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PROXIMATE DETERMINANTS OF FERTLITY IN GHANA

BY

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ACCEPTANCE

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DECLARATION

I hereby declare that, except for the reference to other people's work, which has been duly acknowledged, this work is the result of my own research undertaken under supervision and that it has not been presented elsewhere either in part or in whole for another degree.

Signed ……

Edmund EssahAmeyaw

Date…….

DEDICATION

To my mother, wife and all my loved ones

ACKNOWLEDGEMENTS

My sincere thanks goes to the Almighty God for granting me the strength to undertake this study.

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ABSTRACT

The study examines trends in the proximate determinants of fertility (sexual activity, contraception, and postpartuminfecundability) in Ghana over a decade (from 1998 to 2008)

with a view to finding out their contributions to fertility decline and explaining the factors responsible for fertility decline in the country .

The study was mainly based on data collected from the Ghana Demographic and Health Surveys carried out in 1998 2003 and 2008. Four thousand eight hundred and forty three(4,843) female respondents were interviewed in 1998, 5,691 in 2003 and 4,916 in 2008. The study utilizes Stover's reformulation of Bongaarts' model of proximate determinant. The findings show that postpartum infecundability has a farmore dominant inhibiting effect on fertility than the other proximate fertility determinants and has been relatively stable over the decade. The findings of the study further show that forage at first sexual intercourse, women in the rural areas initiate sexual intercourse a year earlier than those in the urban areas except in the 1998 survey, where those in the rural and urban areas initiated sexual intercourse at the same age. Age at first sexual intercourse increases as the level of education increases from secondary to higher education. The age at first sexual intercourse remains the same from no education to primary education (17years). Age at first intercourse remains relatively stable across age groups within the regions. Brong Ahafo had the lowest mean age at first sexual intercourse(16 years in1998). Overall the mean age at first sexual intercourse for the regions ranges between 17 and 18 years.

The Northern region had the highest percentage reduction in fertility due to the index of postpartum infecundability, Upper East and Upper West also had very high percentage reduction due to Index of Postpartum infecundability. The index of Postpartum infecundability had the highest fertility inhibition effect in 1998, 2003 and 2008 for both rural and urban areas with the rural areas having the highest.

In all the regions in Ghana, Greater Accra had highest percentage reduction due to abortion. The inhibiting effect of abortion is relatively high in the In 1998, induced abortion had the lowest fertility inhibition effect.

KEYWORDS: sexual activity, contraception, post-partum infecundability, fertility decline, proximate determinants, Ghana.

CHAPTER I
INTRODUCTION

1.0BACKGROUND TO THE STUDY

Many developing countries have experienced some fertility declines in the 1980's andstall in the fertility decline observed from late1990's topresent. (Bongaarts, 2008; Shapiro and Gebreselassie, 2007) Results from the 2008 Ghana Demographic and Health Survey (GDHS), relative to the earlier four surveys, indicate that the total fertility rate (TFR) has declined dramatically over the past 20 years from 6.4 children per woman in 1988 to 4.4 children per woman in 1998. It stabilized at that level until 2003 and then declined again to 4.0 in 2008 (Ghana Statistical Service [GSS], 2009). The decline in fertility was especially rapid during the period between 1988 and mid-1998. With a TFR of 4.0 in 2008, Ghana is seen as having achieved its fertility target of 4.0 children per woman two years before the target year (2010). This TFR is also considered as one of the lowest in sub-Saharan Africa. However, thereis Substantial and persistent differentials in fertility by background characteristics.

The TFR for rural areas (4.9 births) is higher than the TFR for urban areas (3.1 births). Over the five-year period preceding the 2008 GDHS there was a decline in fertility among women in rural areas from 5.6 births per woman in 2003 to 4.9 births currently, while the TFR for women in urban areas remained the same. The total fertility rate is highest in the Northern region (6.8 children per woman) and lowest in the Greater Accra region (2.5 children per woman). TFR variedfrom 6.0 children among women with no education to 2.1 children among women with at least secondary education.

1.1STATEMENT OF THE PROBLEM

Even though fertility has been declining from 6.4 children per woman in 1988 to 4.0 children per woman in 2008, Fertility levels are still high compared to the worlds standard of 2.5(PRB,2011). There are differences in fertility between urban and rural areas of the country and there are also regional and socioeconomic differentials.Attempts have been made to explain the drop and variations in fertility. Thefive (5) rounds ofGDHS provide some explanation, for instance contraceptive use was 5 percent in 1988 and increased to 19 percent in 2003 and decline slightly to 17 percent in 2008.Obviously contraception may not be the main cause of the decline. Abortion has been suggested by Gaisie (2005) but the contribution of abortion was not conclusive.

A number of determinants are associated with the decline and according to Bongaarts (1978) changes in fertility levels can always be traced to variations in one or more of the intermediate fertility variables which are marriage, postpartum infecundability, abortion and contraception.The actual determinants have been quite unknown, estimates has been provided (Asare-Tutu, 2008; Gaisie, 2005; Mba, 2002) using the Bongaarts model.But the Bongaarts model has been refined by John Stover (1998), therefore the need to investigate the factors that bring about the decline. The present study, therefore seeks to examine reduction in fertility that may be attributable to the proximate determinants of fertility, which according to Stover(1998) are sexual activity, contraception, abortion and Postpartuminfecundability a modification in the Bongaarts proximate determinant.

1.2RATIONALE OF THE STUDY

In the mid-1950s, Davis and Blake (1956) elaborated a framework of the factors affecting fertility that recognized both indirect and direct determinants of fertility. Their framework related the physiological factors directly affecting fertility to the social, economic and cultural variables. They termed the physiological factors as "intermediate" variable.

In 1978, Bongaarts developed these ideas into a framework for analyzing the proximate determinants of fertility that explained the fertility-inhibiting effects of the key direct determinants (Bongaarts, 1978 and 1982). Bongaarts showed that the difference in fertility among populations was because of the differences in four variables, namely:marriage, contraception, induced abortion and postpartum infecundability.

The proximate determinants of fertility framework, developed by Bongaarts (1984) has been used extensively by researchers for the past 20 years. Since the initial framework was developed, a wealth of new survey data on the proximate determinants has become available. Stover (1998) suggested these modifications (1) the use of sexual activity rather than marriage to indicate exposure to pregnancy; (2) a revision of the sterility index to measure infecundity from all causes; (3) a revised index of contraception that accounted for the fact that users of sterilization may become infecund before age 49; and (4) a revised definition and estimate of total fecundity. Using sexual activity to define the index rather than marriage will increase the index to the extent that some unmarried women are sexually active and will decrease it to the extent that some married women are not sexually active.

As a result, a large amount of additional data on the proximate determinants is now available, which presents the opportunity to refine the proximate determinants indices (Stover, 1998). Using this framework (with a little modification to the marriage index), Jolly & Gribble (1993) in their analysis of twelve Sub-Sahara African countries' DHS datasets, found that contraceptive use in Sub-Saharan Africa is fairly low and that fertility and its determinants have changed over time. They also found that primary sterility of women in the developing countries is much lower than the 3% estimate given by Frank (1983). The shortcoming of the Bongaarts (1978) formulation, however, is that it assumes that all fertility occurs within marriage or union, which is not necessarily the case in many parts of the world including Ghana.

Ibisomi's (2008) study shows that all the indices estimated using the Bongaarts et al formulation(1984) are higher when compared to their equivalents in the Stover's refinement. This implies that the Stover's indices should be influential in reducing PotentialFertility (PF) and this is translated into a high PF in the Stover's model compared to total fecundity (TF) in the Bongaarts et al formulation.

Prior studies that investigated the determinants of fertility in Ghana have often utilized the Bongaart's proximate determinants framework (Mba, 2002; Gaisie,1984). However, due to the centrality of sexual intercourse in the analysis of fertility, coupled with the fact that child birth does not necessarily occuronly within the context of marriage, this thesis contributes to this area of research by using Stover's (1998) refinement in the estimation of the inhibiting effect of the proximate determinants variables on fertility. Abortion may play a very significant role but little is known about the contribution of abortion. HoweverTutu (2008) used indirect measures to estimate the contribution of abortion towards the overall fertility reduction using the 2003 GDHS data. By using the 2008 GDHS data, the present study lends further credence to the fertility literature in Ghana.

Furthermore, the analysis of the proximate determinant of fertility would improve our understanding of the causes of fertility decline in Ghana.

1.3 OBJECTIVES OF THE STUDY

The general objective of the study is to examine the effects of the proximate determinants on fertility in Ghana.

The specific objectives are:

1. To assess the socio-economic and demographic characteristics that influences fertility.
2. To describe trends in fertility levels from 1998-2008.
3. To describe trends in the indices of the proximate determinants of fertility and the Regional and socioeconomic differentials from 1998-2008.
4. To estimate the relative contributions of the indices of the proximate determinants to fertility reduction in Ghana since 1998.
5. To make the policy recommendations on the basis of the findings of this study.

1.4 LITERATURE REVIEW

Bongaarts and Potter(1983) developed a model to quantify the effects of the four proximate determinants that in their analysis had the greatestinfluence on fertility levels: union patterns, contraception, lactational amenorrhea and postpartum abstinence, pathologicalsterility, andabortion (Bongaarts, 1982; Bongaarts et al.. 1984)

This model is based on an earlier framework developed by Davis and Blake (1956). In the earlier model, Davis and Blake (1956) elaborated a framework of the factors affecting fertility that recognized both indirect and direct determinants of fertility. In 1978,Bongaarts developed

these ideas into a framework for analyzing the proximate determinants of fertility that explained the fertility-inhibiting effects of the key direct determinants (Bongaarts, 1978 and 1982). Bongaarts's work represented a significant advance over previous attempts in that it presented a simple model that could be readily applied using available data. Since the publication of Bongaarts' first paper on this framework, more than 100 publications have appeared describing applications to different country and regional settings. The framework has been used for a variety of purposes, including: (1) decomposing the contribution of each of the proximate determinants to the realization of the current level of the total fertility rate (Gaisie, 2005); (2) analyzing the contribution of changes in the proximate determinants to changes in the total fertility rate over time; (3) comparing the differences in fertility between two countries or regions on the basis of differences in the proximate determinants (Jolly & Gribble, 1993); (4) estimating total abortion rates as a residual after the effects of all other proximate determinants have been removed (Tutu 2011); and (5) projecting future levels of contraceptive use that would be required to achieve fertility goals given expected changes in the other proximate determinants or future levels of fertility given expected or desired changes in contraceptive use(Bongaarts 2002). In this study some relevant literature on the proximate determinants and some other related factors are reviewed.

1.4.1 FERTILITY INHIBITION

1.4.1.1 Marriage/sexuality

Aryee(1985) defined marriage as an arrangement that establishes a more or less enduring legally or socially sanctioned relationship between a man and a woman.McDonald (1984) observed that a woman’s nuptial behavior determines the period of reproductive life. He further notes that marriage or exposure to sexual union is not sufficient inhibiting factor but may be necessary

contributing factor to fertility promotion.Ayad and Roudi(2006) found that Morocco's fertility decline is primary attributable to the increase in women's average age at marriage.

In the study of fertility using the proximate determinants of fertility,Sibanda et al (2003) found that a decrease in age-specific proportions of women who are married was strongly related to fertility decline in Addis Ababa. In the developed world the concepts ofmaturing and travelling before becoming a parentgained further ground, and sexual activity's tiewith marriage was weakened. Marriage rates declinedand age at marriage rose. (UN 2004).It is often argued that sexual activity correctly defines exposure to the risk of pregnancythan marriage (APHRC, 2002). In African societies in particular, customs governingabstinence from sexual relations for extended periods can reduce pregnancy risks. Coitalbehavior is thus an important factor in the study of fertility. In the DHS, all respondentswere asked 'When was the last time you had sexual intercourse?' and response to thisquestion is used here as a measure of recent sexual exposure.

Sexually active women isdefined in this study as women who are sexually active in the last month plus womenwho are not now sexually active but who are currently pregnant or abstaining postpartum.The intention of this index is to represent the effect of periods during which a woman is not sexually active. Data on sexual activity were scarce in 1978 and marriage was quite universal, marriage (formal or informal) was used as a proxy. Today, data on recent sexual activity are available for a number of countries. Using sexual activity to define the index rather than marriage will increase the index to the extent that some unmarried women are sexually active and will decrease it to the extent that some married women are not sexually active.

From the literature Sexual activity defines correctlyexposure to the risk of pregnancy than marriage; therefore the study uses recent sexual activity rather than marriage as a proxy for exposure to the risk of pregnancy.

1.4.1.2 Postpartuminfecundability

Susceptibility to pregnancy after birth can be delayed by lactation(breastfeeding) which inhibits fertility. Gaisie (2005) in decomposing the effect of the proximate determinant over 1988 to 1998 in Ghana, found that postpartum infecundability(duration of breastfeeding, postpartum abstinence and amenorrhoea) contributes 70 and 80 percent of the total number of birth per woman averted by all the proximate determinants.Akinkumi (1989) established that, postpartum abstinence beyond amenorrhea was the main inhibitor of fertility in Nigeria. Postpartum non-susceptibility accounted for 70 percent reduction in fertility, except among highly educated women. Gaisie (1984) using the 1979 Ghana fertility survey indicated that combined effects of postpartum amenorrhea and abstinence accounted for over 50 percent reduction in fertility.Akinkumi (1989) established that, post-partum abstinence beyond amenorrhea was the main inhibitor of fertility in Nigeria. Postpartum non-susceptibility accounted for 70 percent reduction in fertility, except among highly educated women. Gaisie (1984) using the 1979 Ghana fertility survey indicated that combined effects of postpartum amenorrhea and abstinence accounted for over 50 percent reduction in fertility.Mba (2002) in analyzing the determinants of fertility transition using the Ghana Demographic and Health Survey data sets of 1988,1993,and 1998 showed that Pospartuminfecundability has far more dominant inhibiting effect on fertility than the other proximate determinant. Specifically, the inhibiting effect of postpartuminfecundability is more important than the effects of contraception and marriage patterns in explaining fertility levelsand trends in Ghana.

In a study by the Alan Guttmacher Institute (1985) in Ghana, two fertility-inhibiting practices identified other than contraceptive use were breastfeeding and postpartum abstinence. Ghanaian women breastfed their babies for an average of 15 months and the mean duration varied only

slightly by age from 14 months among women under the age of 20 to 15 months among 45-49 year olds. However, full breastfeeding which they defined as "unsupplemented by any other food" usually lasted for five months. It further found that, better-educated women breastfed for shorter durations with example being that, women who had no education breastfed their babies for six months while on the average women with 11 or more years of education breastfed their babies for three months. They noted that, extended breastfeeding could lengthen the period of postpartum amenorrhea and that was demonstrated by the Ghana fertility survey data used. They also indicated that, Ghanaian women observed relatively long periods of postpartum abstinence.

1.4.1.3 Contraception

Again, the prevalence of contraception and its use effectiveness in a population affects the level of its fertility. In the developed countries the proportion of currently married women using contraception (72percent) is high, but in developing countries(61 percent) it is low as shown in the UN report (2011). The report further shows that less than 15 percent of current contraceptive users were recorded in many African countries surveyed. Additionally, a large proportion of current contraceptive users belong to educated urban dwellers.

Investigating the effects of contraception on fertility in developing countries in Africa, Latin America,Asia and middle East, Cleland et al (1984) on the other hand, found that in the five African countries the fertility reducing impact of contraception was estimated to be only 5 percent, whereas Asian countries studied, it was 20 percent while in the America it was 35 percent.

According to Gaisie(2005), there is a huge discrepancy between contraceptive use and the level of fertility in Ghana. The study further explained that Significant drops in the level of fertility without marked increases in contraceptive prevalence can only be explained in terms of the

major changes in the proximate determinants for example, timing of marriage, commencement of exposure to the risk of childbearing and changes in the durations of postpartum abstinence, amenorrhea and breastfeeding and foetal loss.

Casterline (1984) in a comparative study noted the positive relationship between the level of fertility and contraceptive use.He found that contraceptive use inhibits fertility by more than 50 percent in Costa Rica and Panama compared to 20 and 5 percent in Asia and Africa respectively.Casterline related contraceptive use to levels of education and found that women with seven years of education had reduced fertility because of high use of contraception than their counterparts with no education.

Ayad and Roudi (2006) found that fertility decline in Morocco among married woman was due to contraceptive use. Contraceptive use among married women in the reproductive age increased from 19 percent to 63 percent between 1980 and 2004. Sibanda et al (2003) confirms that contraceptive use is the important means by which fertility declined in Addis Ababa, Ethiopia.

1.4.1.3 Abortion

Induced Abortion is defined as the voluntary or induced expulsion of fetus (product of conception) before the twenty-eighth week of gestation.A report by the UN (2011) indicates that although voluntary practice of induced abortion is illegal in Africa it appears to have become an important factor influencing the level of fertility in almost all the developed countries in the late 19thand early 20thcenturies. The relatively large reduction of fertility in Japanese population between 1950s and 1960 was achieved mainly as a result of the use of abortion. The report further found that induced abortion has significant reduction impact on the Eastern Germany, Romania, Poland, Czechoslovakia, and Hungary among others.

Bongaarts and Potter (1983) found that the number of births averted per induced abortion is strongly related to the practice of contraception following the induced abortion. In the absence of contraception an induced abortion averts about 0.4 births while about 0.8 births are averted when moderately effective contraception is practiced.According to Kalu (1986), induced abortion has lowered fertility in developing countries but by how much is hard to say since even in many countries where abortion is legal women have been reluctant to acknowledge in surveys that they have had abortion.

In Ghana induced abortion is allowed in cases of rape, incest, or when the physical or mental health of the woman is threatened, and when the fetus is abnormal.Tutu (2008)in estimating the indices of the proximate determinant for Ghana found out that in 1998, induced abortion had the lowest fertility inhibition effect. It inhibited fertility by only 10 percent. However, in 2003 the fertility inhibition due to induced abortion rose to 20 percent and had become the index with the second highest fertility inhibition effect. While averting 1 birth per average woman in 1998, induced abortion averted 2.3 births per averaged woman in 2003.

1.4.2 FERTILITY-MIGRATION NEXUS

Four main reasons have been offered to explain the migration-fertility inter-relationship. These include disruption (e.g. occurs as a result of delayed marriage, reduction of frequency of sexual intercourse due to separation of spouses), adaptation (e.g. when life in urban settings can erode customary practices that impede fertility), selective, and socialization (Codjoe 2007). Codjoe (2007) cites several studies that compare fertility behavior of migrants and indigenous females. These studies show that though fertility rate among migrant females have been higher compared to their indigenous counterparts in urban areas, fertility rate of migrant females have been lower than those of indigenous people in rural areas. According to White et al. (2005) cited in Codjoe

(2007), in certain urban and rural settings, patterns of higher and lower fertility for migrant females compared to indigenous females have been observed. To understand the conditions under which such patterns become apparent, Codjoe (2007) suggests an approach that considers the context and affords the control for both proximate and non-proximate determinants. His study confirms the assertion that fertility rates among migrant females are higher compared to indigenous females in urban areas and vice versa in rural environments.

1.4.3 FERTILITY TRANSITION

There is a spatial component to the fertility change that is being observed in Ghana. According to Agyei-Mensah (2006) there is geographical diversity in the ongoing fertility decline in Ghana. He noted that different phases of the fertility transition are observed in various regions depending on the specific social and economic circumstances. He notes that, while the Northern region is still in the pre-transition stage and yet to experience a significant decline in fertility, the pace of decline has been very rapid in the Greater Accra region

1.4.4 FERTILITY STALLS

The definitions of stalls have varied between authors (Moultrie et al., 2008). However, the general idea is that "a stall implies that an ongoing fertility transition is interrupted by a period of no significant change in fertility before the country reaches the end of the transition" (Bongaarts, 2008, p.109). The systematic analysis of fertility trends in sub-Saharan Africa revealed six cases of stalling fertility, all being highly statistically significant. In Ghana, fertility decline started around1976, and stopped after 1998, the last survey being conducted in 2008. In Kenya, fertility decline started earlier, around 1960, and stopped at about the same time (1997), the last survey also conducted in 2008. In Nigeria, the onset of fertility decline was around 1980, and the fertility stall occurred at the same time.

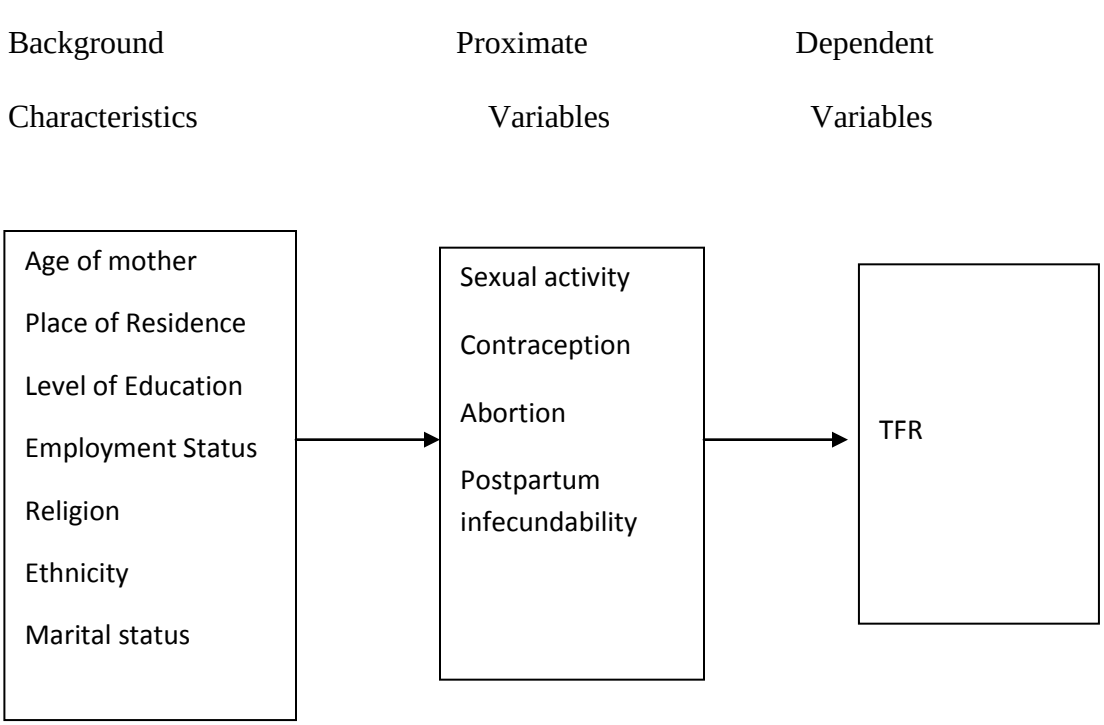
In Ghana and Tanzania, the fertility stall occurred despite increasing contraceptive use. In three other countries (Kenya, Nigeria and Rwanda) the fertility stall was associated with either a decline or no improvement in contraceptive use. Age at first marriage was increasing in Ghanaand Madagascar, whereas it was decreasing in the other cases, thus contributing to the stall (Garenne, 2007).

1.5 CONCEPTUAL FRAMEWORK

The conceptual framework of this study draws largely on John Stover's (1998) reformulation of Bongaarts model which is the intermediate or proximate variables that determine fertility level in a society and how socio-economic and demographic characteristics or variables relate to these intermediate variables. Figure 1 illustrates the framework. In the framework, socio-economic and background characteristics such as education, religion, occupation, place of residence influence a woman's total fertility.

Figure 1 illustrates the framework. In the framework, background characteristics such as age of mother, place of residence,level of education, employment status, religion, ethnicity,influences a woman's behaviour with regards to sexual activity, contraception, abortion, and postpartum infecundability which will then affect the total fertility rate (TFR).

Figure 1: Framework for the Analysis Fertility Levels



Source: Conceived by author based on Stover's Model

1.6 HYPOTHESES

In line with the research objectives and from the literature reviewed as well as the theoretical framework that will be used in the analysis of this work, the hypotheses to be tested in this study are:

1. Abortion reduces Total Fertility Rate than contraceptive use.
2. Postpartum infecundability contributes less to Total Fertility Rate than sexual activity.

1.7 METHODOLOGY

Postpartum amenorrhea refers to the interval between childbirth and the return of menstruation. This is the period during which a woman becomes temporarily infecund following childbirth. Postpartum abstinence refers to the period of voluntary sexual inactivity after childbirth.

Breastfeeding practice appears to be the principal determinants of variations in the length of the period of amenorrhea. Without breastfeeding the average amenorrhea interval is short, usually 1.5 to 2 months.

From the GDHS, postpartum amenorrhea is the interval between the birth of a childand the return of the menstrual cycle. It is the period during which the woman becomes temporarily and involuntarily infecund following childbirth. Postpartum protection from conception can be prolonged by breastfeeding, which can lengthen the duration of amenorrhea. Delaying the resumption of post-partum sexual relations can also prolong protection against pregnancy.

Data for this study were from secondary data drawn from the 1998, 2003 and 2008Ghana Demographic and Health Survey (GDHS). The dataconstitute the principal data set for this study as it provides the latest estimates of demographic and socio-economic characteristics of Ghana's female population.

The 1998, 2003 and 2008 GDHS are series ofnational-level population and health surveysconducted in Ghana as part of the global Demographicand Health Surveys (DHS) programmes.The demographic and health survey is designed to provide information tomonitor the population and health situation in the countries.The three different surveys were implemented

by the Ghana Statistical Service (GSS) in collaboration with the Ghana Health Service. Technical assistance was provided by ICF Macro through the MEASURE DHS programme.

The GDHS used a two stage sampling, based on the 2000 Population and Housing Census to produce separate estimates for key indicators for each of the 10 regions in Ghana. The GDHS householdssample was large enough to provide a sampling frame for conducting case specific child mortality surveillance for children under five years using a Verbal Autopsy Questionnaire. The survey obtained detailed information on fertility, marriage, sexual activity, fertility preferences, awareness and use of family planning methods, breastfeeding practices, nutritional status of women and young children, childhood mortality, maternal and child health, awareness and behaviour regarding HIV/AIDS, and other sexually transmitted infections (STIs).

In addition, the 2008 GDHS collected information ondomestic violence, malaria and use of mosquito nets, and carried out anemia testing and anthropometric measurements for women and children. Stata 11.1 and Microsoft Excel were used for analysis of the datasets.

Descriptivestatistics will be used for the age, residence, level of education, marital status, type ofmarriage union, employment status, wealth quintiles and religion of the women under study.

These are periods after childbirth during which pregnancy is normally not expected to occur and are associated with breastfeeding, abstinence and amenorrhea.

Stover's (1998) refinement of the Bongaarts formulation uses the proportion sexually active in the last month plus women who are not currently sexually active but who are currently pregnant or abstaining postpartum (since they have recently been exposed to the risk of pregnancy) as the population directly exposed to pregnancy. He also modified the components used in the calculation of the index of abortion (by multiplying contraceptive prevalence by the effectiveness

to describe more accurately the proportion of women protected by contraception) and the index of contraception (by removing infecundity consideration since it is now included in the sterility index).

Stover's (1998) formulations will be used toestimate the proximate determinants indices to assess their inhibiting effect on fertility.as stated below:

$$TFR = C_x \times C_c \times C_a \times C_i \times C_f \times PF$$

$$C_x = s$$

$$C_i = \frac{20}{18.5 + i}$$

$$C_a = \frac{TFR}{TFR + 0.4 \times (1 + u \times e) \times TAR}$$

$$C_f = 1 - f$$

$$C_u = 1 - u \times e$$

where *s* = proportion of women aged 15-49 who are sexually active (where sexuallyactive means active in the last month or pregnant or abstaining postpartum); *i*= the meanduration (in months) of postpartum infecundability; *u* = the proportion of sexually active,fecund women using contraceptives that does not overlap with that experiencingpostpartum amenorrhea; *e* = the average effectiveness of contraception; TAR = the totalabortion rate; *f* = the proportion of sexually active women who are infecund; and PF = theindex of potential fertility.

To apply to five-year age groups, C*i* becomes

C*i* = BI/ (BI – 1.5 + *i*),

Where BI = the average birth interval in the absence of lactation, contraception andpostpartum abstinence estimated as 15-19 = 17.5; 20-24 = 18.3; 25-29 = 19.2; 30-34 =

20.0; 35-39 = 20.8; 40-44 = 21.7 and 45-49 = 22.5.

1.8 LIMITATION OF THE STUDY

An appraisal of the age 1998, 2003 and 2008 suggest that there are pronounced distortions in the single and five year age data.These errors may bias fertility estimates and analysis of the determinants of fertility decline because the approach using the age-specific and total fertility rate as analytical fertility measure is dependent on the quality of the age data reported.Again, data on postpartum abstinence, amenorrhoea and breastfeeding cannot be free from the effects of memory lapse together with digit preference. The proximate determinants model is not intended to provide accurate estimates. The study used it to assess to what extent changes in proximate determinants support the decline in Total Fertility Rate. In this respect, interpretation of results of the present study should be accepted in tandem with the limitations of the age data.

1.9 ORGANISATION OF STUDY

The study was divided into fivechapters. The first chapter dealt with the background to the study area, the rationale, literature review sources and limitation of data, method of analysis, conceptual framework.

Chapter two examined the quality of data and background characteristics of the study population such as education, religion and region.

In chapter three,attention was focused on the patterns and differentials in the proximate determinants, in addition to the estimation of the level of fertility. The fourth chapter dealt with the indices of the proximate determinants. From these the fertility inhibition effect was examined.The study concluded with the summary of the key findings and recommendations in chapter five.

CHAPTER TWO

DATA EVALUATION, DATA ADJUSTMENTAND BACKGROUNDCHARACTERISTICS OF SURVEY RESPONDENTS

2.0 INTRODUCTION

In this chapter the data for the study are evaluated and the socio-demographic profile of the respondentsare described. The data evaluation and adjustment techniques usedare Myers' index and the graphical methods (for single age evaluation), the Ramachandran formula (for the evaluation of age group data) and Index of Heaping (for the evaluation of breastfeeding, amenorrhea and abstinence data). The main background characteristics described in this chapter include: the age of the respondents at the time of the survey, place of residence, educational attainment, employment status, marital status, religion as well as ethnicity. The chapter also discusses the fertility behaviour and outcomes of respondents.

2.1Data Evaluation

Demographic data particularly from Africa contain errors namely content and coverage, which have the tendency to bias results if they are not addressed. Evaluation enables the researcher to detect the type and sources of error in the data (if any) so the necessary precautions can be taken in future surveys. It helps to assess the implications of observed errors on expectedestimates from the study.

It is necessary to evaluate demographic data for effective and meaningful analysis to be made. The main reason for the evaluation of data is to determine the extent of accuracy of the data collected, identify the types and sources of errors and make adjustments where necessary.

The evaluation of data is carried out with respect to age distribution, breastfeeding amenorrhea and abstinence as reported in the 1998 through 2008 GDHS.

TABLE 2.1 PERCENTAGE DISTRIBUTION OF REPORTED CURRENT AGE OF RESPONDENTS IN SINGLE YEARS

respondent Age	1998 Percent	2003 Percent	2008 Percent
15	4.23	4.02	4.41
16	3.76	4.11	3.97
17	3.06	3.88	4.03
18	4.13	4.36	4.92
19	3.18	3.18	3.76
20	4.34	4.64	4.39
21	3.49	2.93	3.01
22	4.05	3.57	3.89
23	3.01	3.3	3.3
24	3.43	3.08	3.09
25	4.77	4.04	4.54
26	3.55	3.6	3.09
27	3.16	3.08	2.85
28	3.92	3.5	3.64
29	2.29	2.76	2.5
30	4.34	3.73	3.82
31	1.90	2.34	1.83
32	3.16	3.29	2.85
33	2.06	2.57	2.26
34	2.19	2.46	2.18
35	3.78	3.2	3.76
36	2.48	2.6	2.69
37	1.73	2.18	2.03
38	3.30	2.81	2.87
39	1.65	1.93	1.61
40	3.92	2.97	3.13
41	1.30	1.63	1.55
42	2.00	2.14	2.32
43	1.34	1.88	1.32
44	1.42	1.42	1.55
45	2.44	2.65	2.97
46	1.53	1.63	1.59
47	1.30	1.67	1.42
48	2.02	1.85	1.85
49	1.76	1	1.02
Total	100	100	100

Source: Computed from the 1998, 2003 and 2008 GDHS

The observed single year age distribution as reported by the five GDHS reveal that the Ghanaian age structure is characterized by heaping on some ages and readily apparent deficit on others. The irregularities in the age distribution highlight the incidence of preference for some digits especially 0 and 5 or multiples of 5. The reported age distribution given in table 2.1 may be attributed to the inefficiency of some of the procedures adopted in age estimation. Heaping is prominent on digits 0 and 5 corresponding principally to age 15, 25, 30, 40 and 45. It is, however important to note that heaping is more pronounced at digits ending in 0 than those ending in 5.The heaping is at its peak at age 30, with percentages 4.34, 3.73, and 3.82 in 1998, 2003 and 2008 respectively. Also, minor and less glaring heaping are noticed at digits ending in even numbers especially 2 and 8.

A quick way to evaluate single year age data is to plot a line graph with ages in singleyears on the x-axis and the persons reporting at various ages on the y-axis. If thepopulation under study has not experienced any sharp decline or increases in fertility,mortality or migration, the population age distribution is expected to follow a smoothlinear graph. If this has been the case, fluctuation at various ages is noticed. If the peakshowever are gotten at 0, 5 and even digits, it is an indication of preference for thoseparticular digits. This reporting of certain ages at the expense of others is called ageheaping, age preference or digit preference. Line graphs for the five GDHS are shown in figures 2.1, 2.2and 2.3

FIGURE 2.1 AGE DISTRIBUTION OF RESPONDENTS IN 1998

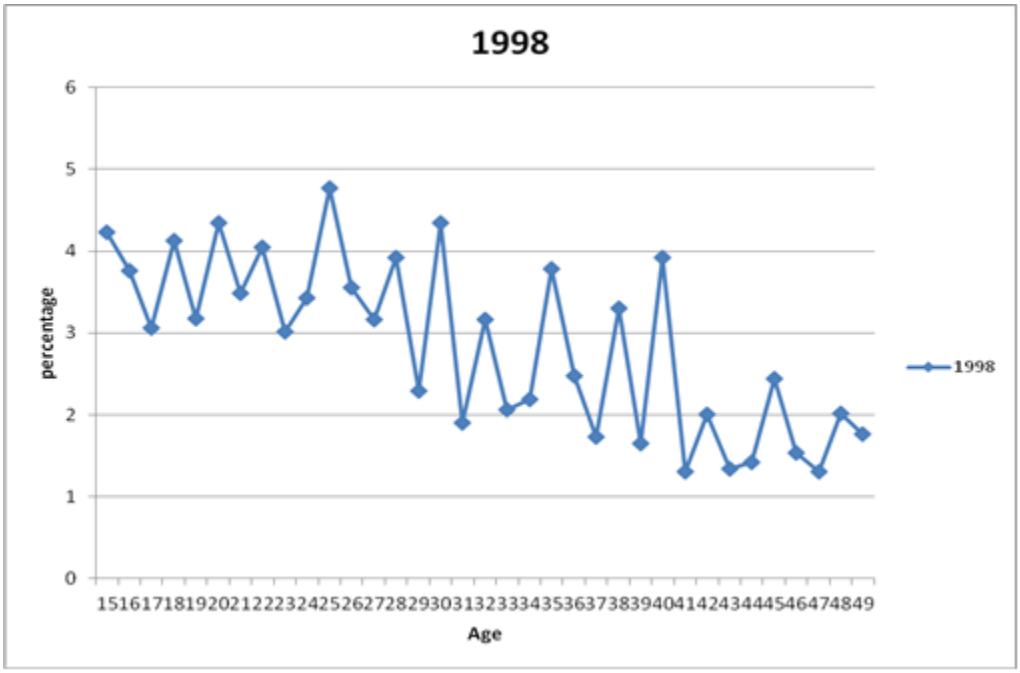


FIGURE 2.2 AGE DISTRIBUTION OF RESPONDENTS IN 2003

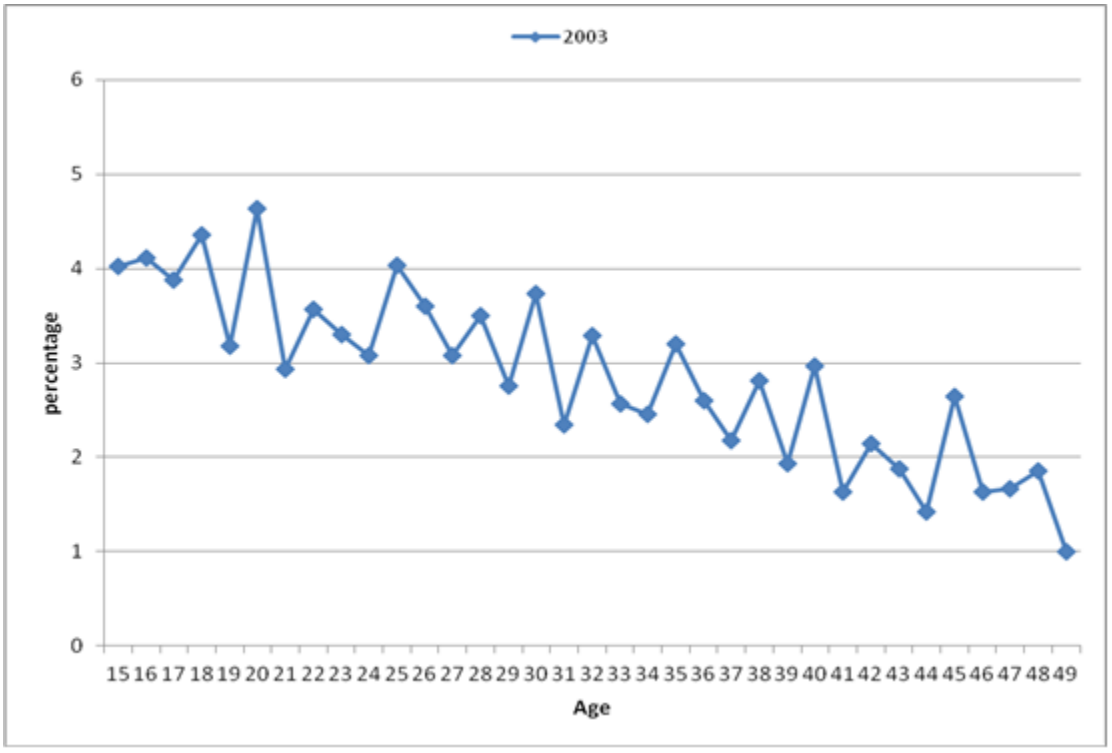
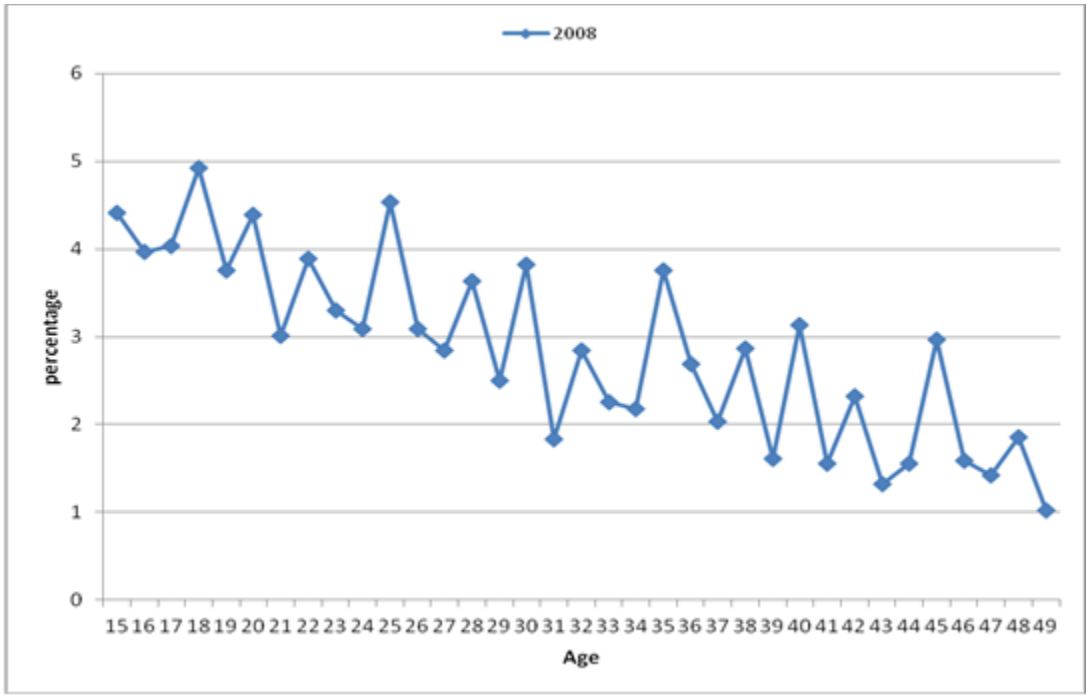


FIGURE 2.3 AGE DISTRIBUTION OF RESPONDENTS IN 2008



The graphical representation of the reported age distribution as depicted in figure 2.1, 2.2 and 2.3 suggest that the concentration of people on the ages ending in digits 0 and 5 may be the result of the transference of women from adjoining ages. For instance the dearth of women at ages 19 and 21, and at ages 29 and 31 could be partially accounted for by the huge concentration of the population at ages 20 and 30 respectively.By similar reasoning, it can be argued that the excessive numbers recorded at ages 15, 25, 35 , 40 and 45 are the outcomes of tranference of women to ages from 14 and 16, 24 and 26, 34 and 36, 39 and 41 and at ages 44 and 46 respectively.

The foregoing shows that two types of errors have characterised the GDHS age reporting.The first type of error is heaping(preference for certain digits), which shows the tendency of the respondents to prefer some digits. The second consists of systematic reporting of an age that is either higher or lower than the actual age of the respondents.However, to further illuminate the

degree of errors in the GDHS data and measure the extent of distortions in the reported age distributions, some mathematical indexes are applied to the data.

Digit Preference Index(DPI) is defined as the sum of the absolute deviation of the percentages from the expected 10 percent or as sum of the absolute values of both positive and negative deviations.DPI shows the preference/avoidance of each of the digits: 0, 1, 2, ……9.

The computation of DPI is restricted to women aged 20-49 years not only because it is a subset of 15-49 age group and therefore falls within the reproductive bracket which is the focus of the analysis of this study but also because age estimation errors are more prominent in the older ages and selective underreporting vitiates data at younger ages. Consequently, the use of 20-49 age group give each digit approximately equal probability of 10 percent occurrence in the true distribution.The result of the application of the DPI technique, displayed in Table 2.2, yield an index of preference for each terminal digit.

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TABLE 2.2EVALUATIONS OF AGE DATA USING DIGIT PREFERENCE (DPI)

Digits ending	1998	2003	2008
0	5.4	4.1	4.4
1	-1.8	-1.4	-1.9
2	1.3	1.2	1.5
3	-2.1	-0.4	-1.3
4	-1.4	-1.3	-1.4
5	3.5	2.3	4.3
6	-0.7	-0.3	-0.7
7	-2.4	-1.4	-2.0
8	1.3	0.1	0.6
9	-3.0	-2.9	-3.5
total	23.0	15.4	21.5

Source: Computed from the 1998, 2003 and 2008 GDHS

The summary index results support earlier discussions that 0 and 5 are the most preferred.

The index calculated for the 1998, 2003 and 2008 GDHS shows that at least 23.0, 15.4 and 21.5 percents of the women interviewed respectively had the last digit of their ages reported incorrectly. In the computation, only ages 20-49 were used for the females.

According to the established convention, survey values of less than a summary index of 10 percent have been classified as those having a low level of digit preference, those with values between 10 and 20 percent as having moderate level of digit preference whilst those with values above 20 are having a high level of digit preference. Going by this categorisation, it is conclusive that in Ghana there is a high level of digit preference in the reporting of the ages of respondents for all the rounds of GDHS except 2003 which has a moderate level of digit preference.

It is also necessary to appraise the data with respect to the distribution of respondents in 5-year age groups. This is becausethe analysis carried out in the study is based mainly on 5-year age groups and analysis carried out with broad age group can be severely affected by errors if there is a displacement of respondent from one age group to another.

Therefore, age ratio technique is employed here to assess the extent of errors in GDHS data according to the conventional 5-year age groups. Age ratios measure the degree of heaping on individual age groups relative the two adjoining age groups. They can be defined in several ways depending on which of the various formulae is adopted. In this analysis, the procedure developed by Ramachandran is used in the calculation of age ratios. He defined age ratio as the ratio of the population in a given age group to one fourth of the sum of twice the population in that age group and the preceding and following age groups. A computational procedure of this technique is given in appendix A. The age ratio score is the index that measures the extent of distortion over the entire age range and is simply obtained by taking the sum of the absolute deviations of

each score from 100 over the entire range and dividing by the sum by the number of each deviation.

Table 2.3 compare the distribution of female respondent in the GDHS.Ordinarily, age ratios should deviate only slightly from 100 since theoretically there should not be too much difference in the number of persons at three consecutive age groups in the absence of any substantial fluctuations in the past fertility, mortality or age selective migration or natural disasters.This means that the computation of age ratio is based on the assumption of linear decline being primarily consequent upon the effects of mortality.

TABLE 2.3: **PERCENT DISTRIBUTION OF OVER AND UNDER ENUMERATION OF AGES IN THE AGE GROUPS**

groups	1998	2003	2008
15-19			
20-24	0.8	-2.1	-3.2
25-29	5.1	3.1	4.1
30-34	-5.8	-1.6	-6.7
35-39	4.5	2.0	6.4
40-44	-4.8	-3.4	-5.0
45-49			

Source: Computed from the 1998, 2003 and 2008 GDHS

But Table 2.3reveals a wide deviation from this theoretical expectation in all the 3 rounds of GDHS data sets which is symptomatic in the reported age distributions. The table indicates that the proportions of women in each age group were not decreasing with increasing age. They fluctuated up to the age group 25-29 after which the proportion of women decreased consistently with increasing age in the three surveys and even that, the expected decline is not gradual.

The highest over – enumerated age group was 25–29 years with 6.9 percent and the least being 20- 24 years with 0.3 percent. The year groups that were under enumerated were 30–34 and 40–44.

The implication of all this is that there was a shifting of respondents from one age group to another and the shifting was not systematic.

Consequently, the expected gradual decline in the proportions of women from lower age group to a higher one could not be attained. Since the lower (close to zero)the age ratio score the more accurate the age data are presumed to be, the computed values further support the assertion that the quality of data in the reported distributions of all the surveys are doubtful.

The main limitation with the Ramachandran Age Ratio technique is that, it is not possible to compute for the first age group (ages 15–19) and the last age group (45–49 years) given uniformity in the data. Another limitation is that, even though over- reporting and under-reporting in an age group is known; it does not for instance tell the source of an under-reporting.

2.2.1 Evaluation of data on breastfeeding, abstinence and amenorrhea

When breastfeeding and postpartum amenorrhea durations are reported in the open birth interval, it can yield misleading results. Akinkumi (1989) states that imprecision in the dating of events such as the length of postpartum sexual abstinence, length of breastfeeding of a child and how long after the birth of a child the mother returns to menstruation are certainly associated with the imprecision in the dating of the birth itself.

Data on abstinence, amenorrhea and breastfeeding frequently shows some heaping on durations of usually multiples of 6 and 12 months where there is a tendency to report duration to coincide with these preferred months. The index of heaping is hence used to evaluate this data.

The index of heaping measures the percentage of the respondents who reported their duration in values of multiples of 6 which they prefer. This indeed is computed by adding the percentage of the preferred values of multiples of 6. To evaluate the effect of heaping on the data on abstinence, amenorrhea and breastfeeding, the complement of the percentage index of heaping in multiples of 6 and 12 month are used.

Tables 2.4, 2.5, and 2.6 shows the percentage distribution of duration of abstinence, amenorrhea and breastfeeding in 1998, 2003 and 2008 GDHS. Table 2.5 reveals that for breastfeeding the index of heaping is 41.4, 40.1 and 41.7 percent for the 1998 2003 and 2008 GDHS respectively meaning that 41.4, 40.1 and 41.7 percent misreported their duration of breastfeeding in preferred digits of multiples of 6. This means that 58.6,59.9 and 58.3 percent of respondents in all the three surveys respectively did not report the duration of their breastfeeding in the preferred digits of multiples of 6 and 12 months. It can therefore be seen that there was relatively better reporting on breastfeeding in 1998.

TABLE 2.4 PERCENTAGE DISTRIBUTION OF BREASTFEEDINGDURING THE LAST CLOSED BIRTH FOR THE THREE GDHS

DURATION IN MONTHS	1998	2003	2008
0	2.0	2.4	2.8
1	2.3	2.3	2.6
2	2.4	2.1	2.8
3	3.1	1.8	2.6
4	2.2	2.1	2.2
5	1.5	2.3	2.3
6	2.7	2.7	2.8
7	2.5	2.4	2.2
8	2.8	2.5	2.3
9	2.6	1.9	2.7
10	2.3	2.3	3.0
11	1.6	2.5	2.4
12	7.1	6.2	9.1
13	3.5	2.3	2.9
14	3.4	3.4	3.7
15	3.0	3.6	2.9
16	3.8	3.8	3.6
17	1.9	2.4	3.0
18	10.5	10.1	10.9
19	2.7	2.4	2.2
20	4.0	3.1	2.4
21	1.7	1.9	1.4
22	1.9	1.7	1.6
23	1.4	1.6	1.4
24	17.6	18.1	15.9
25	1.0	1.4	1.1
26	1.2	2.6	1.7
27	0.8	1.4	0.4
28	1.0	1.7	0.9
29	0.6	0.7	0.4
30	1.9	1.3	1.0
31	0.5	0.4	0.3
32	0.2	0.5	0.3
33	0.2	0.1	0.0
34	0.3	0.1	0.1
35	0.2	0.2	0.0
36	1.7	1.8	2.0
Total respondents	3,130	3639	2818
index of heaping	41.4	40.1	41.7

Source: Computed from the 1998, 2003 and 2008 GDHS

For data on amenorrhea Table 2.5 shows that the index of heaping (women who misreported their duration of amenorrhea) is 33.0,30.8 and 28.4 percent for 1998 2003and 2008 surveys respectively. This indicates that, 67.0 69.2percent and 71.6 percent of respondents in the 1998,2003 and 2008 surveys respectively did not report the duration of amenorrhea in the preferred digits of multiples of 6 and 12 months.

TABLE 2.5PERCENTAGE DISTRIBUTION OF AMENORRHEADURING THE LAST CLOSED BIRTH FOR THE THREE GDHS

DURATION IN MONTHS	1998	2003	2008
0	0.8	0.9	1.4
1	5.7	6.9	10.1
2	6.6	7.2	8.4
3	9.2	11.0	11.1
4	6.7	7.0	7.4
5	4.8	5.5	6.4
6	8.8	8.9	8.4
7	4.8	4.4	4.6
8	5.4	5.1	4.7
9	3.6	3.5	3.9
10	3.0	2.8	2.0
11	1.8	2.7	2.1
12	14.5	13.8	14.4
13	2.8	2.0	1.8
14	2.4	2.0	1.5
15	1.6	1.6	1.5
16	2.3	1.3	1.0
17	1.0	0.9	0.9
18	4.5	3.0	2.1
19	1.0	0.8	0.7
20	1.1	0.8	0.6
21	0.6	0.6	0.3
22	0.4	0.4	0.3
23	0.5	0.4	0.4
24	4.5	4.3	3.1
25	0.2	0.4	0.1
26	0.2	0.2	0.1
27	0.1	0.2	0.1
28	0.1	0.1	0.1
29	0.1	0.1	0.0
30	0.3	0.3	0.0
31	0.0	0.1	0.0
32	0.0	0.1	0.0
33	0.0	0.1	0.0
34	0.0	0.0	0.0
35	0.1	0.1	0.0
36	0.3	0.3	0.3
Total respondents	**3181**	**3714**	**2892**
index of heaping	33.0	30.8	28.4

Source: Computed from the 1998, 2003 and 2008 GDHS

With regard to abstinence Table 2.6 reveals that 31.1,31.4,29.7 percent of respondents in 1998,2003 and 2008 respectively did not report the duration of their breastfeeding in the preferred digits of multiples of 6 and 12 months. This further indicates that there was better reporting in 1998 survey than the other two surveys with respect to the reporting of abstinence duration.

Though the index of heaping has shown some amount of heaping, it does not appear to be large as to have major effects on the results of the study.

TABLE 2.6PERCENTAGE DISTRIBUTION OF ABSTINENCE DURING THE LAST CLOSED BIRTH FOR THE THREE GDHS

DURATION IN MONTHS	1998	2003	2008
0	0.8	0.9	1.3
1	2.4	2.9	3.8
2	3.9	3.6	5.3
3	8.4	8.5	10.4
4	8.8	10.4	10.2
5	7.8	9.6	9.6
6	13.3	14.5	14.8
7	6.4	6.5	6.7
8	8.2	6.2	5.3
9	4.0	3.4	3.3
10	2.9	2.7	2.9
11	1.4	1.8	1.5
12	10.4	10.2	9.7
13	2.0	1.6	2.0
14	2.0	1.7	1.2
15	1.3	1.6	1.0
16	1.5	0.7	0.9
17	0.9	1.0	0.7
18	2.3	2.0	1.4
19	0.9	0.6	0.4
20	1.2	0.6	0.6
21	0.6	0.7	0.4
22	0.4	0.5	0.2
23	0.4	0.4	0.5
24	4.1	3.6	2.9
25	0.3	0.3	0.3
26	0.5	0.3	0.5
27	0.4	0.4	0.1
28	0.3	0.4	0.3
29	0.4	0.3	0.3
30	0.4	0.3	0.3
31	0.3	0.2	0.1
32	0.1	0.2	0.2
33	0.1	0.1	0.0
34	0.1	0.1	0.1
35	0.1	0.1	0.0
36	0.6	0.7	0.6
Total	3119	3627	2,863
index of heaping	31.1	31.4	29.7

Source: Computed from the 1998, 2003 and 2008 GDHS

2.2BACKGROUND CHARACTERISTICS OF RESPONDENTS

Analysis of the background characteristics is useful in understanding the fertility behaviors of women since it has a bearing on the respondent's performance and is expected to help in explaining the fertility level and pattern in Ghana. It clearly shows how the background characteristics operate through the proximate determinants to influence fertility.

For instance, ethnic groups have values, norms and culture, which will affect fertility.The effect may enhance or depress fertility through prolonged amenorrhea.High levels of education may reduce the period of amenorrhea if uncompensated for by increase in use of contraceptives. The background characteristics considered here are age, marital status, place of residence, education, religion, ethnicity and occupation.

2.2.1 Age Distribution of the Respondents

Age is one of the most essential demographic variables. The structure of a population in terms of age is a basic consideration to the study of population problems.Generally, Fertility for age-groups may follow a normal age-specific curve, low fertility at young ages, fertilityincreasing to a maximum in the twenties, then declining at older ages.

Information on the age of each respondent was obtained from the women themselves. Table 2.7 presents the age distribution of women aged 15 – 49 years enumerated during the 1998, 2003 and 2008 Ghana Demographic and Health Survey (GDHS).

Table 2.7: PERCENT DISTRIBUTION OF FEMALE RESPONDENTS AGED 15–49 YEARS BY 5 YEAR AGE GROUP IN THE GDHS

	Percentages		
groups	1998	2003	2008
15-19	18.8	20.2	20.8
20-24	18.6	17.8	17.9
25-29	17.9	16.7	16.9
30-34	13.5	14.1	13.1
35-39	12.9	12.7	13.0
40-44	9.8	10.2	9.6
45-49	8.6	8.4	8.7
Total number of women	**4843**	**5691**	**4916**

Source: Computed from the 1998, 2003 and 2008 GDHS

The percentage distribution of the women declines with increasing age for all the three surveys. It can be seen that approximately82 percent of the respondents in all the three survey years are in the 15- 39 age group and the rest are in the age group 40-49. Again, the age distribution shows that more than one in two females (that is 55 percent) of the respondents in 2003 are under age 30 years. The mean age of respondents 15 – 49 years in 1998 is 29.12 and that of 2008 is 28.96.

2.2.2 Place of residence

People's beliefs, customs and behaviour can be influenced by the type of place of residence they happen to find themselves. Therefore the place of residence plays a key role in shaping attitudes, behaviour patterns and values, which eventually influence fertility.Fertility tends to be higher in rural areas than in urban areas. Place of residence may have a strong effect by influencing a woman's values, how she spends her time and her view of the world.Women in rural areas may want larger families to ensure that someone helps with domestic and agricultural activitiesand provides financial security in old age.In urban areas, women may begin to limit their fertility because of cost associated with childbearing. Living in urban areas may change women's values

as they are exposed to the modern health sector, family planning and more western attitude. (Acsadi and Johnson Acsad, 1990)

All the three rounds of GDHS classified information on place of residence into urban and rural areas. Table 2.8 indicates the percent distribution of women by place of residence in five-year age groups for the three survey years.

TABLE 2.8: PERCENT DISTRIBUTION OF WOMEN BY PLACE OF RESIDENCEFOR THE THREE SURVEY YEARS

Place of residence	1998	2003	2008
urban	35.9	48.4	48.5
rural	64.1	51.6	51.5
Total	4843	5691	4916

Source: Computed from the 1998, 2003 and 2008 GDHS

Table 2.8 shows that, the proportion of respondents in the 1998 survey that were rural residents was 64.1 percent and the proportion of urban residents was 35.9 percent. That implies that about two in three respondents are rural residents. The percentage of respondents in the 2003 survey that was rural was 51.6 percent with 48.4 percent as urban.It is worthnoting that while the proportion of women in the urban areas increases from 35.9 percent in 1998 to 48.4percent in 2003 and to 48.5 percent in 2008, that of rural areas decreases from 64.1 percent in 1998 to 51.6 percent in 2003 and 51.5 percent in 2008.

2.2.3 Educational Attainment

Education is an important socio-economic variable that affects fertility by influencing that age at first sexual intercourse, the desired family size and contraceptive use. The experience of attending school may provide women the confidence they need to aspire higher in their professions, this helps in delaying age at first marriage and birth and therefore reduces fertility.

Two basic patterns describe the association between Education and fertility. As women education increases fertility declines. The relationship follows an inverted U-shape pattern that is, in comparison to women with no education, women with some education have high fertility, but those with even greater amount education have thelowest fertility of all. These two patterns have been previously documented by Tawiah(1997) among others.Ilori (1985) had found U-shaped pattern between education and fertilityin Nigeria. A common explanation of the finding, is that women with education have higher fertility is that increased female education and urbanisation are generally correlated with decreases in duration of breastfeeding and postpartum abstinence, which leads to shorter intervals between births and thus higher fertility (Adegbola et al.. 1977).Women with some education are also likely to seek modern health care from medical problems, such as STDs, leading to reducedsubfecundity (Cochrane 1979,Romaniuk,1980). On the other hand greater contraceptive use and use of more effective method is generally associated with education, hence education having a negative relation with fertility.

Table 2.9 show the percentage distribution of respondent education level. From Table 2.9, it is observed that majority of the respondents have had some education, however 29.1percent in 1998, 21.2 percent in 2008 had never attended school. It is noteworthy that while the proportion of women with No Education decreases from 29.1 percent in 1998 to 28.3 percent in 2003 and to 21.2 percent 2008, those of tertiary increase from 2.3 percent in 1998 to 2.6 in 2003 and to 3.9 percent in 2008.

TABLE 2.9: PERCENTAGE DISTRIBUTION OF RESPONDENTS BY THE HIGHEST EDUCATIONAL ATTAINMENT

Education	1998	2003	2008
No education	29.1	28.3	21.2
Primary	18.1	20.0	20.1
Secondary	50.6	49.2	54.8
Tertiary	2.3	2.6	3.9
Total	**4843**	**5691**	**4912**

Source: Computed from the 1998, 2003 and 2008 GDHS

2.2.4 Employment Status

Female employment might lead to lower fertility since working reduces a woman's available time, and as raising children is time-intensive. Female employment could also lead to higher fertility by boosting family income, thereby making the expenses of childrearing more affordable.Hence the analysis of employment status.

TABLE 2.10: PERCENT DISTRIBUTION OF FEMALE RESPONDENTS IN THE 1998 2003 AND 2008 GDHS

Employment Status	1998	2003	2008
unemployed	23.7	22.3	22.3
Employed	76.3	77.7	77.7
Total	**4843**	**5661**	**4916**

Source: Computed from the 1998, 2003 and 2008 GDHS

From table 2.10, it can be seen that whereas the proportion of women who are unemployed decreased from 23.7 percent in 1998 to 22.3 percent in2003 and stalled in 2008, the proportion of their counterpart who are employed increased from 76.3 percent in 1998 to 77.7 percent in 2003 and further stabilized in 2008.It can also be observed that both unemployment and employment stalled from 2003 to 2008.

2.2.5Marital Status

Studies have shown that the proportion married among women in their reproductive years is an important determinant of observed fertility levels. An observation in Africa is that, fertility is

often higher in marital unions than outside unions.Marriage is universal in Ghana and commencement of childbearing is socially acceptable only within the institution. Marriage therefore exposes a woman to the risk of pregnancy during her reproductive years. However there are non-marital childbearing. Therefore information on marital status in fertility studies is essential.

All the three rounds of GDHS classified data on marital status into categories of never married, married, living together, widowed and divorced. For the purpose of comparison, this study puts 'divorced' and 'not living together' as one. Table 2.11 illustrates the percentage distribution of female respondents by marital status for 1998, 2003 and 2008.

The data from the 1998 GDHS shows that close to one of every five women has never been married and in 2008 only about three in ten women were never married representing 32.4 percent of the respondents. Almost two-thirds of women are in a kind of marital union that is either married or living together in 1998 and in 2003 most of the respondents were married or living together.

TABLE 2.11: PERCENT DISTRIBUTIONS OF FEMALE RESPONDENTS BY MARITAL STATUS

Marital status	Percentages		
	1998	2003	2008
Never married	23.7	28.4	32.4
Married	52.0	54.3	45.4
Living together	12.7	8.1	13.1
Widowed	1.8	1.9	2.1
Divorce/Not living together/Separated	9.8	7.3	7.0
Total Number of women	4843	5691	4916

Source: Computed from the 1998, 2003 and 2008 GDHS

2.2.6 Religion

Religion is one of the socio-economic variables that influence fertility. This is because individual's beliefs in the rebirth of ancestors and also the belief that children are a gift from God encourages early marriage and childbirth.Table 2.12 illustrates the percentage distribution of women respondents by religion. From the Table, most of the respondents were Christians. The proportion of Christians increased from 38.6 percent in 1998 to 77.4 percent in 2003 and further decreased to 66.5 percent. It can also be observed that the proportion of Muslims have decreased from39.6percent in 1998 to 15.6 in 2003 and a further decline to 11.1 percent in 2008.The Table further shows that the proportion of Catholics decreased from 14.6 percent in 1998 to 13.9 percent in 2003 and to 12.4 in 2008. It is also worth noting that the proportion of women with no religion decreased from 6.5 percent in 1998 to 4.4 percent in 2003 and 4.2 in 2008. In 2008, 11 percent of the respondents were Muslim and 15 percent and 4 percent respectively professed to belong to traditional religion or had no religion respectively. In the 2003 about 16 percent professed to be Muslims whiles 3 percent and 4 percent of the respondents professed traditional and no religion respectively.

Table 2.12: PERCENT DISTRIBUTION OF RESPONDENTS BY RELIGION, 1988, 1993, 1998, 2003 AND 2008

	Percentages		
Religion	1998	2003	2008
catholic	14.6	13.9	12.4
other christian	24.0	63.5	54.1
moslem	39.6	15.6	11.1
traditional	11.0	2.7	15.0
no religion	6.5	4.4	4.2
other religion	4.4	0.0	3.1
Total Number of women	4843	5690	4907

Source: Computed from the 1998, 2003 and 2008 GDHS

2.2.7 Ethnicity

Ethnicity may either enhance or depress fertility, due to the customs, beliefs, values and norms of the ethnic groups. Ethnic groups have different perceptions about post-partum abstinence and the initiation, duration and supplementation of breastfeeding. Some ethnic groups experienced greater exposure to cultural and scientific innovations from the western world and are more likely to adopt modern birth control practices.Other Ethnic groupson the contrary, are expected to be much more traditional with regard to childbearing as a result of little, or lack of exposure to western culture.

Table 2.13 shows the distribution of women interviewed in 1998, 2003 and 2008 GDHS by ethnicity. The table indicates that in 1998, Akan (Akwapim, Akyem, Asante, Fanti and all other Akans) constituted 53 percent of the respondents, in 2003 they were 50.8 percent and in 2008 50.7 percent making the Akans the predominant ethnic group. The table further shows that the proportions of Ga/Dangmedecreased 8.3 percent in 1998 to 8.2 percent in 2003 and a further decline in 7.0 percent in 2008.It also be seen in all the three survey years the Guans had the least proportion of females.

TABLE 2.13: PERCENT DISTRIBUTION OF WOMEN BY ETHNIC GROUP.

	Percentages		
Ethnicity	**1998**	**2003**	**2008**
Akan	53.7	50.8	50.7
Ga/Dangme	8.3	8.2	7.0
Ewe	15.8	13.1	12.9
Guan	1.5	2.6	2.5
Mole-Dagbani	6.8	12.9	16.2
Other Ghanaians	10.4	4.9	6.7
Other Africans	3.5	7.7	4.0
Total Number of women	**4843**	**5685**	**4915**

Source: Computed from the 1998, 2003 and 2008 GDHS

2.2.8 Region of residence

Some Regions may have more hospitals and clinics all over making those regions have more access to contraception and abortion services which may reduce their fertility. Some Regions may be characterised by strict adherence to traditional norms and practices governing morals and hence are less likely to resort to induced abortion and contraceptive use which may increase their fertility. Other regions may either delay or reduce their sexual activity due to the enormous educational and jobopportunities thereby reducing their fertility.

The number of women in Ashanti region has been increasing from 15.0percent in 1998 to 20.3 percent in 2003 and further to 20.6 percent in2008 making Ashanti region the region with the highest percentage of women in 2008.In Northern region the number of women increased from 4.8 percent in 2003 to 8.8 and further increasedto 9.5 percent, whereas in Western region the percentage of women dropped from 12.3 in 1998 to 9.7percent andfurther declined to 9.1. In Greater Accra the percentage decreased slightly from 16.7 in1998 to 16.6 in 2003 and increased to 8.6 in 2008.

TABLE 2.14: PERCENT DISTRIBUTION OF WOMEN BY REGION OF RESIDENCE

region	1998	2003	2008
Western	12.3	9.7	9.1
Central	11.4	7.6	8.6
Greater Accra	16.7	16.6	17.4
Volta	11.1	8.7	8.8
Eastern	13.0	10.6	9.8
Ashanti	15.0	20.1	20.6
BrongAhafo	7.4	10.0	8.7
Northern	4.8	8.8	9.5
Upper East	2.5	2.7	5.2
Upper West	6.0	5.4	2.5
Total	4843	5691	4916

Source: Computed from the 1998, 2003 and 2008 GDHS

2.3 FERTILITY BEHAVIOUR AND OUTCOMES

Fertility refers to the actual birth performance while fecundity refers to the capacity of a woman to give birth. Some basic fertility measures used in this study to asses levels and patterns of fertility include age specific fertility rate (ASFR), Total fertility rate (TFR) and children ever born (CEB).

The 1998, 2003 and 2008 GDHS data used for analysis in this study collected information on current fertility, that is birth in the last 12 months before the survey and cumulative fertility that is the number of children ever born.

Age Specific fertility rate (ASFR) measures the variation in the reproductive performance over age. It gives the average annual birth to a woman of specified age or age group. It is usually calculated from births in the last 12 months. But approximation can be obtained from births in the past five years preceding the survey.

2.3.1 Age specific fertility Rate(ASFR's)

ASFR is a measure of the current fertility performance of women and is not directly influenced by the age sex composition of the entire population. TFR and age pattern of the fertility can be derived from a set of age specific fertility rates (ASFR). Errors usually result in the calculation of the ASFR due to misconception of time reference

$$F(i) = \frac{B(i)}{W(i)} \times 1000$$

$$F(i) = ASFR\ of\ women\ in\ each\ age\ group$$

$$B(i) = the\ number\ of\ births\ \ to\ women\ in\ each\ age\ group$$

$$W(i) = the\ number\ of\ women\ in\ each\ age\ group$$

Table 2.15: The Age Specific Fertility Rates (ASFR's) Of Respondent Ghana

	Reported ASFR's		
Age Group	1998	2003	2008
15-19	0.09	0.074	0.066
20-24	0.192	0.176	0.176
25-29	0.206	0.210	0.206
30-34	0.183	0.182	0.173
35-39	0.143	0.141	0.118
40-44	0.079	0.070	0.059
45-49	0.016	0.036	0.008

Source: computed from the GDHS 1998, 2003 and 2008

Among females, the frequency of child bearing varies markedly from one age group to another. There is a characteristic age pattern of fertility, which is quite similar all over the world. The pattern is revealed by computing age specific fertility rates (ASFR). The ASFR is the number of live births per 1000 women of a specified age in a given year (12 months). These are a set of seven rates that show the distribution of frequency of births among women according to age.

Figure 2.4: Age pattern of current fertility

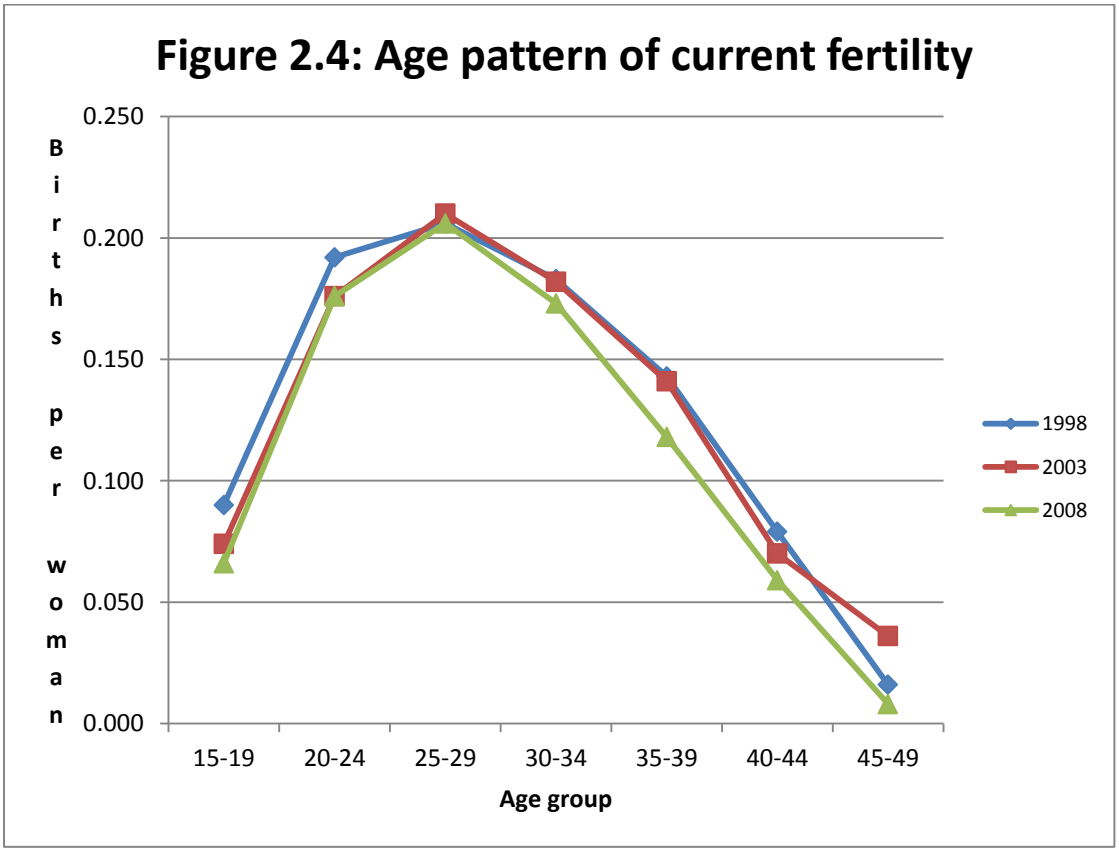


Figure 2.4 shows graphically the observed age pattern of current fertility from the 1998, 2003 and 2008 GDHS. According to the United Nations, there are three (3) age patterns of fertility namely; the early peak type (where maximum fertility occurs in the age group 20-24, the late peak type (where maximum fertility occurs in the 25-29 age group and broad peak (where age specific fertility rates in the 20-24 and 25-29 age groups differ only slightly.

As is shown in Figure 2.4, the fertility pattern of Ghana suggests a late peak. The curve rises sharply and swiftly from age 15 (fifteen) to a peak between ages 25-29. Thereafter, it declines somewhat gradually to virtually zero (0) by age 50, indicating a reduction in the rate of childbearing for the 45-49 age groups.

2.3.2 Mean number of children ever born

The number of children ever born (CEB) to a woman is an aggregate measure of her lifetime fertility experience up to the moment at which the information is collected.

Normally, it is expected that the reported mean parity of women increases with age. The effect of age on mean number children ever born (CEB) is apparent, with older women reporting higher mean number of CEB than younger women.

Table 2.16 shows the mean number of children ever born by age of mother. The mean number of children ever born in 1998 was 2.63, that for 2003 was 2.53 and that of 2008 is 2.33.

The results also conform to the expected age pattern of fertility where the mean number of children ever born increases with age. The mean number of CEB in 1998 increases from 0.13 for age group 15-19 to 5.93 for age group 45- 49, in 2003 it increased from 0.11 for age group 15–19 to 5.88 for age group 45 – 49 and in 2008 it rose from 0.11 for age group 15-19 to 5.59 for 45-49 age group.

Table 2.16: **Percentage Distribution Of Women By Mean Number Of Children Ever Born According To Five Year Age Groups.**

Groups	1998		2003		2008	
	Number of women	Mean number of CEB	Number of women	Mean number of CEB	Number of women	Mean number of CEB
15-19	910	0.13	1148	0.11	1025	0.11
20-24	900	0.99	1012	0.80	878	0.81
25-29	867	2.00	951	2.01	832	1.83
30-34	653	3.36	802	3.26	644	3.01
35-39	625	4.46	722	4.38	638	3.90
40-44	473	5.42	579	5.18	470	4.79
45-49	415	5.93	477	5.88	429	5.59
Total	**4843**	**2.63**	**5691**	**2.53**	**4916**	**2.33**

Source: Computed from the 1998, 2003 and 2008 GDHS

Averagely, women between the ages of 25 – 29 years have two children. This increases to 4.46 children among women in their late thirties and rises to 5.88 children among women within ages of 45-49 years who are at the end of their reproductive years. A similar pattern exists for 2003 and 2008.

CHAPTER III

FERTILITY LEVELS AND DIFFERENTIALS IN THE PROXIMATE VARIABLES

3.1 Introduction

One of the objectives of this study is to examine the inter-relationships between proximate variables and fertility. This chapter therefore discusses the patterns and differentials in the proximate determinants of fertility in Ghana and attempts to estimate the fertility levels.

3.2 AGE AT FIRST SEXUAL INTERCOURSE

From Table 3.1 below, age at first intercourse in the totalsample of women aged 15-49 remained 17 years in 1998 and 2003 and increased to 18 in 2008.

Table 3.1 Mean Age at First Sexual Intercourse Among Women Aged 15-49 by Selected Background Characteristics, GDHS 1998, 2003 and 2008

Background Characteristics	1998	2003	2008
Type of place of residence			
Urban	17	18	18
rural	17	17	17
Educational level			
No education	17	17	17
Primary	17	17	17
Secondary	17	18	18
Higher	19	20	21
Region			
Western	17	17	18
Central	17	17	17
Greater Accra	18	18	18
Volta	17	17	18
Eastern	17	18	17
Ashanti	17	18	18
BrongAhafo	16	17	17
Northern	17	17	18
Upper East	17	18	17
Upper West	17	17	16
Religion			
Catholic	17	17	18
Other Christian	17	18	18
Moslem	17	17	18
Traditional	17	17	17
Other	17	17	18
Ethnicity			
Akan	17	17	18
Ga/Dangme	17	18	18
Ewe	17	17	18
Guan	17	18	18
Mole-Dagbani	17	17	18
Other	17	17	18
Employment			
Not currently employed	17	17	17
Currently employed	17	18	18
TOTAL	17	17	18

Source: Computed from the 1998, 2003 and 2008 GDHS

Table 3.1 also shows that women in the rural areas initiate sexual intercourse a year earlier than those from the urban areas except in 1998 where those in the rural and urban areas initiated sexual intercourse in the same year. As the level of education increases from secondary to higher education age at first sexual intercourse also increases for all the years. The age at first sexual intercourse remains the same from no education to primary (17years).It is worth noting that women with no education on the average initiate sex two years earlier than their counterpart with higher education. Age at first intercourse remainsrelatively stable across age groups within the regions.BrongAhafo had lowest mean age at firstsexual intercourse(16years in 1998). Overall, the mean age first sexual intercourse for all the sub-groups ranges from 17 to 18 years.

3.3 POSPARTUM INFECUNDABILITY

To obtain information on postpartum practice the GDHS collected data on breastfeeding, sexual abstinence and amenorrhea. The information collected was based on birth interval for all births occurring five years before the survey.But the analysis of the GDHS data on postpartum practice was based on thirty six months before the survey.

The mean duration of breastfeeding, amenorrhea or abstinence were calculated by dividing the total number of breastfeeding, amenorrhea or abstinence by the average number of births per month over 36-month period.These are presented according to the background characteristics in Table 3.2, Table 3.3 and Table 3.4

3.3.1 Duration of Breastfeeding

The mean duration of breastfeeding by background characteristics in Ghana for 1998, 2003 and 2008 are shown in Table 3.2. Table 3.2 indicates clearly an inverse relationship between the duration of breastfeeding and the educational level of the mother. From the 1998 data, Ghanaian mothers with no education were found to breastfeed on the average for 19.9 months and

decreases to 13.2 months for mothers with higher education. A similar relationship is evident from the 2003 and 2008 data. Mothers with no education breastfeed on the average 21.3 months and this decreases to 15.6 months among mothers with higher educationin 2003. This means that, the duration of breastfeeding declines with the increase in the educational level of mothers. This inverse relationship could be explained by the fact that more educated mothers are more likely to work away from home which, makes it difficult with child caring and childbearing.

Table 3.2:Mean Duration of Breastfeeding (in Months) by Selected Background Characteristics of Women in Ghana.

BACKGROUND CHARACTERISTICS	1998	2003	2008
Type of Place of Residence			
Urban	16.9	18.2	17.4
Rural	19.4	20.6	19.1
Education			
No Education	19.9	21.3	19.8
Primary	18.9	18.8	17.6
Secondary	17.8	18.9	18.3
Higher	13.2	15.6	13.5
Region			
Western	18.8	18.4	17.5
Central	17.0	19.4	16.8
Greater Accra	15.2	16.8	15.7
Volta	20.3	19.8	20.4
Eastern	18.4	18.9	18.1
Ashanti	18.7	19.1	18.1
BrongAhafo	21.1	20.9	20.1
Northern	20.4	22.3	19.2
Upper East	22.1	21.0	24.2
Upper West	20.8	24.7	21.1
Religion			
Catholic	19.3	19.7	19.6
Other christian	18.0	19.1	17.8
Moslem	21.0	21.6	19.2
Traditional	20.7	21.3	20.4
Other	18.9	20.4	17.9
Ethnicity			
Akan	18.0	18.9	17.5
Ga/Dangme	17.1	18.5	17.1
Ewe	19.4	19.0	19.4
Guan	21.1	21.8	19.3
Mole-Dagbani	21.7	22.7	20.4
Other	20.2	20.8	18.5
Employment			
Not currently employed	18.4	18.0	18.5
Currently employed	18.8	19.9	18.4
Total	**18.7**	**19.7**	**18.5**

Source: Computed from the 1998,2003 and 2008GDHS.

From table 3.2 urban dwelling women on the average breastfed for 16.9 months in 1998, it increased to 18.7 months in 2003 and declined slightly to 17.4 months in 2008 compared to their rural counter parts whose mean duration of breastfeeding was19.4 months in 1998, it went up to 20.6 months in 2003 and decreased to 19.1 months in 2008.It can be observed that women who are resident in the urban areas have lower or shorter breastfeeding duration compared to their rural counterparts, this may be attributable to the fact that women resident in rural areas are less likely to work in formal settings and hence have the time to breastfeed their children for a longer period of time

On level of education, women with no education tend to breastfeed longer than those with education. In all the years except in 2008, as the level of education increases, meanduration of breastfeeding decreases.

Among the 10 administrative regions in Ghana, the average duration of breastfeeding has been lowest in the Greater Accra Region in all survey years with mean duration of 15.2 months, 16.8 months and 15.7months in 1998, 2003 and 2008 respectively. The regions with the highest duration of breastfeeding are Upper West Region (24.7 months) in 2008 and Upper East Region (24.2 months) in 2003.

It can be observed from table 3.2 that, women who professed to be Catholics breastfeed longer than other Christians. In all the years except in 2008 Moslems women had the longest duration of breastfeeding.Christian mothers had average duration of breastfeeding of 18.65 months in 1998, 19.4months in 2003 and 18.7 months in 2008 being the religion with theshortest duration of breastfeeding.

With regard to ethnicity the Mole-Dagbani had the longest duration of breastfeeding, averaging 21.7months in 1998, 22.7months in 2003 and 20.4 months in 2008.The Ga/Dangme had the least duration of breastfeeding in all three years (17.1 months in 2003, 18.5months in 2003 and 17.1months in 2008), possibly because they live in the capital city where they may be engaged in industrial work away from home.

3.3.2. Duration of Postpartum Amenorrhea

The 1998,2003 and 2008 GDHS collected information on postpartum amenorrhea as is presented in Table 3.3 the mean duration of postpartum amenorrhea in Ghana was 9.5 months in 1998, 8.8 months in 2003and 7.8 months in 2008. On the average, postpartum amenorrheahas been between 7 to10 months in all the three survey years.

Education has an inverse relationship with the mean duration of amenorrhea. Women with no education had a mean duration of amenorrhea of 10 months in 1998 and 2003 and 9.1 in 2008. It was 6.4 months in 1998, 6.0 months in 2003 and 5.7 months in 2008 among mothers with higher education. This lower duration of amenorrhea could be attributed to the fact that education is negatively related to the duration of breastfeeding. Mothers with higher education may breastfeed for short periods because of the occupational demand on their time and hence their period of amenorrhea is also shortened.

Women living in rural areas have a longer mean duration of amenorrhea (10.0 months in 1998, 9.4 months in 2003 and 8.5 in 2008) than their counterparts in urban areas with a mean duration of 8.0 months in 1998 7.7 in 2003 and 6.8 in 2008. This could be attributed to the fact that women in rural areas breastfeed for longer durations which increase the period of amenorrhea than women in urban areas. It could also be that women in urban areas have more access to education and better jobs making them have lesser time to breastfeed.

The mean duration of amenorrhea was longer among women living in Upper East Region (12.7 months) and shorter among women in Greater Accra Region (6.6 months) in 2008.The difference may be as a result of the beliefs ofthe women in the Upper East Region about breastfeeding or the fact that Greater Accra is more urbanized than the Upper East Region as such more of the women work away from home hence the lower duration of amenorrhea.

In all the years, women that professed traditional religion had the longest duration of amenorrhoea compared to women that professed to be either Christian or Moslem. Overall the mean duration of amenorrhea decreased overtime and similar pattern existed in all the background characteristics.

Table 3.3: Mean Duration of Postpartum Amenorrhea in the Preceding Birth Interval by Background Characteristics of Women.

BACKGROUND CHARACTERISTICS	1998	2003	2008
Type of Place of Residence			
Urban	8.0	7.7	6.8
Rural	10.0	9.4	8.5
Education			
No Education	10.3	10.0	9.1
Primary	9.3	8.4	7.6
Secondary	9.0	7.8	7.2
Higher	6.4	6.0	5.7
Region			
Western	10.7	8.2	7.2
Central	9.6	9.2	7.3
Greater Accra	7.5	7.9	6.6
Volta	9.9	8.5	10.0
Eastern	9.7	9.0	8.1
Ashanti	8.5	7.6	7.0
BrongAhafo	9.7	8.2	8.8
Northern	9.8	10.2	7.9
Upper East	12.7	10.3	10.2
Upper West	9.6	12.5	8.3
Religion			
Catholic	9.5	9.1	8.5
Other Christian	9.2	8.3	7.7
Moslem	9.7	9.4	7.7
Traditional	10.5	10.6	8.9
Other	10.1	9.9	7.6
Ethnicity			
Akan	9.3	8.1	7.4
Ga/Dangme	9.0	9.1	7.0
Ewe	9.4	8.3	8.5
Guan	9.2	10.2	10.3
Mole-Dagbani	10.3	10.2	8.5
Other	10.0	9.8	7.7
Employment			
Not currently employed	8.9	7.9	7.0
Currently employed	9.6	8.9	7.9
Total	**9.5**	**8.8**	**7.8**

Source: Computed from the 1998, 2003 and 2008 GDHS.

3.3.3 Duration of Postpartum Abstinence

Postpartum abstinence is the avoidance of sexual intercourse after childbirth. Table 3.4 presents the mean duration of postpartum abstinence and the mean duration by background characteristics in Ghana. Generally the average duration for postpartum abstinence increases from 1998 levels to 2003 and decline slightly in 2008.

Table 3.4: Mean Duration of Postpartum Abstinence by Background Characteristics of Women

BACKGROUND CHARACTERISTICS	1998	2003	2008
Type of Place of Residence			
Urban	8.3	7.9	7.6
Rural	8.8	8.9	7.7
Education			
No Education	9.7	10.0	9.0
Primary	8.5	7.6	7.3
Secondary	7.9	7.9	7.2
Higher	7.2	5.2	5.7
Region			
Western	8.4	7.5	7.1
Central	6.9	7.1	6.6
Greater Accra	7.5	7.4	6.5
Volta	9.6	8.9	7.9
Eastern	7.5	8.3	7.6
Ashanti	8.1	7.3	6.7
BrongAhafo	9.2	7.6	7.3
Northern	11.9	12.5	10.8
Upper East	13.6	10.4	11.0
Upper West	12.2	13.1	8.7
Religion			
Catholic	9.2	9.0	8.1
Other Christian	7.9	7.6	7.1
Moslem	11.2	11.1	9.6
Traditional	11.4	10.0	8.3
Other	8.8	10.0	7.1
Ethnicity			
Akan	7.7	7.4	7.0
Ga/Dangme	7.6	7.4	6.0
Ewe	9.0	8.2	7.4
Guan	10.4	9.5	7.9
Mole-Dagbani	13.3	12.5	10.4
Other	10.2	9.6	7.5
Employment			
Not currently employed	9.6	9.1	7.3
Currently employed	8.5	8.5	7.7
Total	8.7	8.5	9.5

Source: Computed from the 1998 and 2003 GDHS.

Rural respondents abstain for longer duration after birth than their urban counterparts in 1998 2003 and 2008. Rural women are found to abstain for 8.8 months in 1998, 8.9 months in 2003 and 7.7 compared to their urban counterparts who on the average abstained for 8.3 months in 1998, 7.9 months in 2003 and 7.6 in 2008. This could be because women living in rural areas are more likely to hold on to traditional sexual taboos of not having sexual intercourse while breastfeeding than urban women.

Christian mothers abstain for a shorter duration than women who profess to belong to Moslem and traditional religions. Christian respondents reported to abstain from sexual relations after birth for an average of 7.9 months in 1998, 8.6 months in 2003 and 7.1 in 2008 while for their Moslem counterparts reported abstention is 11.2 months in 1998, 11.1 months in 2003 and 9.6 months in 2008.

Table 3.4 shows that respondents with no education and primaryeducation abstain from sexual intercourse longer than mothers with secondary or higher education in the surveys. The mean duration of abstinence for women with no education, increases from 9.7 months in 1998 to 10.0 months in 2003 and to 9.0 in 2008 whereas woman who have higher education have their mean duration of breastfeeding changingfrom 7.2 months in 1998 to 5.2 months in 2003 and to 5.7 in 2008.

On region of residence, woman in the Northern regions of Ghana abstain longer than those in the Southern Ghana plausibly because majority of those in the northern part are moslems, since moslems abstain for longer period.

On ethnicity there is considerable diversity in the length of abstinence although Mole-Dagbanihad the longest duration of abstinence at all the surveys. This may be as result of the

belief thatsemen contaminates breast milk and hence the need to abstain for as long as the mother is breastfeeding (Tutu, 2008)

3.4Current Use of Contraception

Effective contraceptive use protects women from the risk of pregnancy and hence childbirth. It is one of the most appropriate means of controlling fertility.It enables couples to control their family size and space their children.

The percentage distribution of sexually active women who have currently used a method of contraception is presented in Table 3.5. Analysis of the data shows that in Ghana, contraceptive prevelance rate among sexually active women who have currently used contraception was 18.3 percent in 1998,it increased to 20.7 percent in 2003 and further declined slightly to 19.4 percent in 2008. Sexually active women who are resident in urban areas in Ghana had 23.0 percent of them in 1998 who have currently used contraceptives, in 2003 they were 22.8 percent and 20.6 percent in 2008 compared with their rural counterparts with 15.2 percent in 1998, 18.7 percent in 2003 and 18.2 in 2008.

Table 3.5: Percentage Distribution of Sexually active Women Who Have Currently used contraception.

BACKGROUND CHARACTERISTICS	1998	2003	2008
Residence			
Urban	23.0	22.8	20.6
Rural	15.2	18.7	18.2
Region			
Western	14.6	21.2	15.0
Central	14.8	14.0	19.4
Greater Accra	24.1	23.5	25.3
Volta	19.0	19.9	22.6
Eastern	21.2	22.1	21.6
Ashanti	19.1	24.0	21.5
BrongAhafo	21.1	27.4	21.2
Northern	9.4	10.8	5.5
Upper East	11.3	21.4	11.6
Upper West	8.5	10.0	19.1
Education			
No Education	11.5	13.6	11.8
Primary	15.9	20.2	20.5
Secondary	21.8	24.2	21.6
Higher	35.4	34.1	23.2
Religion			
Catholic	19.2	22.6	20.9
Other Christian	19.5	22.9	19.8
Moslem	15.3	14.9	11.7
Traditional	4.6	5.1	15.3
Other religion	16.0	11.6	21.9
Ethnicity			
Akan	19.4	24.0	20.8
Ga/Dangme	23.5	19.3	23.9
Ewe	18.1	21.6	25.6
Guan	15.7	19.5	15.4
Mole-Dagbani	12.1	14.9	11.7
Other	12.7	13.7	14.4
Employment			
Not currently employed	10.8	12.2	10.6
Currently employed	20.3	23.2	22.0
Total	**18.3**	**20.7**	**19.4**

Source: Computed from the 1998, 2003 and 2008 GDHS.

Among sexually active women resident in the different regions, Greater Accra had the highest contraceptive use in 1998 and 2008 (24.1 percent and 25.3 percent). In 2003 the BrongAhafo region had the highest contraceptive use (27.1percent).Sexually active women resident in the Upper West Region had contraceptive use of 8.5 percent in 1998 and 10.0 percent in 2003 being the lowest for the regions in the two surveys. In 2008 Northern Region had the lowest(5.5percent) contraceptive use.

Table 3.5 also shows that for all the surveys contraceptive use increases with educational attainment. Sexually active women with higher education had the highest contraceptive use (35.4 percent in 1998, 34.1percent in 2003 and 23.2 in 2008).Sexually active women with no education had the lowest contraceptive use (11.5percent in 1998,13.6 percent in 2003 and 11.8 percent in 2008).

With regards to religion, Christians had the highest contraceptive use in all the surveys. Whilst other Christians had the highest contraceptive use (19.5 percent and 22.9 percent) in 1998 and 2003 Catholics had the highest contraceptive use (20.9 percent) in 2008. Table 3.5 further shows that the Ga/Dangme had the highest contraceptive use (23.5 percent and 23.9 percent) in 1998 and 2008.The Mole-Dagbani had the lowest contraceptive use in 1998 and 2008.

Womenwho are sexually active and are currently employedhad contraceptive use of 20.3 percent in 1998, 23.2 percent in 2003 and 22 percent in 2008 whereas their counterpart who are not currently employed had10.8 percent in 1998, 12.2percent in 2003 and 10.6percent in 2008.

ESTIMATION OF THE PROXIMATE DETERMINANTS USING DATA ON SEXUALLY ACTIVE WOMEN.

The indices of the proximate determinants of fertility calculated in this section was done using the Stover's 1998 reformulation of the Bongaarts et al (1984) model for the analysis of proximate determinants of fertility. Stover (1998) proposed some refinement to the Bongaarts formulation. He argued that since the index of sexual activity is the proportion sexually active in the last month plus women who are not now sexually active but who are currently pregnant or abstaining postpartum (since they have recently been exposed to the risk of pregnancy) should be used in place of proportion of married women aged 15-49 that is usually used. He also modified the components used in the calculation of the index of abortion and that of contraception.

4.1 THE INHIBITING EFFECTS OF THE PROXIMATE DETERMINANTS, THE APPLICATIONS OF THE STOVER'S REFORMULATION

The fertility inhibiting effects of the proximate determinants are determined by the indices of the sexual activity (Cx), contraception use (Cu), induced abortion (Ca) and postpartuminfecundability (Ci)and sterility (Cf).

According to the model,potential fertility is defined as the total fertility rate for a population of women who are sexually activeand fecund for the entire period from age 15 to 49 andwho do not practice breastfeeding, experience postpartumabstinence, nor practice contraception. The other way to estimate potential fertility is to start with actual fertility and remove the effects of each of the proximate determinants. Rearranging the proximate determinants equation yields the following:

$$PF = \frac{TFR}{C_x \times C_u \times C_a \times C_i \times C_f}$$

(See Appendix A for computational formulae for all indices of the proximate determinants)

The indices in the framework take values between 0 and 1.Each of these indices is equal to 1, if the inhibiting effect of the components to which it refers is non-existent. Therefore, the closer the index to 1 the smaller the fertility inhibiting effect of the proximate determinant. Details of the effect are presented in APPENDIX B.

First of all, to crosscheck the validity of the index of abortion computed, the Stover's model is used to compute the Total Fertility Rate (TFR) for Ghana in 1998, 2003 and 2008 including and excluding abortion index. See APPENDIX D.

After computation of the TFR using the Ca, you arrive at the exact TFR values reported by the GDHS reports of 1998, 2003, and 2008. This, to a large extent, validates the index of abortion computed.

Table 4.1 shows the estimated indices of the proximate determinants, and the relative contribution of the indices (see APPENDIX C for calculations)

Table 4.1 OVERALL ESTIMATED INDICES OF THE PROXIMATE DETERMINANTS AND THE PERCENTAGE REDUCTION DUE TO EACH INDEX

	TOTAL COUNTRY		
Indices of the proximate determinants	**1998**	**2003**	**2008**
sexual activity	0.54	0.58	0.55
Contraception	0.86	0.83	0.84
Induce abortion	0.76	0.75	0.70
postpartum infecundability	0.62	0.58	0.59
Sexually active and infecund	0.85	0.89	0.92
Relative contributions due to :			
Index sexual activity	36.5	32.0	34.4
Index of contraception	9.2	11.4	10.2
index of abortion	15.9	17.1	20.4
index of postpartum infecundability	28.6	32.4	29.9
index of postpartum sterility	9.7	7.2	5.1

In the total sample, the index of sexual activity has the most fertility inhibiting effect followed by indices of infecundability, abortion, contraception and sterility (see Table 4.1).

As indicated in the table, the index of contraception (C_u) did not follow a linear trend over the years.The indices decreased from 0.86 in 1998 to 0.83 in 2003 and increased slightly to 0.84 in 2008. This explains the rise in contraceptive use from 18.3 percent in 1998 to 20.7percent and slight decline to 19.4 percent in 2008. In the total sample of sexually active women, $C_x$increased from 0.54 in 1998 to 0.58 in 2003 and declined 0.55by the year 2008. The index of infecundability (C_i) in the total sample of sexually active women decreasedfrom 0.62 in 1998 to 0.58 in 2003 and then went upto 0.53 by 2008; an indication of increase in the fertility inhibition effect of postpartum infecundability from 1998 to 2008. It was the second highest inhibitor of fertility possibly due to customs such as mothers staying away from sexual partners after delivery and long duration of breastfeeding. The index of infecundability has been relatively stable over the three survey years, probably explaining the relatively stable nature of fertility in Ghana. For the index of sterility, there wasa small increase over time (0.85, 0.89 and 0.92 in 1990, 1999 and 2003 respectively).This implies sterility has been decreasing over the years. Potential fertility in the total sample declined from 24.8 in 1998 to 23.7 in 2003 and further declined to 22.9 by 2008.

The index of contraception was shown to be consistently weaker suppressor of fertility than abortion. In 1998, contraception inhibited fertility by 9.2 percent, in 2003 it inhibited fertility by 11.4 percent and 10.2 percent in 2008 whilst the fertility inhibition due to induced abortion rose from 15.9 in 1998 to 17.1 percent in 2003 and to 20.4 percent in 2008, possiblythe promotion of contraceptive use has not yielded the desired result, probably those who may resort to contraceptive use have turned to abortion, hence the increase in the contribution of abortion a result the increase in abortion.

Table 4.1 further shows that the contribution of the index of sterility is the weakest inhibitor of fertility for all the years and its contribution to fertility hasbeen decreasing from 9.7 percent in 1998 to 7.2 percent in 2003 and to 5.1 percent in 2008, possibly due to government interventions.

4.3DIFFERENTIAL OF THE PROXIMATE DETERMINANTS OF FERTILITY

Comparison of the proximate determinants across subpopulations helps identify the background factors(educational attainment, type of place of residence, region of residence, religion/religiosity) that underlie fertility differentials. For example, observed fertility is generally higher with those with no education, and the proximate determinants provide an understanding of what behavioural or biological factors are associated with this differential. Table 4.2 shows the differentials of the proximate determinant of fertility examined by regional and socioeconomic groups.

Table 4.2:Estimates of the Indices of the Proximate Determinants of Fertility among Recent Sexually Active Women by Region of Residence, GDHS 1998, 2003 and 2008.

		Indices of the proximate determinants					Observed TFR	Calculated PF
	YEAR	sexual activity	contraception	Induced abortion	postpartum infecundability	sterility	Total Fertility Rate	PF
TOTAL COUNTRY	1998	0.54	0.86	0.76	0.62	0.85	4.6	24.8
	2003	0.58	0.83	0.75	0.58	0.89	4.4	23.7
	2008	0.55	0.84	0.70	0.59	0.92	4.0	22.9
WESTERN	1998	0.54	0.88	0.84	0.58	0.87	4.7	23.6
	2003	0.56	0.82	0.79	0.61	0.98	4.5	20.9
	2008	0.55	0.87	0.71	0.65	0.97	4.2	19.8
CENTRAL	1998	0.48	0.87	0.94	0.60	0.86	4.8	23.4
	2003	0.62	0.88	0.89	0.61	1.00	5.0	16.8
	2008	0.56	0.87	0.78	0.65	0.79	5.4	28.3
GREATER ACCRA	1998	0.51	0.80	0.81	0.61	0.76	2.7	17.3
	2003	0.44	0.76	0.61	0.61	0.95	2.9	23.5
	2008	0.47	0.76	0.60	0.67	0.87	2.5	20.3
VOLTA	1998	0.57	0.85	0.89	0.58	0.90	4.4	19.5
	2003	0.58	0.83	0.88	0.59	0.98	4.4	18.3
	2008	0.58	0.82	0.69	0.62	0.92	3.8	20.3
EASTERN	1998	0.64	0.82	0.84	0.58	0.75	4.4	23.2
	2003	0.60	0.80	0.71	0.59	0.83	4.3	25.2
	2008	0.53	0.83	0.68	0.61	0.87	3.6	22.6
ASHANTI	1998	0.54	0.83	0.87	0.61	0.86	4.8	23.3
	2003	0.54	0.79	0.65	0.65	0.96	4.1	23.6
	2008	0.54	0.81	0.67	0.66	0.93	3.6	19.8
BRONG AHAFO	1998	0.56	0.81	0.93	0.59	0.86	5.4	25.5
	2003	0.63	0.77	0.68	0.64	0.97	4.8	23.8
	2008	0.60	0.81	0.69	0.61	0.93	4.1	21.5
NORTHERN	1998	0.46	0.89	0.98	0.55	0.92	7.0	34.4
	2003	0.81	0.92	1.00	0.57	0.99	7.0	16.7

	2008	0.64	0.97	0.82	0.59	0.97	6.8	23.6
UPPER WEST	1998	0.42	0.89	0.95	0.55	0.95	6.1	33.5
	2003	0.64	0.86	0.88	0.61	1.00	4.7	16.0
	2008	0.56	0.88	0.68	0.54	0.99	4.1	22.7
UPPER EAST	1998	0.52	0.91	0.99	0.58	0.97	5.0	18.9
	2003	0.69	0.91	1.00	0.53	0.93	5.5	17.8
	2008	0.55	0.84	0.75	0.61	0.89	5.0	26.8

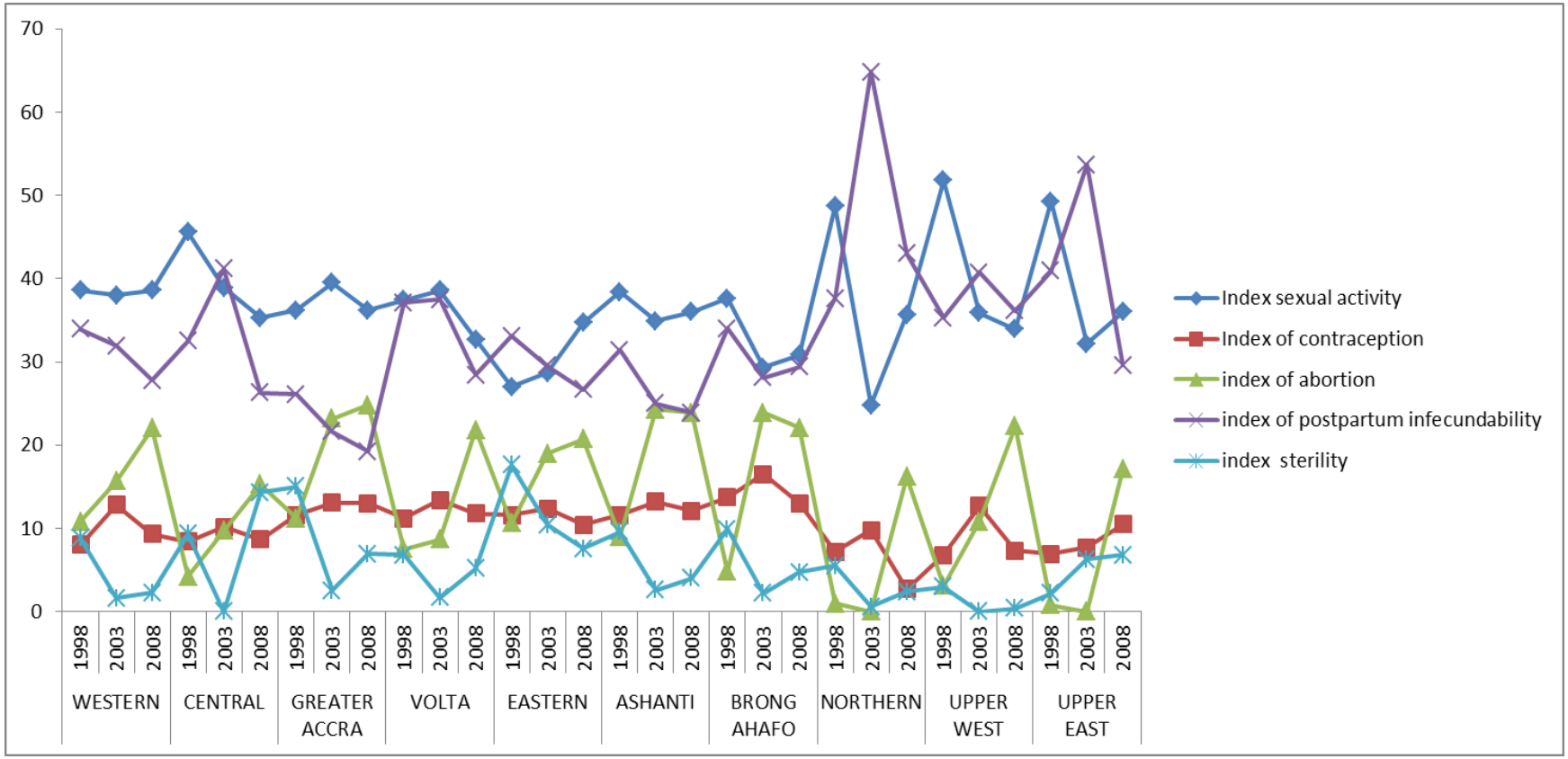
Source: Computed from the 1998, 2003 and 2008 GDHS

It can be observed from table 4.2a that in 1998 both Ashanti and Western region had an index of sexual activity of 0.54 which was the same as that of the total country (0.54) in the same year. It is worth noting that in 2003 it was only Volta region which had an index of sexual activity which is the same as that of the total country and in 2008 Upper East was also the only region with an index of sexual activity being the same as that of the total country which suggest that in 2003 the index of sexual activity for Volta region was a representation of the total country and in 2008 the index of sexual activity for Upper East can be used for the whole country.The index of sexual activity(Cx) values shows that, the index were 0.64 and 0.56 in the Northern and Upper West regions in 2008 and 0.47 in the Greater Accra region in the same year. The difference may be as a result of women in the Greater Accra region delaying onset of sexual activity due to the higher school attendance or aspiration for higher educational status as compared to their counterparts in the northern parts of Ghana where woman may marry early. The situation is not different given the indices of 2003 and 2008.

Generally the index of contraception for the three Northern regions are slightly higher than the index of contraception for the regions in southern Ghana, this may be due to low contraceptive use among sexually active women in the northern Ghana. Table 4.2 shows that in 2003 the index

of contraception for the country is 0.83 which is the same as that of Volta region and in 2008 the index of contraception for the total country (0.84) is the same as that of that of Upper East region. This probably explains the low contraceptive use among sexually active women in the country. Table 4.2 further shows that the index of abortion for the three northern regions in Ghana is higher than the index of abortion for the southern regions of Ghana. The higher indices suggest a lower rate of abortion in the three northern regions of Ghana.

Figure 4.1:**Relative contribution due to the proximate determinants by Region of Residence**



Source: Computed from the 1998, 2003 and 2008 GDHS

From Figure 4.1 it can be observed that generally the index of contraception was the second weakest fertility suppressor. For all the regions except Upper East, the percentage reduction of fertility due to contraception (Cu) increased in 1998 and 2003, but decreased in 2008.

Figure 4.1 reveals that the Northern region had the highest percentage reduction due to the index of infecundability of 37.6 percent in 1998, 64.8 percent in 2003 and 43.0 percent in 2008. Upper East and Upper West also had very high contributions due to Ci. This may be due to beliefs about long duration of breastfeeding such as sperms contaminating breast milk. In the case of Eastern, Ashanti and Greater Accra percentage reduction due to postpartum infecundability was relatively lower.

It can be observed from Figure 4.1 that the Northern region and Upper East region had the lowest percentage reduction in fertility due to abortion (i.e. zero in 2003).Except for Northern, Western and Upper East regions, the inhibition index due to abortion increases in1998, 2003, and 2008.The change was very substantial in certain regions. For instance,in the BrongAhafo region the percentage reduction due to the inhibiting effect of abortion sharply increased from 4.8 percent in 1998 to 23.9 percent in 2003. In all the regions in Ghana, Greater Accra had highest percentage reduction due to abortion in1998 andin 2008. Ashanti region had the second highest percentage contribution due to abortion in 1998 and 2008. However, in 2003 had the highest contribution (24.3 percent) compared to all the other regions in the country. The inhibiting effect of abortion is relatively high in the Greater Accra Region and the Ashanti Region possibly because these two regions have the two largest cities in Ghana. These cities have more educational and job opportunities,hence women may stay for long hours in jobs and work away from home or have educational aspiration and may not desire to take pregnancy to term.

Figure 4.1 further reveals that the threeNorthern regions had higher percentage reduction of fertility due to postpartum infecundability than their counterpart in southern Ghana; this may be due the long duration of breastfeeding the three northern regions

Table 4.3:Estimates of the Indices of the Proximate Determinants of Fertility among Recent Sexually Active Women by some socioeconomic groups, GDHS 1998, 2003 and 2008.

	YEAR	sexual activity	contraception	Induced abortion	postpartum infecundability	sterility	PF	Total Fertility Rate
RURAL	1998	0.55	0.87	0.92	0.73	0.86	19.6	5.4
	2003	0.52	0.86	0.87	0.60	0.96	24.8	5.6
	2008	0.61	0.86	0.74	0.62	0.93	22.2	4.9
URBAN	1998	0.51	0.80	0.80	0.74	0.82	14.9	3.0
	2003	0.48	0.77	0.62	0.63	0.96	22.6	3.1
	2008	0.48	0.82	0.65	0.65	0.90	20.6	3.1
NO EDUCATION	1998	0.53	0.89	0.97	0.73	0.88	20.3	5.8
	2003	0.76	0.90	0.91	0.59	0.97	17.0	6.0
	2008	0.70	0.90	0.67	0.60	0.93	25.4	6.0
PRIMARY	1998	0.54	0.86	0.86	0.74	0.90	18.7	4.9
	2003	0.61	0.81	0.78	0.61	0.95	23.9	5.3
	2008	0.60	0.83	0.73	0.63	0.94	22.7	4.9
SECONDARY +	1998	0.55	0.82	0.79	0.73	0.80	13.7	2.8
	2003	0.48	0.77	0.58	0.63	0.94	19.4	2.5
	2008	0.48	0.81	0.56	0.65	0.90	16.7	2.1

Table 4.3 shows that the index of sexual activity had the highest inhibition effect on fertility for sexually active women in urban areas thantheir ruralcounterpart.The index of sexual activity for sexually active women living in the urban areas was 0.51, 0.48and 0.48 in 1998, 2003 and 2008 respectively whiles in the rural areasthe index of sexual activity was 0.55 in 1998, 0.52 in 2003 and 0.61 in 2008.

The index of contraception has been highest in the rural areas (0.87 in 1998,0.86 in 2003and 0.86 in 2008) than in the urban areas (0.80 in 1998, 0.77 in 2003 and 0.82 in 2008); an indication of lower contraceptive use among sexually active women living in the rural areas than those living in the urban areas, plausibly due to the higher contraceptive prevalence in the urban areas than rural areas and the increase educational attainment in the urban areas than the rural areas.

The inhibition effect of abortion is greatest in the urban areas than among sexually active women in the rural areas. The index of abortion among sexually active women in the rural areas was 0.92 in 1998 and 0.87 in 2003 and 0.74 in 2008 whereas in the urban areas the indices were 0.80 in 1998, 0.62 in 2003 and0.65 in 2008.

The index of postpartum infecundability in the rural areas was 0 .73 in 1998, 0.60 in 2003, and in 2008 it was 0.62 whilst in the urban areas the index was 0.74 in 1998, 0.63 in 2003 and 0.65 in 2008.This implies that the index of postpartum infecundability was highest in the urban areas than that of the rural areas

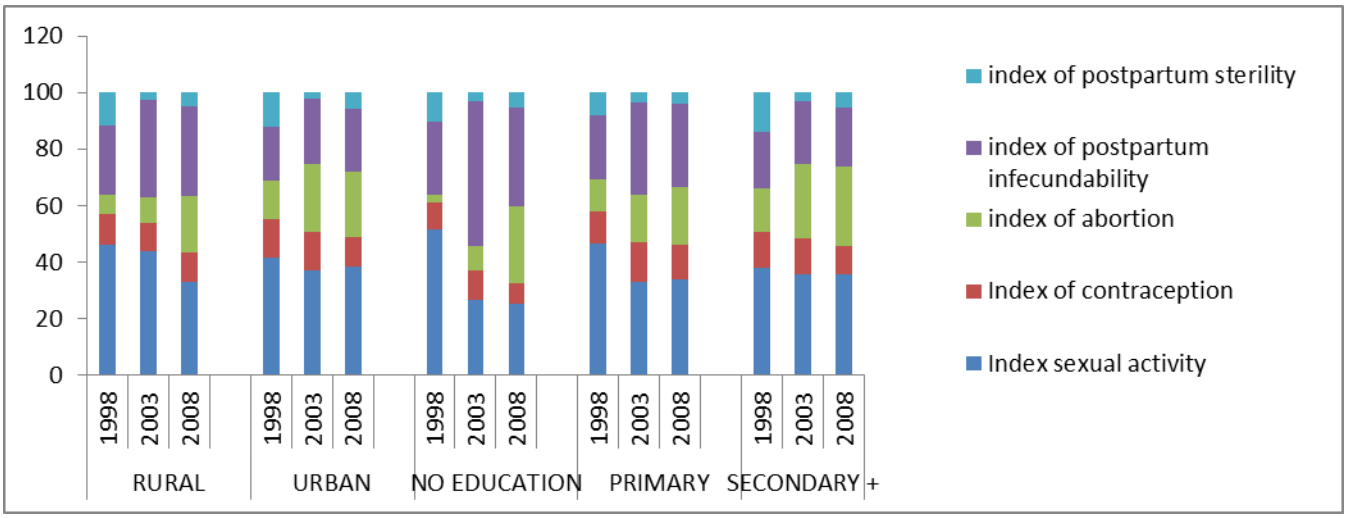
Generally the inhibition effect of sexual activity increases with increase in educational attainment. Sexually active women who have primary education (0.54 in 1998, 0.61 in 2003 and 0.60 in 2008) have a lower index of sexual activity than sexually active women with no education(0.53 in 1998, 0.76 in 2003 and 0.70 in 2008);an indication of higher inhibition effect by sexually active women with primary education than those with no education.

The index of contraception decreases with increases in educational attainment. The index of contraception among women with no education increases from (0.89 in 1998, 0.90 in 2003 and 0.90 in 2008) to (0.86 in 1998,081in 2003 and 0.83 in 2008) among sexually active women with

no education and to (0.82 in 1998, 0.77 in 2003 and 0.81in 2008) among women with secondary or higher education .Index of sterility and index of abortion follows a similar pattern.

The inhibition effect of postpartum infecundability decreases with increases in educationalattainment. The index decreased from0.73 in 1998,0.59 in 2003 and changed slightly to 0 .60 in 2008 among women with no education to 0.74 in 1998, 0.61 in 2003 and 0.63 in 2008 among women with primary educational attainment.

Figure 4.2:Relative contribution due to the Proximate Determinants by Region of Residence



Source: Computed from the 1998, 2003 and 2008 GDHS

The relative contribution of postpartum infecundability was higher for women who are sexually active and are resident in rural areas(24.6 in 1998, 34.4 in 2003 and 31.7 in 2008) than their counterpart in the urban areas(19.0 in 1998,23.1 in 2003, and 22.5 in 2008)

Probably women in the rural areas are more likely to adhere to traditional practices with regard to postpartum abstinence and are more likely to breastfeed for a longer period due to their likelihood to beinformal employment and, hence, will have enough time to breastfeed their

children. Also their children are more likely to be with them even when they are working(Tutu,2008).

Delayed onset of sexual activity inhibited fertility by 30.8 percent in 1998, 26.9 percent in 2003and 18.3 percent in 2008 in the rural areas while it reduced from 23.7 percent in 1998 to 17.4 percent in 2003 and increased slightly to 18.9 percent in 2008 in the urban areas.

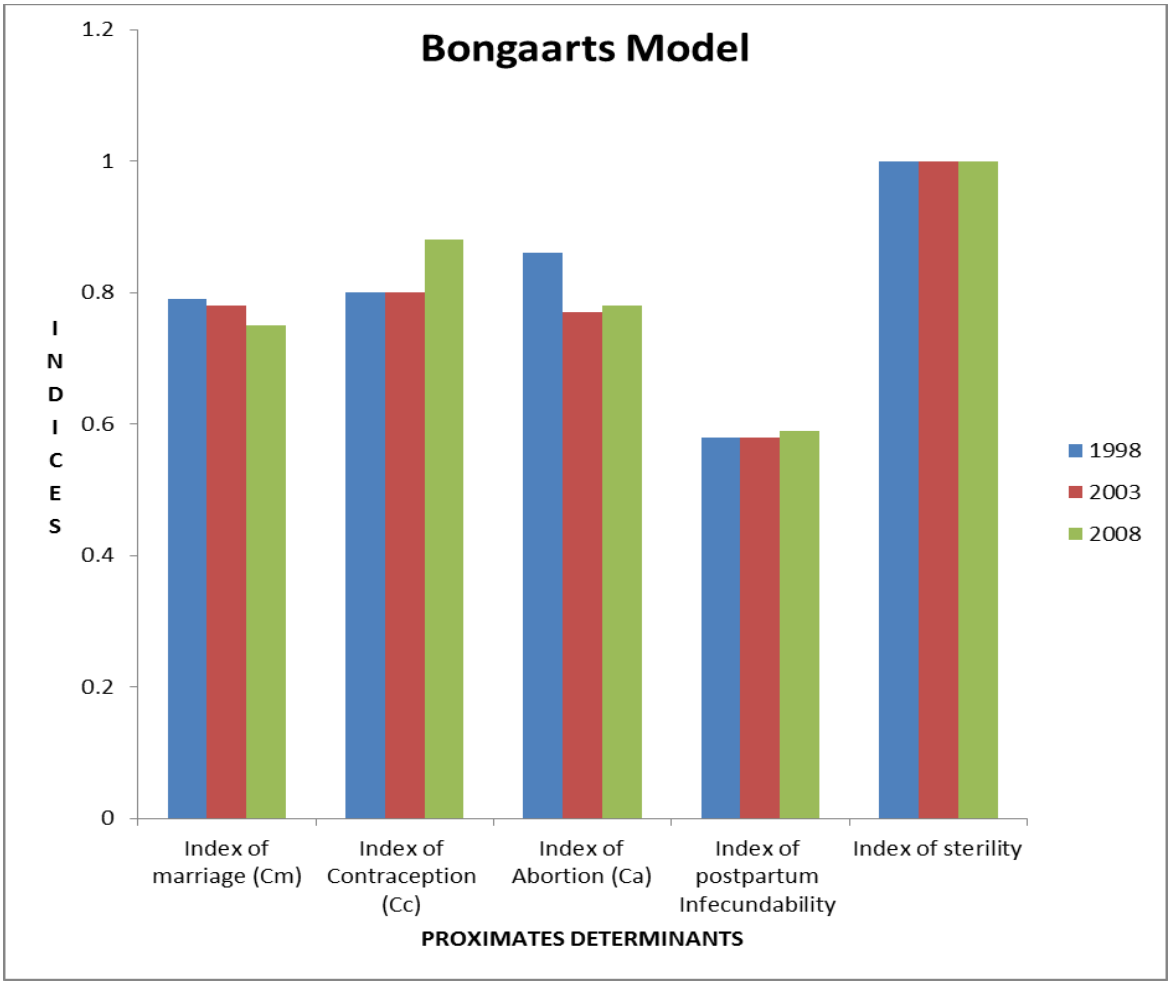
The index of contraception had the least percentage fertility inhibition effect in both rural areas and urban areas in all the three periods with the index having higher percentages in the urban areas than the rural areas.The disparity probably reflects the limited availability of family planning services in rural areas, and probably due to differences in the levels of use rather than effectiveness of method. Also it could be high knowledge rate in both urban and rural areas but higher practice or acceptance in the urban areas than the rural areas.

Fertility tends to be higher in rural areas than in urban areas. Women in rural areas may want larger families to ensure that someone will help with domestic and agricultural activities and provide financial security in old age.In urban areas, women may limit their fertility because of the cost associated with childbearing.Living in an urban area may change a woman's values as they are exposed to the modern health sector, family planning, and more westernattitudes (Acsadi and Johnson-Acsadi,1990)

Among women with no education the percentage reduction in fertility due to sexual activity decreased from 36.4 in 1998 to 17.6 in 2003 and 13.5 in 2008.Compared to their counterparts with secondary or higher education, the index decreased from 21.3 percent in 1998 to 15.9percent in 2003 and 15.6.Figure also shows that fertility-inhibition effect of index of sexual activity is influenced by education and place of residence. The effect of contraception on fertility

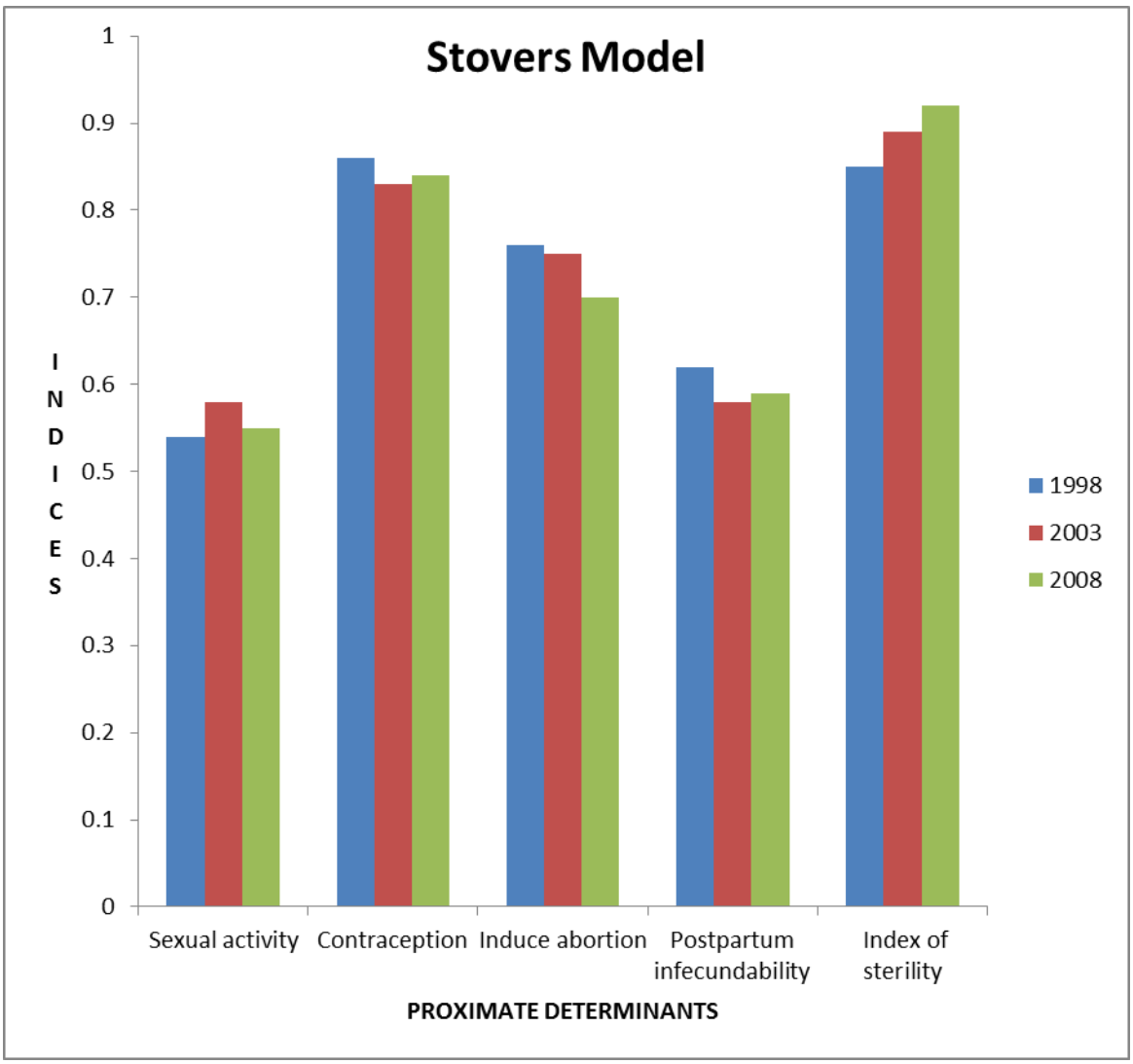
is weak among women with no education compared with those with formal education.This differential among education categories increases as level of education increases.As per the literature review John Stover dis some modifications in the Bongaarts model. This section compares the Bongaarts model with Stover's Reformulation.

Figure 4.3: Bongaarts model: Indices of the Proximate Determinant of fertility



Source: Computed from the 1998, 2003 and 2008 GDHS

Figure 4.4: Stover's model: Indices of the Proximate Determinant of fertility



Source: Computed from the 1998, 2003 and 2008 GDHS

In the Bongaarts model, the index of postpartum infecundability had the highest inhibition effect in all three survey years. The indices were 0.58, 0.58 and 0.59 in 1998, 2003 and 2008 respectively. This was in conformity with the studies of Tutu (2011), Gaisie (2005), Chucks (2002). In the Stover reformulation, the indices of postpartum infecundability were 0.62, 0.58 and 0.59 in 1998, 2003 and 2008 respectively. In this case, the postpartum infecundability index was the second highest inhibitor which is at variance with results from the Bongaarts model. However, the indices of postpartum infecundability for the two models were almost the same for all three surveys years. The index of sterility for Bongaarts model for all three survey years was 1.00 whereas for the Stover's reformulation the indices were 0.85, 0.89 and 0.92, for 1998, 2003 and 2008 respectively. The difference in the index of sterility in the two models may be attributable to the use of all forms of sterility by John Stovers whiles Bongaarts model uses only pathological sterility. The introduction of other measurements associated with sexuality as done by Stover therefore reduces the relative effects of postpartum infecundability.

It is important for demographers to use Stovers model instead of the Bongaarts since non-marital childbearing has become prevalent in African population including Ghana. Fertility can be examined not with respect to marriage but sexuality. It should be noted that young unmarried girls have contributed about 10 percent of births in Ghana over the past few decades. Any examination of fertility transition must therefore use sexual activity instead of marriage.

CHAPTER V
SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary and Conclusion

The main focus of this study was to examine the impact of the proximate determinants of fertility in Ghana.To achieve this objective the 1998,2003 and 2008 Ghana Demographic and Health Survey data were used.The background characteristics of the study population were described first. Then the levels, trends, differentials and proximate determinants of fertility during the period were examined and also with respect to the background characteristics of the study population.

In all 4843 female respondents aged 15-49 years were interviewed in 1998, 5691 in 2003 and 4916 in 2008.Percentages, mean and median rates of contraceptive use, postpartum abstinence, and duration of breastfeeding were calculated.

Again, the age distribution shows that a little more than one in two females (that is 55 percent) of the respondents in 2003 were under age 30 years. The mean age of therespondents were 29.12in 1998 and 28.96 in 2008.The religious affiliation of the respondents at the three surveys showed Christians formed the majority followed by Muslims.The study indicates that the Akan formed the predominant ethnic group; the others ethnic groups include theMole-Dagbani, Ewe etc.

The study showed that majority of the respondent have had some education, however approximately 42 percent of the respondent never attended school in 1998.The percentage decreased to approximately 21 percent in 2008.Those with tertiary educationin 1998 was 0.9 percent and has increased to 3.9 percent in 2008.

The findings of the study also showed that women in the rural areas initiate sexual intercourse a yearearlier than those from the urban areas except at the 1998 whose age at first sexual intercourse was the same for both rural and urban areas.The age at first sexual intercourse was thesame for those with no education and primary education (17years). Age at first intercourse was about the same across age groups within the regions, ranging from 17 and 18 years.

There was an inverse relationship between the duration of breastfeeding and the educational level of the mother. This means that, the duration of breastfeeding declines with increase in the educational level of mothers. Regarding theresidence, women in urban areas had lower or shorter breastfeeding duration compared to their rural counterparts.

Education also shows an inverse relationship with the mean duration of amenorrhea. The fall in the mean duration of amenorrhea could be attributedto negative relation of education to the duration of breastfeeding. Mothers with higher education breastfeed for short periods and hence their period of amenorrhea is also shortened.

Women living in rural areas had a longer mean duration of amenorrheathan their counterparts in urban areas.Those with no education and primary education started sexual intercourse after postpartum periodearlier than mothers with secondary or higher education in all the survey years. Rural respondents abstained for longer duration than their urban counterparts in all the survey years.

Sexually active women who were resident in urban areas in Ghana had 23.0 percent of them in 1998 who have currently used contraceptives, in 2003 they were 22.8 percent and 20.6 percent in 2008 compared with their rural counterparts with 15.2 percent in 1998, 18.7 percent in 2003 and 18.2 in 2008.

There was a general decline in the age specific fertility rates (ASFR) from1998 to 2008 in all the age groups. This is reflected in the total fertility rate (TFR) forthe country as a whole, which declined from 4.6 in 1998 to 4.0 in 2008. The fertility trend across age groups follows the normal fertility pattern with a steady rise from age group 15-19, which peaks at age groups 25-29 and 30-34 and thereafter follows a downward trend.

Fertility levels are also higher among rural residents compared to those in the urban areas. Substantial differences equally exist in the fertility levels of women by level of education.with fertility being negatively associated with level of education. Gaisie (2005), Mba (2003) Tutu, (2008) also found these regional, residential and educational differentials in the national studies that they carried out in the country. Region, place of residence as well as educational Variations in fertility levels among regions have also been reported in other parts of the world including Sub Sahara African countries (Mboup and Saha, 1998; Moultrie and Timaeus, 2002; APHRC, 2002, Ibisomi 2007).

The indices of the proximate determinants of fertility were calculated using the Stover's 1998 reformulation of Bongaarts et al (1984) model for the analysis of proximate determinants of fertility. The fertility inhibiting effects of the proximate determinants were determined by the indices of sexual activity (C_x), contraceptive use (C_u), induced abortion (C_a) postpartum infecundability (C_i) and postpartum sterility. Index of postpartuminfecundability had the highest fertility inhibition effect in all the regions of Ghana in all the survey years,followed by indices of sexual activity, contraception and sterility in that order. Other studies also found this order regarding the indices of proximate determinants (Gaisie, 1984; Mba, 2003; Ibisomi,2007; Tutu, 2008;). Stover in his refinement obtained a value of about 21 with a range of 18 to 24 for

potential fertility.The index of postpartum infecundability has been almost stable over the years examined. This may explain the almost stable fertility over the ten years period.

The index of contraception (C_u) did not follow a linear trend over the years the indices decreased from 1998 to 2003 and increased slightly in 2008.This explains the rise in contraceptive use in 1998 and a slight decline in2008. The index of contraception was shown to be consistently weaker inhibitor of fertility.

The indexof postpartuminfecundability had the highest fertility inhibition effect in 1998, 2003 and 2008 for both rural and urban areas with the rural areas having the highest In all the regions in Ghana, Greater Accra had the highest percentage reduction due to abortion. Ashanti Region had the second highest.The inhibiting effect of abortion is relatively high in the percentage reduction.This may possibly be that women in the rural areas are more likely to adhere to traditional practices with regard to postpartum abstinence and are more likely to breastfeed for a longer period because they are less likely to be in formal employment and may have enough time for their children and even have them with them while working. The Northern region had the highest percentage reduction due to the index of postpartum infecundability, Upper East and Upper West also had very high percentage reduction due to C_i. These are the least urbanised regions.

Among all the regions Greater Accra had the highest percentage reduction in fertility due toabortion followed by Ashanti.The inhibition effect of abortion is relatively high in the Greater Accra Region and the Ashanti Region possibly because these two Regions have the two largest cities in Ghana. These cities have more educational and job opportunities, hence women may

stay for long hours in jobs and work away from home or have educational aspiration and may not desire to take pregnancy to term.

5.2 RECOMMENDATIONS

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It is confirmed in this study that fertility is declining in Ghana. Ghana is seen as having achieved its fertility target of 4.0 children per woman two years before the target year (2010). With a TFR of 4.0 in 2008, Ghana is considered as having one of the lowest TFR in Sub-Saharan Africa. However disparities exist between the urban and the rural areas as well asthe regions, which need to be urgently addressed, as this in the long run will impact negatively on the growth rate, demographic and human development rate of country.

It is therefore recommended that

1.Maternal education increases age at first sexual intercourse and contraceptive use increases with level of education, hence education should be provided to girls at least up to secondary level as long term measure of fertility reduction.

The existing family planning programmes should be strengthened andexpanded through the provision of family planning clinics to areas with no such facilities.Contraceptive use should be encouraged.

2.Since the overall findings of this study showthat, the fertility inhibiting effects of postpartum infecundability is more important than the effects of contraception and sexual activity. The promotion of prolong breastfeeding durations since intense, frequent breastfeeding supresses' ovulation hence prolonging birth interval.

3. It is important for demographers to use Stovers model instead of the Bongaarts since non-marital childbearing has become prevalent in African population including Ghana. Fertility can be examined not with respect to marriage but sexuality. It should be noted that young unmarried

girls have contributed about 10 percent of births in Ghana over the past few decades. Any examination of fertility transition must therefore use sexual activity instead of marriage.

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APPENDIX A

Index of Sexual Activity:

$$\boxed{C_x = s}$$

Where s = proportion of women aged 15-49 who are sexually active (where sexually active means active in the last month or pregnant or abstaining postpartum)

Index of Abortion (Ca):

This index is calculated as follows:

$$Ca = \frac{\text{Total fertility rate}}{\text{Total fertility rate} + (0.4 * TAR * (1+U))}$$

Where ***TAR*** is total abortion rate – the average number of abortions per woman if the current age-specific abortion rate remains unchanged, and ***U*** is the contraceptive prevalence rate.

The index of abortion is derived through an indirect estimation of the number of induced abortions per woman from the GDHS data. The women were asked if they have had a pregnancy that was miscarried, aborted or ended in a stillbirth. They were further asked the year the pregnancy ended which shows the number of pregnancies that were either aborted, miscarried or ended in a stillbirth within the five year periods preceding the surveys. Hence on the basis of the following scientific assumptions, induced abortion was computed:

Computation of Induced Abortion in 2008

i. "Miscarriages of 13-22 weeks account for 2.9 % of all recognised pregnancies, and live births for 84.8 %; therefore, such miscarriages are equal to 3.4 % of all live births". (Susheela et al 2005)

ii. Age-specific schedule of ever having a pregnancy that miscarried, was aborted, or ended in a stillbirth is similar to the age-specific schedule of induced abortion for the five year periods preceding the surveys.

Index of Contraception

The index of contraception is intended to describe the fertility-inhibiting effects of contraceptive use.

$$C_u = 1 - u \times e$$

Where:

u = the proportion of sexually active, fecund women using contraceptives that does not overlap with that experiencing postpartum amenorrhea; e = the average effectiveness of contraception;

Index of Postpartum infecundability

5. Index of Postpartum Infecundability (Ci):

This index is computed as follows:

$$Ci = \frac{20}{18.5 + i}$$

Where i is the mean duration of postpartum infecundability (computed as the mean duration of postpartum insusceptibility).

The index of Postpartum infecundability is intended to describe the effects on fertility of extended periods of postpartum amenorrhea. The index is calculated as the average birth interval in the absence breastfeeding divided by the average length of the interval when breastfeeding takes place

APPENDIX B

indices of the proximate determinants and their Effects

Index	effect
Sexual Activity	1 if all women of reproductive age are sexually active;0 in the absence of sexual activity
Contraception	1 1 in the absence of contraception; 0 if all fecund use 100 percent effective contraception
induced abortion	1 in the absence of induced abortion; 0 if pregnancies are aborted
Postpartum infecundability	1 in the absence of lactation and postpartum abstinence; 0 if the duration of infecundability is infinite
Sterility	1 if all women of reproductive age are infecund; 0 in the absence of infecundity

APPENDIX C

Computation of Induced Abortion in 2008

Total Number of pregnancies ever terminated-2003		**832**
Number of preg. ever terminated in the five year period		444
Number of Induced Abortions		
Pregnancies terminated in the Five year period		444
Less:		
Stillbirths	38	
Miscarriages	97	134
		310

Therefore 310 / 4916 * 1000 = 63 induced abortions per 1000 women.

Age Schedule of Number of Ever Terminated Pregnancy

Age Group	Ever Termin.
15-19	23
20-24	118
25-29	150
30-34	145
35-39	157
40-44	139
45-49	99
Total	**832**

Computation of Total Abortion Rate 2003

Ages	Ind. Abortions	Women	ASAR (Age Specific Abortion rate).
15-19	9	1,025	0.0084
20-24	44	878	0.0502
25-29	56	832	0.0671
30-34	54	644	0.0838
35-39	58	638	0.0916
40-44	52	470	0.1106
45-49	37	429	0.0864
Total	310	4,916	0.4981

Therefore Total Abortion Rate = .4981 * 5 = 2.5

(i) Age 15-19 = 23/892 * 310 = 9

$$Cu = \frac{\text{Total fertility rate}}{\text{Total fertility rate} + (0.4 * TAR * (1+U))}$$

Hence

Ca = 4.0/ 4.0 + (0 .4 * 2.5 * (1+ 0.714)) = 0.70

$$C_u = 1 - u \times e$$

Where:
u = the proportion of sexually active, fecund women using contraceptives that does not overlap with that experiencing postpartum amenorrhea; *e* = the average effectiveness of contraception;

Computation of Cc- Ghana 2008

Methods	Use (U)	Effectiveness(E)	U * E
Pill	0.0517	0.9	0.04653
IUD	0.0025	0.95	0.002375
Sterilisation	0.015	1	0.015
OMM	0.1088	0.7	0.07616
Trad Met.	0.0753	0.3	0.02259
Total			0.162655

Cu = 1- (.16266)

0.84

4. Index of Postpartum Infecundability (Ci):

This index is computed as follows:

$$Ci = \frac{20}{18.5 + i}$$

Where i is the mean duration of postpartum infecundability (computed as the mean duration of postpartum insusceptibility).

i=15.2
Ci=0.57971

ComputationofC_f

$$C_f = 1 - f$$

f = the proportion of sexually active women who are infecund;
seeout put tables for computation

***f*=0.0847**

C_f = **0.92**

The relative contribution of the index of sexual activity to reduction in fertility is given by C_x

$$\frac{lnC_x}{lnC_x + lnC_u \times lnC_a \times lnC_i \times lnC_f} \times 100$$

The relative contribution of the index of contraception to reduction in fertility is given by C_u

$$\frac{lnC_u}{lnC_x + lnC_u \times lnC_a \times lnC_i \times lnC_f} \times 100$$

The relative contribution of the index of abortion to reduction in fertility is given by C_a

$$\frac{lnC_a}{lnC_x + lnC_u \times lnC_a \times lnC_i \times lnC_f} \times 100$$

The relative contribution of the index of infecundability C_i to reduction in fertility is given by

$$\frac{lnC_i}{lnC_x + lnC_u \times lnC_a \times lnC_i \times lnC_f} \times 100$$

The relative contribution of the index of contraception C_f to reduction in fertility is given by

$$\frac{lnC_f}{lnC_x + lnC_u \times lnC_a \times lnC_i \times lnC_f} \times 100$$

APPENDIX D

From the 1998 indices (assuming Ca = 1 because TAR = 0);

$$TFR = C_x \times C_u \times C_a \times C_i \times C_f \times PF$$

$$TFR = 0.54 \times 0.86 \times 1 \times 0.62 \times 0.85 \times 24.8$$

$$TFR = 5.96$$

However, using the computed Ca in 1998 then,

$$TFR = 0.54 \times 0.86 \times 0.76 \times 0.62 \times 0.85 \times 24.8$$

$$TFR = 4.55$$

From the 2003 indices (assuming Ca = 1 because TAR = 0);

$$TFR = 0.58 \times 0.83 \times 1 \times 0.58 \times 0.89 \times 23.7$$

$$TFR = 5.9$$

However, using the computed Ca in 2003 then,

$$TFR = 0.58 \times 0.83 \times 0.75 \times 0.58 \times 0.89 \times 23.7$$

$$TFR = 4.4$$

From the 2008 indices (assuming Ca = 1 because TAR = 0);

$$TFR = 0.55 \times 0.84 \times 1 \times 0.59 \times 0.92 \times 22.9$$

$$TFR = 5.7$$

However, using the computed Ca in 2008 then,

$$TFR = 0.55 \times 0.84 \times 0.70 \times 0.59 \times 0.92 \times 22.9$$

$$TFR = 4.0$$