study recommends that sexual and reproductive health issues be raised in rural areas where most of these ethnic resides.
- iii. Furthermore, given that education plays a significant role in the transition to higher parities, the study recommends that education be improved among the different ethnic groups.
- iv. It is recommended that institutions deal with data collection should start to collect, analyze and release fertility data on ethnic groups. This is because the study has outlined which ethnic groups have the highest levels of fertility. This would enable comprehensive research and in-depth understanding of fertility behavior.
- v. This could assist policymakers regarding areas of focus when dealing with fertility. It is not helpful for the government and policymakers to focus on the population group and confirming the high levels of fertility without knowing which ethnic group contributes more

There should be an interest in explaining fertility from the ethnicity level rather than only focusing on the population group. It is recommended that StatsSA should start to collect, analyze and release fertility

data on ethnic groups. This is because the study has outlined which ethnic groups have the highest levels of fertility. This would enable comprehensive research and in-depth understanding of fertility behavior.

Furthermore, this could assist policymakers regarding areas of focus when dealing with fertility. It is not helpful for the government and policymakers to focus on the population group and confirming the high levels of fertility without knowing which ethnic group contributes more. It would be more significant identifying which ethnic group contributes more to high levels of fertility and consequently crafting specific policy to be directed to that ethnic group rather than focusing on all groups which might not even need those policies.

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Addendum

1. Mean Parities

Table 2: Total Number of women by age group and parity and Mean Parity

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	101108	59595	34940	22474	16099	12651	11099	2 968
1	12942	40696	37690	23250	13876	9868	7341	1212
2	1083	12234	26477	28875	21990	17331	13175	2265
3	91	2076	9396	15813	16588	15643	13592	2366
4	16	281	2289	5885	8097	9329	9637	1814
5	0	30	474	1826	3277	4912	5616	1194
6	0	9	103	568	1294	2382	3079	715
7	0	0	20	146	497	1078	1556	337
8	0	0	6	42	191	505	818	193
9	0	0	0	15	68	219	429	118
10	0	0	0	6	30	116	197	68
11	0	0	0	0	5	41	82	16
12	0	0	0	0	6	15	42	9
13	0	0	0	0	0	6	17	4
14	0	0	0	0	0	2	14	1
15	0	0	0	0	0	0	4	0
16	0	0	0	0	0	0	1	1
17	0	0	0	0	0	0	1	1
Total	115240	114921	111395	98900	82018	74098	66700	13282
CEB	15445	72720	1131164	166070	170203	183081	184752	38384
Mean Parity	0,134	0,633	1,177	1,679	2,075	2,471	2,770	2,739

Table 3: Total births reported in the last year before the survey and ASFR

Parity	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
1	5337	7600	3068	1027	352	98	19	2
2	1078	7240	9388	6050	2446	686	96	4
3	123	2400	7260	7947	4869	1578	189	3
4	24	472	2924	5128	4176	1840	228	4
5	0	60	925	2435	2640	1570	275	15
6	0	30	234	1098	1590	1188	174	24
7	0	0	42	371	903	721	231	7
8	0	0	16	144	368	400	136	0
9	0	0	0	18	189	252	63	0
10	0	0	0	10	50	220	30	0
11	0	0	0	0	11	88	44	0
12	0	0	0	0	36	12	36	12
13	0	0	0	0	0	0	13	0
14	0	0	0	0	0	0	14	0
15								
16	0	0	0	0	0	0	16	0
Total	5923	12155	11145	8727	5240	2151	341	15
ASFR	0.051	0.106	0.100	0.088	0.064	0.029	0.005	0.000

Table 7: Number of Zulu women by age group and parity and Mean Parity

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	36665	22124	14225	9449	6568	5090	4327	1107
1	4956	14710	13009	8063	4986	3538	2545	395
2	437	4610	9343	9508	6957	5538	3979	722
3	35	811	3582	5319	5193	4793	4106	731
4	7	136	926	2070	2604	2936	2946	538
5	0	13	178	699	1138	1596	1824	405
6	0	1	55	222	445	823	1075	268
7	0	0	11	69	175	393	557	122
8	0	0	5	16	64	194	312	66
9	0	0	0	9	24	83	154	46
10	0	0	0	4	15	40	69	28
11	0	0	0	0	3	13	31	7
12	0	0	0	0	4	7	15	4
13	0	0	0	0	0	2	5	2
14	0	0	0	0	0	2	2	1
15	0	0	0	0	0	0	2	0
16	0	0	0	0	0	0	0	1
Total	42100	42405	41334	35428	28176	25048	21949	4443
Total Births	2348	4276	3642	2702	1583	627	103	5
Mean parity	0,142	0,636	1,149	1,605	1,968	2,371	2,701	2,718

Table 8: Number of Xhosa women by age group and parity and Mean Parity

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	24454	14174	8075	5241	3790	2907	2677	734
1	3611	9880	8957	5701	3475	2516	1834	313
2	297	3123	6158	6662	5374	4185	3233	542
3	26	555	2294	3756	3975	3842	3282	576
4	6	68	573	1474	2023	2322	2482	489
5	0	4	113	448	881	1355	1539	327
6	0	2	17	138	370	713	903	189
7	0	0	4	28	155	340	497	115
8	0	0	0	11	64	175	266	65
9	0	0	0	3	20	74	179	41
10	0	0	0	1	8	43	88	27
11	0	0	0	0	1	21	30	5
12	0	0	0	0	1	5	16	5
13	0	0	0	0	0	4	8	1
14	0	0	0	0	0	0	8	0
TOTAL	3940	13632	18116	18222	16347	15595	14365	2695
Total Births	1601	3094	2801	2180	1300	563	96	4

Table 9: Number of Pedi women by age group and parity and Mean Parity

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	14878	8880	4838	2914	2181	1747	1588	411
1	1543	5818	5601	2965	1493	964	730	140
2	110	1576	3859	4455	2954	2124	1544	254
3	9	232	1206	2424	2724	2448	1932	315
4	1	29	242	865	1430	1715	1617	271
5	0	4	53	230	533	898	985	182
6	0	1	9	64	189	396	537	143
7	0	0	1	10	75	172	258	58
8	0	0	1	6	21	69	134	31
9	0	0	0	1	6	30	61	14
10	0	0	0	0	3	19	20	10
11	0	0	0	0	1	3	11	3
12	0	0	0	0	0	1	6	0
13	0	0	0	0	0	0	3	1
14	0	0	0	0	0	0	1	0
15	0	0	0	0	0	0	1	0
16	0	0	0	0	0	0	0	1
TOTAL	16541	16540	15810	13934	11610	10586	9428	1834
Total Births	659	1760	1697	1428	891	413	75	5
Mean parity	0,108	0,593	1,154	1,742	2,229	2,696	2,982	2,937

Table 10: Number of Sotho women by age group and parity and Mean Parity

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	11992	7192	3995	2554	1752	1414	1179	349
1	1284	4944	5129	3441	2083	1479	1092	194
2	97	1337	3566	4153	3379	2786	2272	338
3	5	196	1056	2118	2312	2301	2086	357
4	1	19	214	641	953	1062	1203	246
5	0	6	61	200	320	486	575	129
6	0	2	11	51	129	197	250	52
7	0	0	1	19	33	55	103	23
8	0	0	0	3	16	21	44	10
9	0	0	0	1	6	8	12	5
10	0	0	0	1	0	2	8	2
11	0	0	0	0	0	3	3	1
12	0	0	0	0	0	0	1	0
13	0	0	0	0	0	0	2	0
TOTAL	13379	13696	14033	13182	10983	9814	8830	1706
Total Births	588	1370	1418	1138	691	265	28	1
Mean Parity	0,112	0,608	1,187	1,680	2,037	2,292	2,538	2,461

Table 11: Number of Tswana women by age group and parity and Mean Parity

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	13099	7204	3784	2287	1783	1466	1304	363
1	1548	5344	4994	3080	1839	1371	1140	170
2	142	1588	3551	4097	3326	2698	2147	409
3	16	282	1258	2196	2384	2259	2186	387
4	1	29	334	835	1087	1294	1389	270
5	0	3	69	249	405	577	693	151
6	0	3	11	93	161	253	314	63
7	0	0	3	20	59	118	141	19
8	0	0	0	6	26	46	62	21
9	0	0	0	1	12	24	23	12
10	0	0	0	0	4	12	12	1
11	0	0	0	0	0	1	7	0
12	0	0	0	0	1	2	4	0
13	0	0	0	0	0	0	1	0
14	0	0	0	0	0	0	1	0
15	0	0	0	0	0	0	1	0
16	0	0	0	0	0	0	1	0
17	0	0	0	0	0	0	1	0
18+	727	1655	1587	1279	775	283	39	12
TOTAL	14806	14453	14004	12864	11087	10121	9427	1866
Total Births								
Mean Parity	0,127	0,658	1,259	1,804	2,143	2,439	2,642	2,562

2. Births reported a year before survey and ASFR

Table 12: Zulu Births reported in the last year before the survey and ASFR

Parity	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
1	2118	2655	984	338	138	27	10	1
2	420	2516	2950	1804	706	234	36	2
3	54	903	2490	2406	1368	441	57	0
4	8	220	1080	1548	1196	516	64	4
5	0	30	295	890	880	415	80	0
6	0	6	120	396	594	366	60	6
7	0	0	14	154	280	231	42	0
8	0	0	16	56	88	80	24	0
9	0	0	0	0	63	81	18	0
10	0	0	0	0	20	60	0	0
11	0	0	0	0	0	55	11	0
12	0	0	0	0	24	0	12	12
13	0	0	0	0	0	0	13	0
14								
15								
TOTAL	2348	4276	3642	2702	1583	627	103	5
ASFR	0.056	0.101	0.088	0.076	0.056	0.025	0.005	0.001

Table 13: Xhosa Births reported in the last year before the survey and ASFR

Parity	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
1	1432	1882	819	287	92	27	2	0
2	302	1954	2214	1464	656	186	26	2
3	45	621	1887	637	407	136	18	0
4	12	104	756	1332	936	400	56	0
5	0	10	250	645	595	395	80	10
6	0	0	30	276	396	330	48	0
7	0	0	14	70	224	245	77	7
8	0	0	0	40	120	152	24	0
9	0	0	0	9	45	81	36	0
10	0	0	0	0	10	70	20	0
11	0	0	0	0	0	22	22	0
12	0	0	0	0	12	12	24	0
13								
14	0	0	0	0	0	0	14	0
Total	1601	3094	2801	2180	1300	563	96	4
ASFR	0.056	0.111	0.107	0.093	0.065	0.030	0.006	0.001

Table 14: Pedi Births reported in the last year before the and ASFR

Parity	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
1	602	1173	490	122	37	19	3	1
2	112	966	1546	1060	326	90	18	0
3	3	276	1008	1425	834	288	312	3
4	0	40	284	884	948	420	40	0
5	0	10	105	275	480	72	70	0
6	0	0	36	108	282	228	42	18
7	0	0	0	35	154	119	56	0
8	0	0	0	16	48	96	72	0
9	0	0	0	0	666	36	9	0
10	0	0	0	0	0	50	10	0
11	0	0	0	0	11	0	11	0
12								
13								
14								
15								
16								
Total	659	1760	1697	1428	891	413	75	5
ASFR	0.040	0.106	0.107	0.102	0.077	0.039	0.008	0.003

Table 15: Sotho Births reported in the last year before the survey and ASFR

Parity	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
1	535	875	373	157	45	15	2	0
2	104	810	1304	832	416	82	14	0
3	0	243	855	987	678	219	21	0
4	4	24	316	580	460	240	36	0
5	0	5	125	305	270	190	10	5
6	0	12	24	120	132	138	6	0
7	0	0	0	49	84	49	0	0
8	0	0	0	8	48	32	0	0
9	0	0	0	9	27	18	0	0
10	0	0	0	10	0	10	0	0
11	0	0	0	0	0	11	0	0
12								
14								
Total	588	1370	1418	1138	691	265	28	5
ASFR	0.044	0.100	0.101	0.086	0.063	0.027	0.003	0.001

Table 16: Tswana Births reported in the last year before the survey and ASFR

Parity	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
1	650	1015	402	123	40	10	2	5
2	140	994	1374	890	342	94	2	4
3	21	357	1020	1218	768	222	21	24
4	0	84	488	784	636	264	32	23
5	0	5	150	320	415	210	35	9
6	0	12	24	198	631	126	18	5
7	0	0	14	63	161	77	56	34
8	0	0	0	24	64	40	16	0
9	0	0	0	0	18	36	0	5
10	0	0	0	0	20	30	0	5
11								
12								
13								
14								
15								
16	0	0	0	0	0	0	16	10
17								
Total	727	1655	1587	1279	775	283	39	12
ASFR	0.049	0.115	0.113	0.099	0.070	0.028	0.004	0.006

3. Proportions ever-attaining

Table 17: Total proportions ever attaining Parity-Zulu

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	1	1	1	1	1	1	1	1
1	0,129	0,478	0,656	0,733	0,767	0,797	0,803	0,751
2	0,011	0,131	0,341	0,506	0,59	0,656	0,687	0,662
3	0,001	0,023	0,115	0,237	0,343	0,434	0,506	0,499
4	0	0,004	0,028	0,087	0,159	0,243	0,319	0,335
5	0	0	0,006	0,029	0,066	0,126	0,184	0,214
6	0	0	0,002	0,009	0,026	0,062	0,101	0,123
7	0	0	0	0,003	0,01	0,029	0,052	0,062
8	0	0	0	0,001	0,004	0,014	0,027	0,035
9	0	0	0	0	0,002	0,006	0,013	0,02
10	0	0	0	0	0,001	0,003	0,006	0,01
11	0	0	0	0	0	0,001	0,003	0,003
12	0	0	0	0	0	0	0,001	0,002
13	0	0	0	0	0	0	0	0,001

Table 18: Total proportions ever attaining Parity-Xhosa

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
1	0,139	0,490	0,692	0,777	0,812	0,843	0,843	0,786
2	0,012	0,135	0,350	0,534	0,639	0,707	0,735	0,695
3	0,001	0,023	0,115	0,250	0,372	0,481	0,546	0,537
4	0,000	0,003	0,027	0,090	0,175	0,273	0,353	0,369
5	0,000	0,000	0,005	0,027	0,074	0,148	0,207	0,226
6	0,000	0,000	0,001	0,008	0,031	0,074	0,117	0,131
7	0,000	0,000	0,000	0,002	0,012	0,036	0,064	0,076
8	0,000	0,000	0,000	0,001	0,005	0,017	0,035	0,042
9	0,000	0,000	0,000	0,000	0,001	0,008	0,019	0,023
10	0,000	0,000	0,000	0,000	0,000	0,004	0,009	0,011
11	0,000	0,000	0,000	0,000	0,000	0,002	0,004	0,003
12	0,000	0,000	0,000	0,000	0,000	0,000	0,002	0,002
13	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

Table 19: Total proportions ever attaining Parity-Pedi

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
1	0,10	0,46	0,69	0,79	0,81	0,83	0,83	0,78
2	0,01	0,11	0,34	0,58	0,68	0,74	0,75	0,70
3	0,00	0,02	0,10	0,26	0,43	0,54	0,59	0,56
4	0,00	0,00	0,02	0,08	0,19	0,31	0,39	0,39
5	0,00	0,00	0,00	0,02	0,07	0,15	0,21	0,24
6	0,00	0,00	0,00	0,01	0,03	0,07	0,11	0,14
7	0,00	0,00	0,00	0,00	0,01	0,03	0,05	0,06
8	0,00	0,00	0,00	0,00	0,00	0,01	0,03	0,03
9	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,02
10	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01

Table 20: Total proportions ever attaining Parity-Sotho

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
1	0,104	0,475	0,715	0,806	0,840	0,856	0,866	0,795
2	0,008	0,114	0,350	0,545	0,651	0,705	0,743	0,682
3	0,000	0,016	0,096	0,230	0,343	0,421	0,486	0,484
4	0,00	0,002	0,020	0,069	0,133	0,187	0,249	0,274
5	0,000	0,001	0,005	0,021	0,046	0,079	0,113	0,130
6	0,000	0,000	0,001	0,006	0,017	0,029	0,048	0,055
7	0,000	0,000	0,000	0,002	0,005	0,009	0,020	0,024
8	0,000	0,000	0,000	0,000	0,002	0,003	0,008	0,011
9	0,000	0,000	0,000	0,000	0,001	0,001	0,003	0,005
10	0,000	0,000	0,000	0,000	0,000	0,001	0,002	0,002
11	0,000	0,000	0,000	0,000	0,000	0,000	0,001	0,001
12	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
13	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

Table 21: Total proportions ever attaining Parity-Tswana

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
1	0,115	0,502	0,730	0,822	0,839	0,855	0,862	0,805
2	0,011	0,132	0,373	0,583	0,673	0,720	0,741	0,714
3	0,001	0,022	0,120	0,264	0,373	0,453	0,513	0,495
4	0,000	0,002	0,030	0,094	0,158	0,230	0,281	0,288
5	0,000	0,000	0,006	0,029	0,060	0,102	0,134	0,143
6	0,000	0,000	0,001	0,009	0,024	0,045	0,060	0,062
7	0,000	0,000	0,000	0,002	0,009	0,020	0,027	0,028
8	0,000	0,000	0,000	0,001	0,004	0,008	0,012	0,018
9	0,000	0,000	0,000	0,000	0,002	0,004	0,005	0,007
10	0,000	0,000	0,000	0,000	0,000	0,001	0,003	0,001
11	0,000	0,000	0,000	0,000	0,000	0,000	0,002	0,000
12	0,000	0,000	0,000	0,000	0,000	0,000	0,001	0,000
13	0,000	0,000	0,000	0,000	0,000	0,000	0,001	0,000

4. Parity Progression Ratios

Table 22: Parity Progression Ratio of Zulus

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	0,129	0,478	0,656	0,733	0,767	0,797	0,803	0,751
1	0,088	0,275	0,520	0,690	0,769	0,823	0,856	0,882
2	0,088	0,173	0,337	0,469	0,581	0,663	0,736	0,755
3	0,167	0,156	0,247	0,367	0,463	0,560	0,630	0,671
4	0,000	0,093	0,212	0,330	0,418	0,518	0,579	0,638
5		0,071	0,285	0,314	0,391	0,494	0,549	0,574
6		0,000	0,225	0,306	0,390	0,471	0,516	0,508
7			0,313	0,296	0,386	0,465	0,514	0,560
8			0,000	0,448	0,418	0,431	0,471	0,574
9				0,308	0,478	0,435	0,446	0,483
10				0,000	0,318	0,375	0,444	0,349
11					0,571	0,458	0,436	0,533
12					0,000	0,364	0,375	0,500
13						0,500	0,444	0,500
14						0,000	0,500	0,500
15							0,000	0,900
16								0,000
17								

Table 23: Parity Progression Ratio of Xhosas

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	0,139	0,490	0,692	0,777	0,812	0,843	0,843	0,786
1	0,084	0,275	0,506	0,687	0,787	0,839	0,872	0,884
2	0,097	0,168	0,328	0,468	0,583	0,680	0,742	0,772
3	0,188	0,118	0,236	0,359	0,470	0,568	0,647	0,687
4	0,000	0,081	0,190	0,299	0,426	0,540	0,587	0,613
5		0,333	0,157	0,288	0,413	0,504	0,565	0,578
6		0,000	0,190	0,238	0,402	0,481	0,547	0,578
7			0,000	0,349	0,378	0,486	0,545	0,556
8				0,267	0,319	0,457	0,553	0,549
9				0,250	0,333	0,497	0,456	0,481
10				0,000	0,200	0,411	0,413	0,289
11					0,500	0,300	0,516	0,545
12					0,000	0,000	0,250	0,000
13								

Table 24: Parity Progression Ratio of Pedi

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	0,101	0,463	0,694	0,791	0,812	0,835	0,832	0,776
1	0,072	0,240	0,490	0,731	0,842	0,891	0,907	0,902
2	0,083	0,144	0,282	0,447	0,628	0,730	0,783	0,802
3	0,100	0,128	0,202	0,327	0,453	0,574	0,653	0,694
4	0,000	0,147	0,209	0,264	0,367	0,481	0,555	0,620
5		0,200	0,172	0,260	0,356	0,435	0,512	0,589
6		0,000	0,182	0,210	0,359	0,426	0,480	0,452
7			0,500	0,412	0,292	0,415	0,479	0,508
8			0,000	0,143	0,323	0,434	0,435	0,483
9				0,000	0,400	0,434	0,408	0,517
10					0,250	0,174	0,524	0,333
11					0,000	0,250	0,500	0,400
12						0,000	0,455	0,900
13							0,400	0,500
14							0,500	0,900
15							0,000	0,900
16								0,000

Table 25: Parity Progression Ratio of Sotho's

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	0,104	0,475	0,715	0,806	0,840	0,856	0,866	0,795
1	0,074	0,240	0,489	0,676	0,774	0,824	0,857	0,857
2	0,058	0,143	0,274	0,422	0,527	0,597	0,654	0,709
3	0,167	0,121	0,214	0,302	0,387	0,444	0,513	0,567
4	0,000	0,296	0,254	0,300	0,346	0,421	0,453	0,474
5		0,250	0,164	0,273	0,365	0,370	0,424	0,419
6		0,000	0,083	0,320	0,299	0,311	0,409	0,441
7			0,000	0,208	0,400	0,382	0,405	0,439
8				0,400	0,273	0,382	0,371	0,444
9				0,500	0,000	0,385	0,538	0,375
10						0,600	0,429	0,333
11						0,000	0,500	0,000
12							0,667	
13								

Table 26: Parity Progression Ratio of Tswana's

Parity (i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
0	0,115	0,502	0,730	0,822	0,839	0,855	0,862	0,805
1	0,093	0,263	0,511	0,709	0,802	0,842	0,860	0,887
2	0,107	0,166	0,321	0,454	0,554	0,630	0,693	0,693
3	0,059	0,110	0,249	0,354	0,424	0,507	0,548	0,581
4	0,000	0,171	0,199	0,306	0,381	0,444	0,476	0,497
5		0,500	0,169	0,325	0,394	0,441	0,450	0,434
6		0,000	0,214	0,225	0,388	0,445	0,447	0,457
7			0,000	0,259	0,422	0,419	0,445	0,642
8				0,143	0,395	0,459	0,451	0,382
9				0,000	0,294	0,385	0,549	0,077
10					0,200	0,200	0,571	0,000
11					1,000	0,667	0,563	0,000
12					0,000	0,000	0,556	0,000
13							0,800	0,000
14							0,750	0,000
15							0,667	0,000
16							0,500	0,000
17							0,000	0,000
18+								