GHANA STATISTICAL SERVICE

Health of Children & Women in Ghana

EVIDENCE FROM THE DEMOGRAPHIC & HEALTH SURVEYS

DECEMBER, 2016

PREFACE AND ACKNOWLEDGEMENT

The mandate of the Ghana Statistical Service (GSS), like many other national statistical offices, includes data collection, compilation and analysis as well as dissemination of statistical information in an accessible and user-friendly manner. In order to satisfy the needs of users, GSS is required to analyse and interpret statistics in a form that makes it easily understood for the public to appreciate the value of the statistical information. There is also the need to disseminate widely all the statistics produced by GSS so that they are easily accessible to users.

Survey and census data provide users with a wealth of information for planning and policy formulation. The Ghana Statistical Service (GSS) has over the years conducted Demographic and Health Surveys as part of the Global Demographic and Health Survey (DHS) program. The 2014 Ghana Demographic and Health Survey (GDHS) is the sixth in the series conducted in the country, with the previous Demographic and Health Surveys conducted in 1988, 1993, 1998, 2003 and 2008 at approximately 5-year intervals. Findings from the Demographic and Health Surveys have complemented data from other sources to provide the country with a wealth of data for planning and policy decision making.

Even though attempts were made in the past to compare results of the various Demographic and Health Surveys, no concerted effort has been made to carry out trend analysis of topical issues of the data from the Demographic and Health Surveys. Such an analysis would provide users with information on how intervention policies by Government and Development Partners have impacted on the health and demographics of the Ghanaian population.

This report on "*Health of Children and Women in Ghana: Evidence from the Demographic and Health Surveys"*, is yet another attempt by the Ghana Statistical Service to provide policy makers and other data users with detailed analysis of topical issues on the health of women and children and the changes that have taken place over time.

The Ghana Statistical Service wishes to thank the United Nations Population Fund (UNFPA) for providing funds for the preparation of this report and the lead role UNFPA plays in mobilising resources from the UN System and other Development Partners for the production of statistics in Ghana. Our appreciation also goes to Professor Samuel K. Annim for the dedication and hardwork he demonstrated in the preparation of this report.

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EXECUTIVE SUMMARY

Introduction

As enshrined in the third Sustainable Development Goal (SDG) - "Ensure healthy lives and promote well-being for all at all ages" - improving health status remains a global and national agenda. In particular, is the health status of mothers and children, which is also reflected in the first two targets of the third Sustainable Development Goal. In the light of this backdrop, this report presents analyses of health outcomes of children and mothers in Ghana, using data from the Demographic Health Surveys (1988, 1993, 1998, 2003, 2008 and 2014). The specific objectives are to: (1) explore trends in selected health outcomes specifically, children's immunization, nutritional, mortality and anemia status and their experiences with acute lower respiratory infection, fever and diarrhea as well as mother's nutritional status, fertility, mortality, use of postnatal and antenatal care and family planning; (2) examine the effect of preceding birth interval (spacing) of mothers on the nutritional status of their children; and (3) determine the nature of the relationship between preceding birth interval and the nutritional status of children. In relation to the second and third objectives, specific research hypotheses tested were (1) the relationship between birth spacing and child health is non-linear (two turning points) and (2) wider birth spacing among older mothers is associated with low risk of child stunting compared to lower birth spacing among younger mothers. The motivation for the two hypotheses was that, in Ghana, the concept of 'pension babies' - children given birth at a later stage to cater for house chores during the pension period of parents - is gradually becoming an accepted and 'glorified' norm without a careful assessment of the health implications on both children and mothers.

The analyses are expected to incite researchers to interrogate underlying causes of changes that have occurred over time and also, across different correlates of selected health outcomes. From a policy perspective, the analyses aim at establishing the specific birth interval that is ideal in fostering better nutritional status of children and also provide an advocacy platform positing that child spacing should take cognisance of other factors specifically, age of the mother and the nature of the relationship.

Methods

The study employed the Ghana Demographic and Survey (GDHS) for the analysis. The GDHS is a nationally representative household survey that provides data on a wide range of monitoring and impact evaluation indicators in the areas of population, health, and nutrition. Although the GDHS collects information on households, children under 5, and men and women between the ages of 15 and 49, its orientation is mainly towards providing information for monitoring and evaluating the living conditions of women and children in developing countries. In all, six rounds of the GDHS have been conducted since its launch in 1988. The subsequent rounds (second, third, fourth, fifth, and sixth) were conducted in 1993, 1998, 2003, 2008 and 2014, respectively. The study used all the six rounds for the trend analysis, whereas the relationship between birth spacing and children's nutritional status was analysed using the last three rounds. Descriptive and inferential analyses were employed to respond to the objectives. The first objective is addressed by use of graphs to present the trends and the hypotheses on the relationship between birth spacing, and nutritional status of children made use of four variants of logistic econometric models. These models are as follows: a constrained model that includes only birth spacing, child's age and sex; a full model that includes all variables that have been established in the literature as correlates of nutritional status of under-5 children; a full model that aims at establishing the threshold at

which birth spacing shows a non-linear relationship with children's nutritional status; and lastly, a full model asserting that the relationship between birth spacing and children's nutritional status is moderated by the age of the mother.

Main Findings

Highlights of findings of the trend analyses of health outcomes of children and women are as follows:

(1) Proportion of childhood immunization (received all eight basic vaccination) increased significantly by 30 percentage points between 1988 and 2014. However, more than a-fifth (23%) of children aged 12 - 23 months in Ghana are not fully immunized. Also worth mentioning in the context is the observation that between 2008 and 2014 the proportion of children fully immunized dropped by two percentage points;
(2) Proportion of overweight children increased by one (1) percentage point between 1998 to 2014, whereas the proportion of stunted, underweight and wasted children decreased by 12, 9 and 5 percentage points respectively between the same period;
(3) Mild anaemia prevalence increased by 4 percentage points between 2003 and 2014 survey periods, while that of severe anaemia decreased by 5 percentage points between the same period;
(4) Under-5 mortality reduced from 119 deaths per 1000 live births to 60 deaths per 1000 live births;
(5) Whereas under nutrition among women has decreased over time between 2003 and 2014, over nutrition (overweight/obese) over the same period, has increased. Indeed, comparing the extent of decrease and increase of the under nutrition and over nutrition status of women between 2003 and 2008, it is observed that the gains (fall in per cent of women undernourished) was only three percentage points while the loss (increase in per cent of women obese and/or overweight) was 15 percentage points;
(6) Antenatal and maternal care utilization among pregnant women has increased steadily since the launch of the GDHS in 1988. Over the twenty-eight-year period, antenatal care has increased from 82 per cent to 97 per cent; and
(7) Fertility rate generally declined over time, but increased marginally between 2008 and 2014 survey periods.

The analyses on the relationship between birth spacing and child stunting showed the following main findings

(8) The adverse effect between shorter birth spacing and the likelihood of stunting was corroborated with the evidence showing that an additional month of birth spacing contribute to 0.5 percentage point decrease in the likelihood of a child being stunted;
(9) In addition to birth interval, key correlates including mother's education, household wealth status, child's age, sex and size at birth were all statistically significant in explaining the likelihood of stunting among under-5 children in Ghana;
(10) Two variables that were consistently and robustly significant across all the four models were birth interval and size at birth. This suggests that the initial conditions of children are critical in determining their health outcomes as they grow.
(11) A non-linear relationship between the birth spacing and nutritional status of children was observed. Three types of relationships were observed suggesting the presence of two turning points. Firstly, shorter birth spacing is associated with higher likelihood

of stunting; secondly, wider birth spacing is associated with lower likelihood of stunting; and thirdly, 'much wider' birth spacing increases the likelihood of stunting;

(12) In the context of the second relationship, it was established that the ideal birth spacing that engenders a lower likelihood of child stunting is 52 months (4 years and 4 months); and

(13) Wider birth spacing by older mothers is associated with better nutritional status of their children.

Conclusion

Generally, health outcomes of children and mothers in Ghana have improved in the last 28 years. This observation however, should be interpreted with circumspect since the levels and spatial disparity for some of the selected health outcomes require further discourse on the underlying causes and strategies to hasten the rate of improvement and minimize the regional inequalities. Typical are the rate of improvement and regional disparity of childhood immunization and stunting. In the case of childhood immunization, albeit the significant increase, the proportion of children not fully immunized remains a concern. This concern is premised on the observation that other developing countries such as Rwanda and Bangladesh recorded 84 percent and 93 percent respectively, of children fully immunized in 2014 respectively compared to 77 percent for Ghana. There are wide disparities of the changes in the proportion of stunted children under age five among the regions and not consistent with the national observation. At the national level, the proportion of stunted children reduced by 9.2 per cent over the period 2008 and 2014. However, although in all regions but for Northern region a reduction was observed for the same period, the decrease across the regions ranged between 21.6 percent for Upper East region and 2.4 percent for Upper West region. Thus some regions (Eastern and Upper East) recorded more than 100 per cent of the national average while for others (Greater Accra and Upper West) the increase was just about one-third of the observation at the country level.

The analyses has brought to the fore a non-linear relationship between birth spacing and the likelihood of child stunting. This observation alongside the finding that size of the child at birth is also a significant contributory factor to the nutritional status of the child, present the need to place more premium on the initial factors for early childhood development.

Recommendations

The findings and conclusions inform the following policy recommendations:

(1) With the median birth spacing in Ghana, ranging from 36 to 40 months in the past 28 years and mean birth spacing ranging between 45 and 47 months since 2003, it is imperative to sensitize health professionals and mothers on the need to plan and increase birth spacing in Ghana. Specifically, based on the national average, birth spacing in Ghana should increase by 5 months to reach the established 4 years and 4 months that engenders a higher likelihood of better nutritional status; and

(2) In planning to space births, mothers should take into consideration their age, which is potentially influenced by their career and educational engagement. This advocacy should be initiated by the Ministry of Health and Ministry of Education.

(3) Spatial analyses (both within the country and across developing economies) of the trends and in the context of Ghana, regional level interventions should be analysed to help provide responses to the differences in the rate of improvement and the observed disparities. Policy makers, development partners and researchers should be at the forefront to engage in these analyses.

CHAPTER ONE

INTRODUCTION

1.0 Background

A number of international organizations, including the United Nations Development Programme (UNDP), see health as the key to human development and a basic indicator of social development. As a result, health related issues continue to be high on the global development agenda. Also issues of health and inequalities within and between countries remain a key concern for the global community. Health outcomes are not only influential in enabling people to earn a living and to enjoy the fruits of their labour, but are also a key element of wellbeing in its own right. Thus the health status of the nation could be seen as a good indicator of the wellbeing of its citizenry. The World Health Organization (WHO) (2010) indicated that the objective of good health is twofold. First, it involves achieving the best attainable average health status (goodness) and secondly, it also involves the smallest feasible differences between individuals and groups (fairness). Thus, the objective of good health status must necessarily include fairness and eliminating health inequalities. Efforts to improve health care in a number of developing countries are being derailed by a number of challenges, and key among them are maternal and child health care issues.

The importance of good health status is reflected in both the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs). Three out of the seven goals of the MDG are related to health care. Out of these three, two are related to child and maternal health related challenges that are critical for the continue survival of a nation. Good health and wellbeing continue to be key issues in the SDGs, as captured by goal three. Thus, achieving good health status via appropriate and cost effective preventive and curative interventions remains a key issue on the global development agenda.

In the case of Ghana, efforts have been made over the past 50 years to eliminate major health-related challenges in the country. These efforts have taken the form of government policy interventions in the health sector through the expansion of health infrastructure, introduction of health insurance schemes, provision of free maternal health care services, etc. This implies that there is the need for conscious efforts to examine the progress Ghana has made towards achieving a good and fair health status for its citizenry.

The goal of this report is to provide trend analyses of the health outcomes of children and mothers in Ghana using the Demographic and Health Survey (DHS). While the analyses engaged in this report is not aimed at providing basis for attributing changes to be observed, if any, to an intervention, it provides a platform to incite researchers to interrogate underlying causes for changes that have occurred over time and also, across different correlates of selected health outcomes. Further to the trend analyses, this report provides specific analysis on the relationship between birth spacing and the health outcomes of children.

Specifically, the analysis is underscored by the hypothesis that there is a non-linear relationship between duration of birth spacing and stunting. The premise of the hypothesis is that while shorter birth duration has been observed to relate to high risk of poor child health and infant and child mortality, the nature of the relationship has been assumed to be linear. This report contents that, although wider birth spacing is preferred to shorter durations between births, there is limit on the length of spacing. Thus, at a certain threshold of birth spacing the positive effect on child health slows down. In addition to the non-linear relationship, it is argued in this report that, the relationship between birth interval and health of children is moderated by the age of the mother. Specifically, the hypothesis is that, wider birth spacing among older mothers is associated with low risk of child stunting compared to lower birth spacing among younger mothers.

The motivation for the two hypotheses is that, in Ghana, the concept of 'pension babies' - children given birth at a later stage to cater for house chores during the pension period of parents - is gradually becoming an accepted and 'glorified' norm without a careful assessment of the health implications on both the children and mothers. Both the trend analyses and the hypotheses on birth spacing and child health outcomes will improve our understanding of the progress that has been made in the past 28 years (since the first round of the Ghana Demographic and Health Survey (GDHS)) in 1988) and provide a context for the country as efforts are geared towards the achievement of the SDGs.

An examination of the MDG report for Ghana revealed that the country was only able to achieve the targets of reducing infant mortality and increased antenatal coverage. According to the report, all other health related targets on child and maternal health fell short of their targets. For example, though under-five mortality reduced from 119 deaths per 1000 live births to 60 deaths per 1000 live births the figure was still short of the target of 40 deaths per 1000 live births. In the case of maternal mortality, what was achieved was about 94 per cent greater than the MDG target of 185 maternal deaths per 100,000 live births.

Compared with other countries in Sub-Saharan Africa, Ghana seems to be lagging behind in terms of achieving some health goals of the MDGs. For example, whereas the average decline in under-5 mortality for the entire African continent stood at 55.5 per cent at the end of 2012, Ghana's achievement was just about 49.6 per cent at the end of 2014. Countries such as Cape Verde, Democratic Republic of Congo and Niger achieved a decline of about 59.8 per cent at the end of 2014, 104 per cent at the end of 2013 and 60.4 per cent at the end of 2015 respectively. This clearly indicates that there is the need to analyse the various trends in Ghana's forward match to good health care in order to understand the factors that undermined the country's achievement of the MDGs and identify the way forward.

The need to improve maternal and child health within the context of the MDGs in Ghana is reflected in the Health Sector Medium Term Development Plan (HSMTD). The HSMTD recognises the need for the country to respond to global, sub-regional and national initiatives in which maternal and child health related issues are key. Hence the HSMTD tends to pay specific attention to Goals 4 and 5 of the MDGs as Ghana was unable to progress towards the MDG of achieving the wellbeing of the citizenry. This is clearly captured by the fifth policy objective which identifies the need to enhance national capacity to achieve the health related MDGs and sustain the gains.

However, it is important to note that in order to achieve this, there is the need to examine the trends in maternal and child health over the years and to examine critical socio-economic factors that led to the country's inability to achieve the health related MDGs. In doing this, it is important to identify the health inequalities, if any, that exist across the country and also to analyse better ways of sustaining gains made in the past to propel Ghana to achieve the health related goal of the SDGs.

This report is therefore, an attempt to look at Ghana's progress towards achieving good health for its citizenry, with particular focus on maternal and child related issues. It goes further to examine factors affecting Ghana's forward match to good health care for all.

The report is organized as follows: section two throws more light on the methodology employed for the report, section three pays specific attention to child and maternal health outcomes, section four examines infant and child mortality related issues, while section five considers family planning engagement. Section six provides the summary and conclusion for the entire report.

CHAPTER TWO

METHODOLOGICAL BACKGROUND TO DEMOGRAPHIC AND HEALTH SURVEYS

2.0 Introduction

Demographic and Health Surveys (DHSs) are nationally-representative household surveys that provide data on a wide range of monitoring and impact evaluation indicators in the areas of population, health, and nutrition. There are two main types of DHS, namely Standard DHS and Interim DHS. The latter focuses on the collection of information on key performance monitoring indicators but depends on smaller samples and shorter questionnaires, and is usually conducted in between the Standard DHSs. The former has large sample sizes, usually between 5,000 and 30,000 households, and is typically conducted about every 5 years, to allow comparisons over time. The focus of the study is on the Standard DHSs, due to their extensive coverage in terms of sample and questionnaire size compared to that of the Interim DHS.

Although the DHS collects information on households, children under 5, and men and women between the ages of 15 and 49, its orientation is mainly towards providing information for monitoring and evaluating the living conditions of women and children in developing countries. Indeed, the scope of the issues considered by the DHS is a true reflection of its orientation. Some of the prominent issues are fertility preferences, family planning, infant and child mortality, child health, nutrition of women and men, malaria, and women's empowerment. Besides the extensive scope of issues, the DHS's geographical coverage is remarkable. As at 2016, it covered countries in the following regions in the world: Sub-Saharan Africa; Central Asia, South and South East Asia; Oceania; Latin America and the Caribbean; North Africa; West Asia; and Europe. The number of countries covered in each of the aforementioned regions is forty-four (44): five (5), fifteen (15), two (2), fifteen (15), three (3), five (5) and three (3) respectively.

Currently, some countries have attained seven phases (DHS-VII) corresponding to six rounds of the Ghana Demographic and Health Survey (GDHS) (recode VI). One of the notable changes across surveys is that indicators on the nutritional status of children were calculated using the 2006 WHO new growth standards. The new growth standards replaced the previously used Centre for Disease Control (CDC) reference standards. Another significant change is the deployment of biomarkers as an additional survey instrument from the fourth (IV) round of the DHS to collect information on a wide range of conditions such as infectious and sexually transmitted diseases, and chronic diseases.

2.1 Measurement of Key Health Variables

The key variables to be considered in the study are in the domain of child and maternal health outcomes. The main variables are childhood immunization, nutritional status among children, acute lower respiratory infection, fever, incidence of diarrhoea, anaemia status, antenatal care use among mothers, postnatal care use among mothers, fertility, and nutritional status among mothers. The measurements of each of the aforementioned outcomes are considered below.

2.1.1 Childhood immunization: This is measured as the proportion of children aged 12-23 months who have received all basic immunizations. The basic immunizations include: Bacille Calmette-Guerin (BCG) given shortly after birth; oral polio vaccine given at birth and at age 6, 10, and 14 weeks; prevalent vaccine at approximately 6, 10, and 14 weeks; measles-rubella and yellow fever vaccines given at or soon after the child reaches 9 calendar months (39 weeks); rotavirus vaccine given at ages 6 and 10 weeks; pneumococcal vaccine administered as an injection to infants in three doses at ages 6, 10, and 14 weeks; and the measles-only dose offered to children at 18 months. Depending on the round of the GDHS, information on vaccination coverage was obtained in two ways – from health cards and from mothers' verbal reports.

2.1.2 Nutritional status among children: Height-for-age, weight-for-height, and weight-for-age are used to measure the nutritional status of children. First, children whose height-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered short for their age (stunted), or chronically malnourished. Second, children who have weight-for-height Z-scores below -2 SD from the median of the reference population are considered thin (wasted), or acutely malnourished. Third, children who have weight-for-age Z-score below -2 SD from the median of the reference population are classified as underweight.

2.1.3 Acute Respiratory Infection (ARI): The prevalence of ARI was measured as a dummy variable with one (1) denoting a situation where children under age five had been ill with a cough accompanied by short, rapid breathing in the two weeks preceding the survey, and zero (0) otherwise.

2.1.4 Fever among children: This was measured as a binary variable with one (1) representing the proportion of children under five with fever during the two weeks preceding the survey, and zero (0) otherwise.

2.1.5 Incidence of diarrhoea: This was measured as a dummy variable with one (1) representing the proportion of children under five years of age that had diarrhoea during the two weeks preceding the survey, and zero (0) otherwise.

2.1.6 Anaemia status: Anaemia status is measured as a dummy variable with one (1) showing the proportion of children who have a low level of haemoglobin in their blood, and zero (0) otherwise.

2.1.7 Antenatal care use among mothers: Three main antenatal care uses among mothers are employed in the study, namely type of service provider, the number of antenatal care visits, and the place of delivery. Type of service provider is measured as a categorical variable showing the type of antenatal care provider consulted by women during the pregnancy for the most recent birth in the five years preceding the survey. The number of antenatal care visits is measured using the WHO recommendation of an expectant mother making at least four visits to a health facility during the duration of pregnancy. Hence, for this study, the number of antenatal care visits is measured as a dummy variable with one (1) denoting women who made at least four antenatal visits, and zero (0) for those who failed to make four visits before delivery. Finally, the place of delivery was measured as a categorical variable depicting the place of birth for each child born in the five years preceding the survey.

2.1.8 Postnatal care use among mothers: Three indicators were used for this measurement: (1) whether women who had their last birth two years preceding each survey had received a check-up after delivery; (2) the timing of the first check-up; and (3) the type of health provider performing the postnatal check-up**.**

2.1.9 Fertility: This is measured from the reports of reproductive histories provided by women aged 15-49 for the three years preceding each report. Specifically, it was measured as the total number of live births of each woman in the sample.

2.1.10 Infant and childhood mortality: This social development indicator is measured in five ways, namely neonatal mortality, post-neonatal mortality, infant mortality, child mortality, and under-5 mortality. Neonatal mortality is measured as the probability of a child dying within the first month of life. Infant mortality is the probability of dying between birth and the first birthday, whereas the post-neonatal mortality is measured as the difference between infant and neonatal mortality. Child mortality is measured as the probability of a child dying between exact ages 1 and 5. Finally, under-5 mortality is measured as the probability of a child dying between birth and the fifth birthday.

2.1.11 Knowledge of contraceptive methods: This is measured as a dummy variable with one (1) denoting the proportion of all women currently married and sexually active unmarried women age 15-49 who have heard of specific contraceptive methods, and zero (0) otherwise.

2.1.12 Ever used a contraceptive: This is measured as a dummy variable with one (1) representing women that have ever used a contraceptive and zero (0) denoting those that have not used any kind of contraceptive.

2.1.13 Current use of a contraceptive: The current use of a contraceptive is measured as a categorical variable depicting the proportion of currently married women who are currently using a method of contraception ranging across any general method, any modern method, and any traditional method.

2.1.14 Knowledge of fertile period: This is measured as a dummy variable with one (1) signifying women who have knowledge about the time during the menstrual cycle when they are most likely to get pregnant, and zero (0) otherwise.

2.1.15 Source of modern contraception: This is restricted to women who recently used a contraceptive, and based on the source, a binary response is captured.

2.1.16 Timing of sterilization: This is measured as the age at which women adopt "female sterilization" as a method of contraception.

2.2 Data Structure

The data structure takes into consideration the survey instruments, the sample design, and the sample size for the six rounds of the GDHS. These components are elaborated below.

2.2.1 Survey Instruments

A mixture of three survey instruments is used to conduct the DHS: questionnaires, biomarkers, and geographic information. First, questionnaires are used generally to collect information on

households, women and men. Secondly, recent DHSs collect biomarker data relating to a wide range of conditions including infectious and sexually transmitted diseases, chronic illnesses such as diabetes, micronutrient deficiencies, and exposure to environmental toxins. Most surveys now include testing for HIV infection in their survey design. Thirdly, DHSs routinely collect geographic information in all surveyed countries. All survey data are presented both nationally and by sub-national reporting area.

2.2.2 Sample Design

The sample design of a DHS is generally representative at the national level (the country as whole), the type residence (rural or urban) and the regional level. The sample is usually based on a stratified two-stage cluster design whereby the first stage involves selection of enumeration areas (EAs) drawn from census files, and in the second stage, in each EA selected, a sample of households is drawn from an updated list of households. For example, the 2014 GDHS followed a two-stage sample design and covered key indicators at the national level as well as for urban and rural areas and each of Ghana's ten administrative regions. The first stage involved selecting sample points (clusters) consisting of EAs from the 2010 Population and Housing Census (PHC): a total of 427 clusters were selected, 216 in urban areas and 211 in rural areas. Consequently, the second stage involved systematic sampling of households listed from the clusters.

2.2.3 Data and Sample Size

Based on the foregoing, especially the section on the measurement of key variables, the concentration of this study is on the trend analysis of child and maternal health outcomes using the GDHSs. These are national surveys that collect information on health and population trends of women and children in Ghana. Over the years, the data received technical assistance from MEASURE DHS and ICF Macro International and has been mainly funded by the U.S. Agency for International Development (USAID). The first round of the GDHS was conducted in 1988. Six rounds in total have been conducted, with the second, third, fourth, fifth, and sixth rounds conducted in 1993, 1998, 2003, 2008, and 2014 respectively. Table **2.1** shows the distribution of the sample sizes of women between 15-49 and children under-five years across the six rounds of the GDHS.

Table 2.1: Sample size across surveys for women (15-49) and children (U5)

Year	Women 15-49	Children Under 5
1988	4488	4136
1993	4562	2204
1998	4843	3298
2003	5691	3928
2008	5096	2992
2014	9396	5695

Source: Authors' derivation from the GDHS.

2.3 Analysis of Data

The study employed bivariate and multivariate analysis in determining the empirical relationship between maternal and child health outcomes over time. Some of the analysis/techniques may include scatter plots, cross-tabulations, regression analysis, and correlation coefficients. Stata 14 is the principal software used for the analysis.

2.4 Summary and Conclusion

The methodology section has addressed issues pertaining to the coverage of the DHSs, the measurement of key maternal and child health outcomes, and the data structure along the lines of survey instruments, sample design, and sample size. The aforementioned have laid a solid background against which to conduct the trend analysis of the key maternal and child health outcomes across the six rounds of the GDHS. It is worth mentioning that by employing repeated cross-sectional data, by virtue of appending all six rounds of the GDHS, the analysis may suffer from notable limitations. The major limitation of repeated cross-sectional data is that the same individuals (women or children) in this study are not followed over time, and to apportion a reduction or decrease in trends may be erroneous. Another limitation is that very often sample sizes are substantially larger across surveys, both in the number of individuals or households and in the time period that they span. This may not allow for consistent comparison of results for the phenomenon under observation. Though these concerns are worth probing, genuine panel data where specific individuals/households are followed over time are lacking in most countries, including Ghana. Moreover, the discrepancy in sample sizes across each survey period is a true representation of the national level at each period respectively.

CHAPTER THREE

TRENDS IN CHILD AND MATERNAL HEALTH OUTCOMES

3.0 Introduction

This section presents trends in child and maternal health outcomes. The child health outcomes include childhood immunization, nutritional status, anaemia status, ARI, fever, incidence of diarrhoea infection, infant and child mortality, while the maternal health outcomes considered in this section include antenatal and postnatal care use, maternal care, nutritional status of mothers, fertility of mothers, maternal mortality and family planning engagement of women.

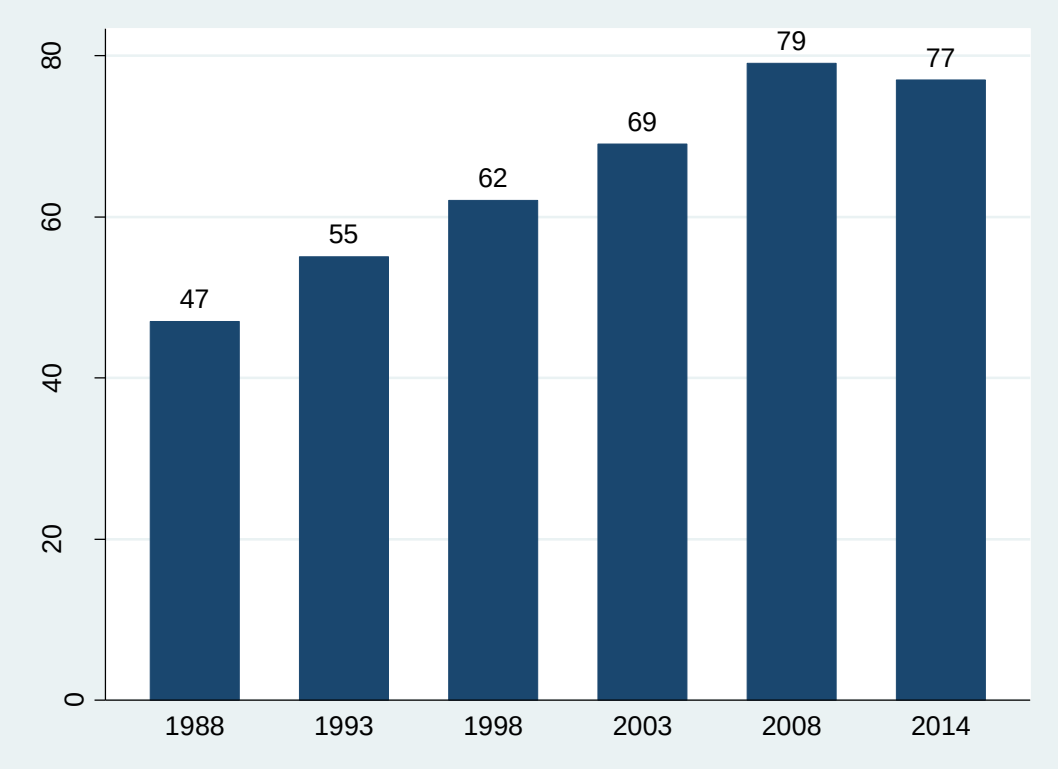
3.1 Trends in Childhood Immunization

The essence of immunization for children under five cannot be underestimated as far as child health and early development are concerned. Consequently, the GDHS collects information on immunization coverage for all children born in the five years before the survey. To measure the immunization coverage, the government of Ghana has adopted the WHO and UNICEF guidelines as the gold standard for vaccinating children. By this measurement, children who received one dose each of BCG and measles, three doses of polio vaccine, and three doses of DPT are considered fully vaccinated.

Figure 3.1 shows the trend in immunization coverage using the six rounds of the GDHS, spanning between 1988 and 2014. Even though the trend is for under-five children, Figure 3.1 depicts children between 12 and 23 months since children within this age group have reached the age by which they should have had the basic vaccines, and the goal is also to measure the coverage of full immunization. It is worth noting that Figure 3.1 is restricted to children who were alive at the time of the survey. Information on vaccination coverage was obtained in two ways from the GDHSs: (1) health cards and (2) mothers' verbal reports. Thus all mothers were asked to show the interviewer the health card on which the child's immunizations are recorded; otherwise the verbal reports of the mother were used.

Figure 3.1 depicts a general trend towards increasing vaccination coverage for children aged 12-23 months since 1988. However, the percentage point change for fully immunized children between the survey years decreased over time, and even registered a percentage decrease of two (2) between 2008 and 2014. Overall, the proportion of fully immunized children largely increased between 1988 and 2014, given that the period recorded an impressive percentage point difference of thirty (30). It can be argued that wider coverage of immunization helps in reducing child mortality, as required by the MDG4. In Ghana, child mortality constitutes a major public health concern and the increase in the proportion of under-5 children immunized over time is feeding into the declining rate of child mortality. Under-5 mortality decreased from 80 deaths per 1,000 live births in 2008 to 60 deaths per 1,000 live births in 2014, although this did not meet the 2015 MDG4 target of 40 deaths per 1,000. Furthermore, this contributes to the quest to meet the fourth SDG (SDG4) of ensuring healthy lives and promoting wellbeing for all at all ages, as a component of wellbeing for children under five being immunized against preventable diseases such as measles, whooping cough and polio.

Figure 3.1: Trends of childhood immunization in Ghana



3.2 Trends in Nutritional Status among Children

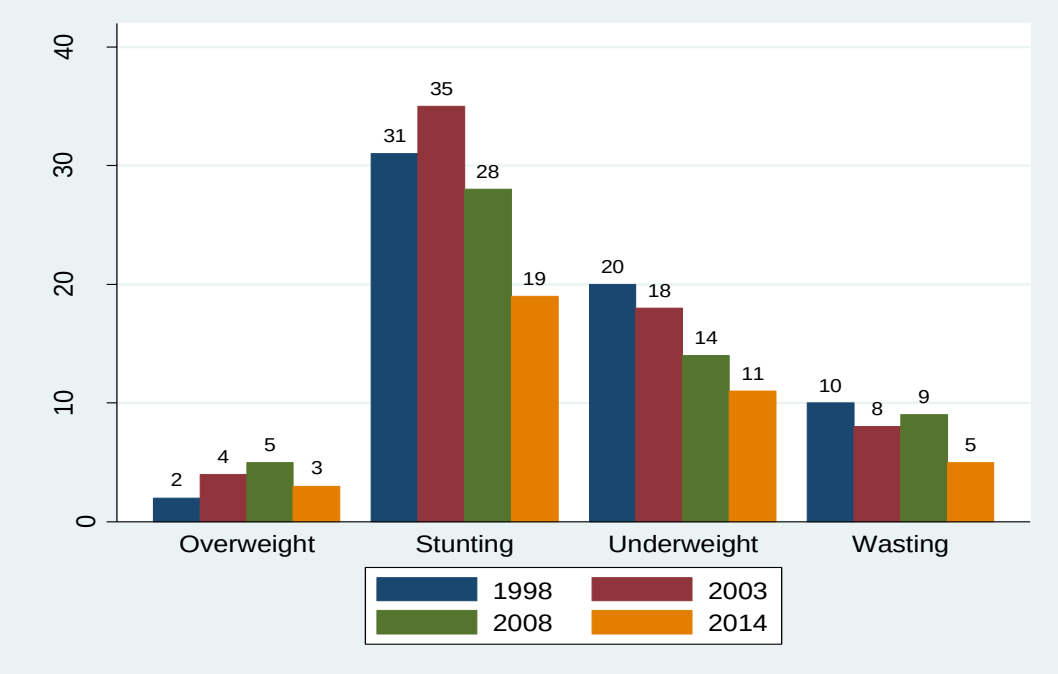
The GDHSs collect anthropometric data on the height and weight of children under five. This permits the measurement of indicators of nutritional status of children, namely height-for-age, weight-for-height, and weight-for-age. The height-for-age index is an indicator of inadequate nutrition over a long period and chronic illness. Children whose height-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered short for their age and stunted. Children who are below minus three standard deviations (-3 SD) are considered severely stunted. Whereas the height-for-age index indicates long -term health conditions, the weight-for-height index measures body mass in relation to body height or length and describes current nutritional status, as it represents the failure to receive adequate nutrition in the period immediately preceding the survey. Children whose Z-scores are below -2 SD from the median of the reference population are considered wasted.

Weight-for-age is a composite index of height-for-age and weight-for-height. It considers both short and long-term malnutrition. Children whose weight-for-age is below -2 SD from the median of the reference population are classified as underweight. Similarly, children whose weight-for-age is below -3 SD from the median are considered severely underweight.

Other forms of malnutrition, overweight and obesity have become a concern for some children in developing countries in recent times. Children whose Z-score values are +2 SD above the median for weight-for-height are considered overweight. Figure 3.2 depicts the proportion of children who are stunted, wasted, underweight and overweight between 1998 and 2014 GDHS.

The figure generally depicts a decreasing trend, indicating that all nutritional status indices have improved over time. From the figure, the proportion of stunted children has decreased steadily from 31 per cent in 1998 to 19 per cent in 2014. Similarly, the proportion of wasted children has decreased from 10 per cent in 1998 to 5 per cent in 2014. The proportion of underweight children has decreased from 20 per cent in 1998, 18 per cent in 2003, and 14 per cent in 2008 to 11 per cent in 2014. Figure 3.2 depicts that the overweight condition of children is not as pronounced as the other three nutritional statuses of children. It was as low as 2 per cent in 1998, but increased to 4 per cent and 5 per cent in 2003 and 2008 respectively. However, in 2014 it decreased to 3 per cent. The effects of poor nutrition among children have immediate and long-term consequences on the child and the society at large. Some of the concurrent and short-term consequences are high child mortality and morbidity rates, poor child cognitive and language development, and an increase in family health expenditure. The long-term consequences include the following: decrease in adult stature, increased obesity with its associated risk of cardiovascular diseases, poor reproductive health of mothers, and poor academic performance. Hence a general decrease in the poor nutritional status of children, as shown in Figure 3.2, helps in ensuring healthy lives for children in the country.

Figure 3.2: Trends of nutritional status of children in Ghana



3.2.1 Regional distribution of stunted children in Ghana over time

The regional distribution of stunted children is presented in Table 3.2.1. Two comparisons are made; between 1993-2003 and 2008-2014. This is against the backdrop that measurement of stunting has changed over the two periods. As can be seen from the table, between 1993 and 2003, eight out of the ten regions recorded an increase in the proportions of children that are

stunted. However, between 2008 and 2014, only the Northern region recorded an increase in the percentage of stunted children. Between 1993 and 2003, the differences in stunting range between 12.9 and 4.9, whereas that of the 2008 and 2014 range between -0.7 and 21.6 per cent. The incidence of stunting is consistently high in the Northern, Upper East and Upper West Regions, over time. Another observation is the instability in the proportions of stunted children across the regions over time. This can be discerned from the significant percentage differences that regions such as the Brong Ahafo, Ashanti, Western and Upper East regions recorded between 2008 and 2014 as shown by the 8th column. Table 3.2.2 and Table 3.2.3 show the distribution of wasted and underweight children over time in Ghana.

Table 3.1: Regional distribution of stunted children in Ghana over time

Region	1993	1998	2003	Change	2008	2014	Change
Western	33.1	29.4	28.4	4.7	27	17.7	9.3
Central	23	26.8	31.4	-8.4	33.7	22	11.7
Greater Accra	15.7	11.3	13.9	1.8	14.2	10.4	3.8
Volta	19.8	25.1	23.3	-3.5	26.8	19.3	7.5
Eastern	25	23.6	27.4	-2.4	37.9	17	20.9
Ashanti	27.9	27.6	29.1	-1.2	26.5	16.1	10.4
Brong Ahafo	24.5	17.8	29.4	-4.9	25.2	17.2	8
Northern	35.9	39.6	48.8	-12.9	32.4	33.1	-0.7
Upper East	26	35.9	31.7	-5.7	36	14.4	21.6
Upper West	33.3	34.6	34.1	-0.8	24.6	22.2	2.4
National	26	25.9	29.9	-3.9	28	18.8	9.2

Source: Ghana Statistical Service, Ghana Demographic and Health Survey report

Table 3.2: Regional distribution of wasted children in Ghana over time

Region	1993	1998	2003	Change	2008	2014	Change
Western	13	9.2	5.3	7.7	5.6	3.9	1.7
Central	11.5	10.3	3	8.5	12	7.7	4.3
Greater Accra	7.9	5.5	7.2	0.7	5.9	3.7	2.2
Volta	10.4	15.2	13.9	-3.5	5.2	2.5	2.7
Eastern	5.9	8.7	6.2	-0.3	6.4	3.2	3.2
Ashanti	8.4	9.2	6.7	1.7	9.2	3.5	5.7
Brong Ahafo	13	8.1	5.7	7.3	5.4	4.5	0.9
Northern	19	12.7	6.6	12.4	12.9	6.3	6.6
Upper West	20.6	7.1	11	9.6	13.9	4.4	9.5
Upper East	14.5	8.2	12.9	1.6	10.8	9.4	1.4
National	11.4	9.5	7.1	4.3	8.5	4.7	3.8

Source: Ghana Statistical Service, Ghana Demographic and Health Survey report

Table 3.3: Regional distribution of underweight children in Ghana over time

Region	1993	1998	2003	Change	2008	2014	Change
Western	33.1	25.6	16.5	16.6	10.3	10.6	-0.3
Central	21.5	26.3	22	-0.5	17.2	13.9	3.3
Greater Accra	16.9	12.2	11.5	5.4	6.5	8.7	-2.2
Volta	24	24.7	25.7	-1.7	13.6	10.5	3.1
Eastern	20.6	22.3	17.3	3.3	8.7	7.9	0.8
Ashanti	22.6	24.7	20.8	1.8	12.1	9.4	2.7
Brong Ahafo	33.2	24.1	20.4	12.8	13.5	5.9	7.6
Northern	41.3	38.1	35.5	5.8	21.8	20	1.8
Upper West	47.6	28.4	25.9	21.7	13.1	13.5	-0.4
Upper East	32.8	34	32.4	0.4	27	10.8	16.2
National	27.4	24.9	22.1	5.3	13.9	11	2.9

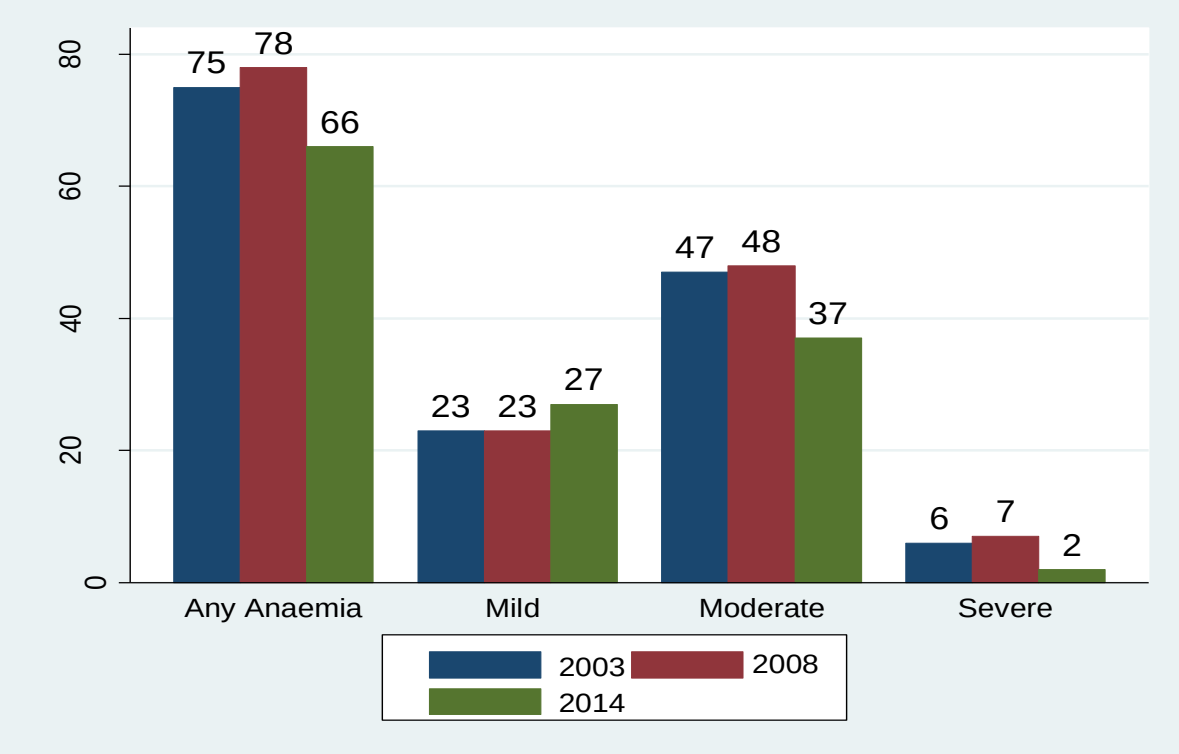
Source: Ghana Statistical Service, Ghana Demographic and Health Survey report

3.3 Trends in Anaemia Status among Children

Anaemia in children is associated with impaired mental and physical development and could increase child morbidity and mortality. It has a long-term consequence of affecting the educational and health outcomes of children later in their lives. Generally, iron deficiency anaemia is the most common micronutrient deficiency, and anaemia is often described as an indicator of both poor nutrition and poor health. As far as the fourth MDG goal of reducing child mortality to 40 deaths per 1,000 live-births was concerned, addressing the prevalence of anaemia was essential in achieving this goal. At the same time, reducing the prevalence of anaemia would help the country to move towards achieving the fourth SDG of ensuring healthy lives and promoting wellbeing at all ages. According to the 2003 GDHS, the most common causes of anaemia in Ghana are inadequate dietary intake of iron, malaria, and intestinal worm infestation. The last two rounds of the GDHS (2008 and 2014) included anaemia testing of children aged 6-59 months and women aged 15-49.

Figure 3.3 depicts a general decline in anaemia prevalence in children between 2003 and 2014. There are three main types of anaemia, namely mild, moderate, and severe anaemia. Even though the mild category increased over time, the moderate and the severe anaemia decreased from 47 percent to 37 percent, and from six (6) to two (2) per cent respectively. The ‘any anaemia’ category is the summation of the aforementioned three kinds of anaemia. The prevalence in children of this broad group increased by two percentage points between the 2003 and 2008 survey periods; however, it decreased by 12 percentage points to 66 percent in the 2014 survey period.

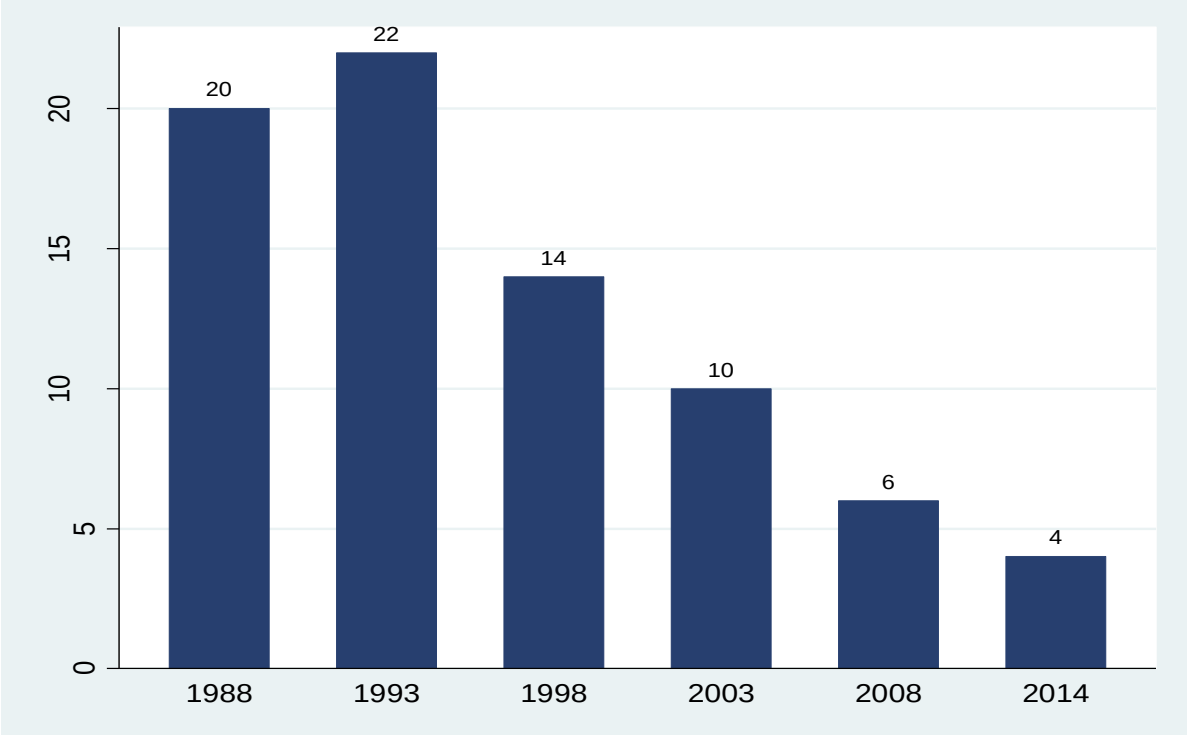
Figure 3.3: Trends of anaemic status of children in Ghana



3.4 Trends of Acute Lower Respiratory Infection among Children

Acute lower respiratory infection is a major health concern among children since their immune systems are very sensitive to infections in the early stages of their development. For the GDHS the prevalence rate of ARI was estimated by asking mothers whether any of their children under age five had been ill with a cough accompanied by short, rapid breathing in the two weeks preceding the survey. Figure 3.4 shows the trend in the prevalence of AR1 between 1988 and 2014. From the figure it can be seen that even though the ARI prevalence increased marginally from 20 percent in 1988 to 22 per cent in 1993, after 1993 it decreased continuously to 4 per cent in 2014. However, caution should be exercised in interpreting the prevalence rate of ARI since the symptoms are subjective as they are based on the mother's perception of illness and are not validated by a medical examination. Over the years, early treatment with antibiotics has been effective in preventing deaths. The implication of the sharp decline in ARI over time can be seen in the reduction in child mortality rate over time in the country, and this is likely to improve the general wellbeing of children as well.

Figure 3.4: Trends of acute lower respiratory infection among children in Ghana

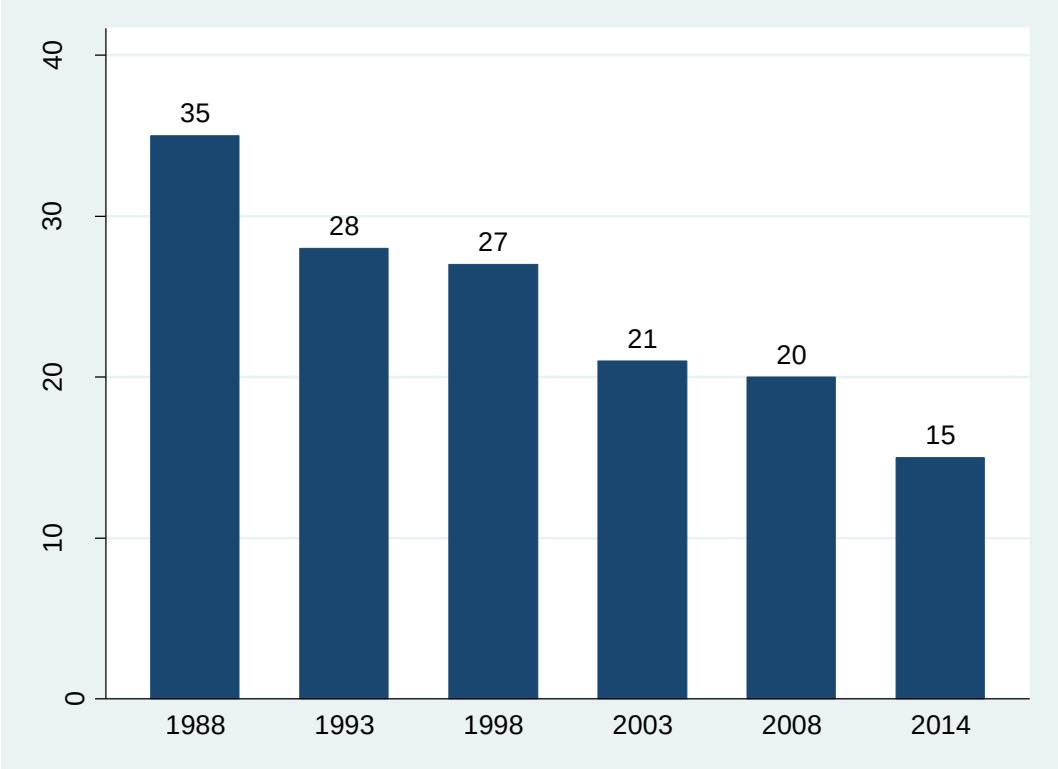


3.5 Trends of Fever among Children

Fever is a symptom of an underlying health anomaly in children, including malaria and other acute infections. In a tropical country such as Ghana, fever generally reveals the presence of malaria. It is a major contributory cause of death in infancy and childhood in many developing countries, especially in countries with a tropical climate. In 2015, nearly half of the world's population of about 3.2 billion people was at risk of malaria. Most malaria cases and deaths occur in Sub-Saharan Africa. In 2015, the region was home to 88 per cent of malaria cases and 90 per cent of malaria deaths (WHO, 2015). The disease affects all ages but children under five and pregnant women are the most vulnerable groups. Fever left untreated among children may lead to child mortality, and long-term consequences such as kidney failure and anaemia

Malaria occurs every year and the transmission intensity is greater after the rainy season. It is worth noting that since the timing of the survey affects the prevalence rate, temporal factors must be accounted for when interpreting fever as an indicator of malaria prevalence. Figure 3.5 shows the prevalence rate of fever between 1988 and 2014. The figure depicts a decreasing rate of fever prevalence among the under-5 children of more than half between the first round of the GDHS (1988) and the most recent round of the GDHS (2014). From the figure, it can be seen that fever prevalence decreased from 35 per cent in 1988 to 28 per cent in 1993, and decreased to 27, 21, 20 and 15 per cent in 1998, 2003, 2008 and 2014 respectively.

Figure 3.5: Trends of fever among children in Ghana

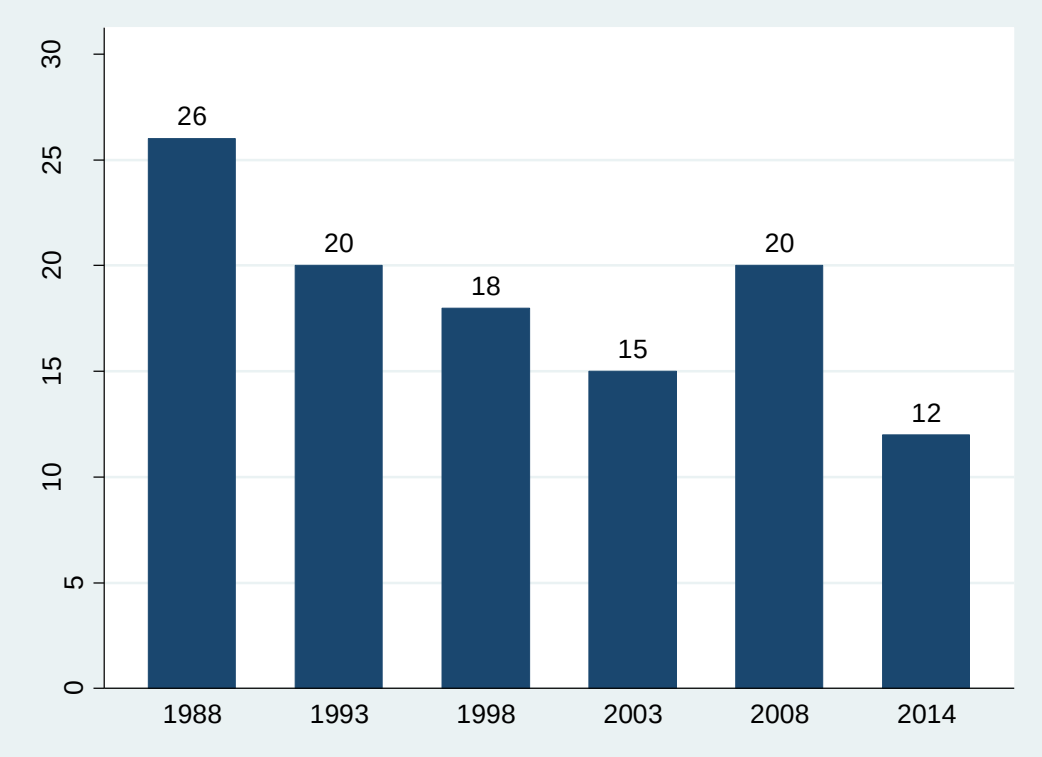


3.6 Trends of Diarrhoea Infection among Children

Diarrhoeal disease is one of the major causes of death in children under five years old, and is responsible for killing around 760,000 children every year. According to World Health Organisation (WHO), in developing countries children under three years old experience on average three episodes of diarrhoea every year. Each episode deprives the child of the nutrition needed for growth. As a result, diarrhoea is a major cause of malnutrition, and malnourished children are more likely to fall ill from diarrhoea. The incidence of diarrhoea is frequently related to the use of contaminated water and to unhygienic practices in food preparation and disposal of excreta. Severe diarrhoea leading to dehydration is a major cause of morbidity and mortality among young children in Ghana. To measure the incidence of diarrhoea, mothers were asked whether any of their children under five years of age had diarrhoea during the two weeks preceding the survey.

Figure 3.6 shows the prevalence of diarrhoea between 1988 and 2014. The prevalence generally decreased over time, as although the prevalence increased from 15 per cent in 2003 to 20 per cent in 2008, it decreased to 12 per cent in 2014.

Figure 3.6: Trends of diarrhoea infection among children in Ghana



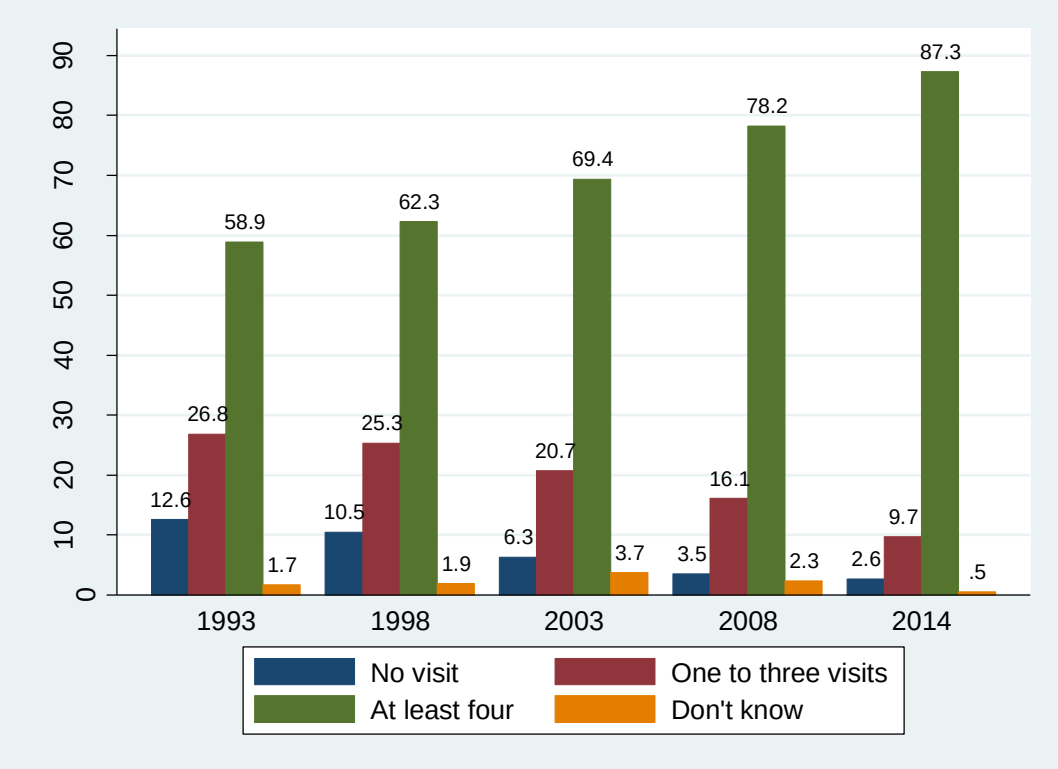
3.7 Trends of Antenatal Care use among Mothers

The essence of antenatal care is essential in preventing adverse outcomes when it is sought early in the pregnancy and is continued until delivery. According to WHO, it is recommended that women without complications should make at least four antenatal care visits, the first of which should take place during the first trimester. Making at least four antenatal care visits during pregnancy increases the probability of improving the health situation of the mother and the child. The trend in increasing the number of antenatal visits a pregnant woman makes before delivery is a component in achieving the two targets of the fifth MDG: the first is to reduce by a quarter the maternal mortality ratio between 1990 and 2015, and the second is to achieve universal access to reproductive health by 2015.

Even though Ghana made significant strides in halving the maternal mortality rate (MMR) from 760 to 380 maternal deaths per 1,000 live-births, it still fell short of the target of 190 deaths per 1,000 live-births required by the MDG5 target.

Figure 3.7 shows the proportion of women who made no visit, one to three visits, and at least four visits during pregnancy. Those who made no visit and one to three visits decreased from 12.6 to 2.6 per cent, and 26.8 to 9.7 per cent in 1993 and 2014 respectively, and the proportion of women who achieved the recommended WHO requirement of at least four visits increased from 58.9 to 87.3 per cent. This is good news for Ghana in achieving MDG5.

Figure 3.7: Trends of mother's antenatal care in Ghana



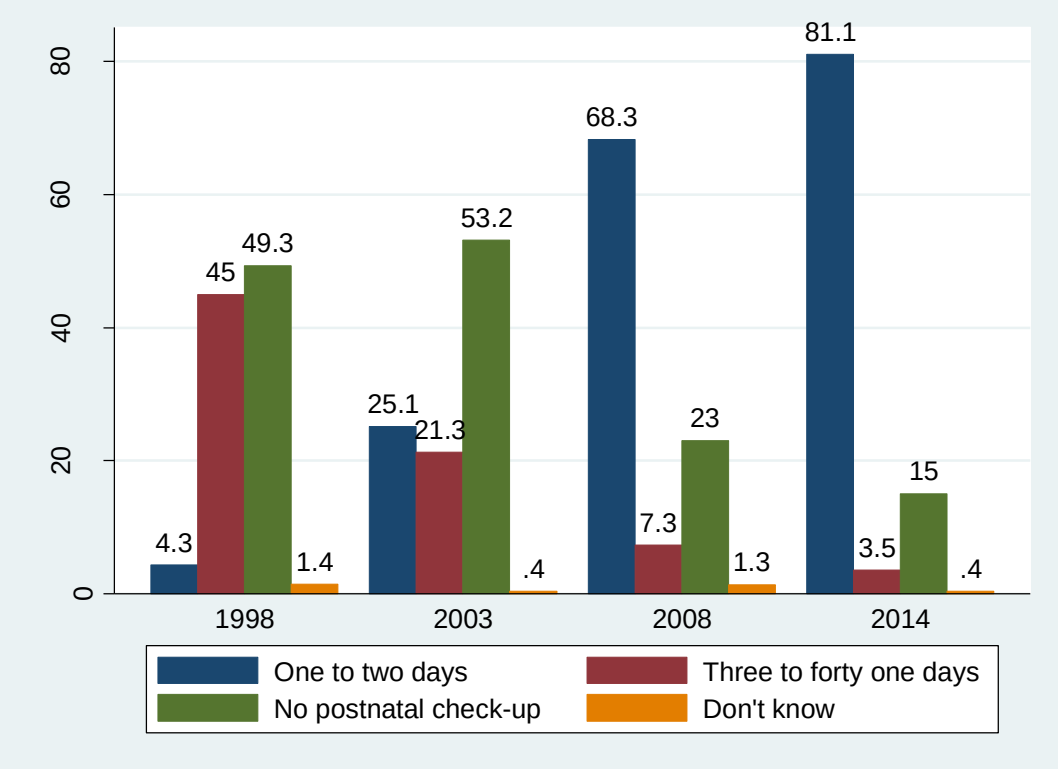
3.8 Trends of Postnatal Care in Ghana: Time of the Check-up after the Delivery of the Mother's First Postnatal Check-ups

Postnatal care use is important since a significant proportion of neonatal deaths occur during the first few hours of the life of the baby after delivery. The most critical period is two days (48 hours) and the provision of postnatal care services for new-borns should therefore, start soon after the child is born, a failure of which increases the risk of neonatal deaths. The timing of the postnatal check-up for the new-born is similar to that of the mother in that it should occur within two days after birth. A higher proportion of women using postnatal care in a given country prevent mortality of the both the mother child. This health indicator has the twin potential of aiding the achievement of the fourth and the fifth MDG goals. Figure 3.8 shows the proportion of mothers who had postnatal care within the first two days and between the third and the forty-first day, and those who did not receive any postnatal care after delivery.

The figure shows that those who received postnatal care within the first two days (48 hours) after delivery increased steeply from 4.3 per cent in 1998 to 25.1, 68.3 and 81.1 per cent in 2003, 2008 and 2014 respectively. It can also be discerned from the figure that the proportion of mothers that had no postnatal check-up decreased from 49.3 per cent in 1988 to 15 per cent in 2014, though this proportion increased slightly between 1998 and 2003. Furthermore, the proportion of mothers who had postnatal care from the third to the forty-first day after delivery decreased over time from 45 per cent to 3.5 per cent between 1998 and 2014. The consistent decrease in the

proportion in this category does not call for concern since the critical period for postnatal care is the first two days after delivery and, barring any complications the mother is discharged.

Figure 3.8: Trends of mother's postnatal care in Ghana



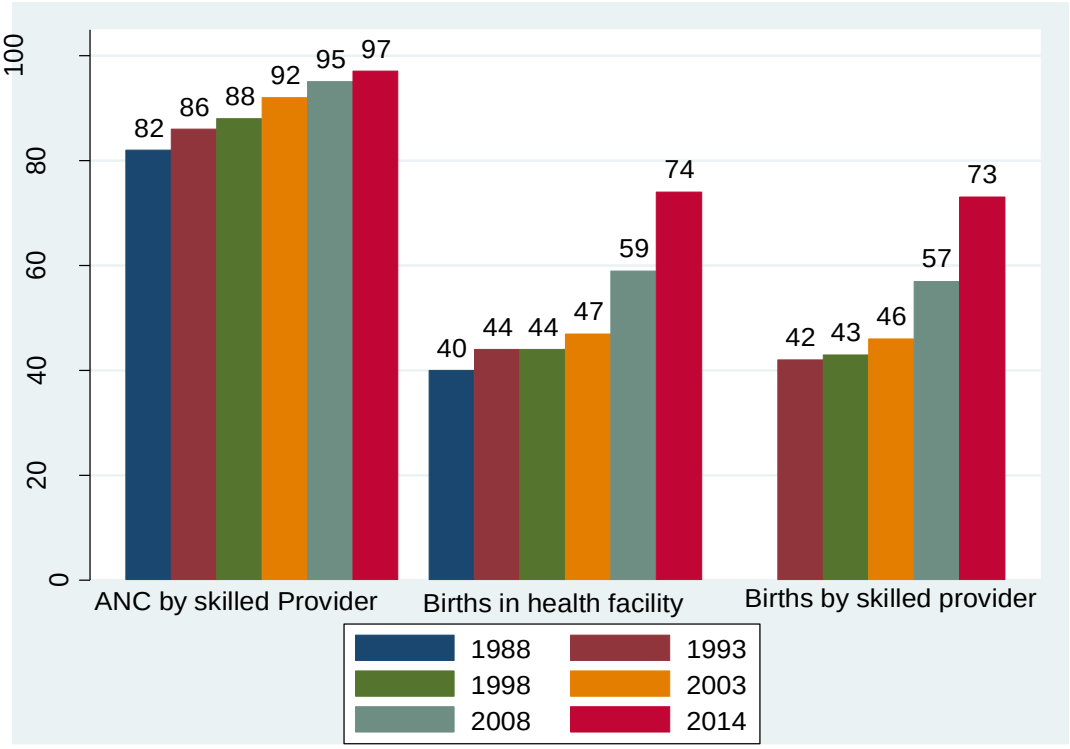
3.9 Trends in Maternal Care

The source of the maternal health care received has a bearing on the health of both the mother and the child. The maternal health care corresponds to each of the following three: the proportion of pregnant women that received antenatal care visits from a skilled provider; the proportion of pregnant women that had their delivery in a health facility; and the proportion whose birth was attended by a skilled provider. These three elements contribute to reducing maternal mortality, especially in African countries. Even though significant progress has been made towards reducing maternal mortality on the continent, Africa still remains the region with the highest maternal mortality ratio compared to the rest of the world, registering 289 maternal deaths per 100,000 live births compared to the global average of 210 maternal deaths per 100,000 live births in 2013. The reasons are that Africa is still grappling with low proportions of births attended to by skilled health personnel, low contraceptive prevalence rates, high adolescent birth rates, limited antenatal care coverage, and a high unmet need for family planning, all of which are contributing to a high maternal mortality ratio in the continent.

Figure 3.9 depicts the trend of these three components of maternal care between 1988 and 2014. Generally, all three components depict an increasing trend across all six rounds of the GDHS. The proportion of pregnant women that received antenatal care visits from a skilled provider

increased from 82 per cent in 1988 to 97 per cent in 2014, and pregnant women that made a delivery in a hospital also increased, from 40 per cent in 1988 to 74 per cent in 2014. Similarly, pregnant women whose births were attended by skilled providers increased from 42 per cent in 1988 to 73 per cent in 2014.

Figure 3.9: Trends in maternal care in Ghana



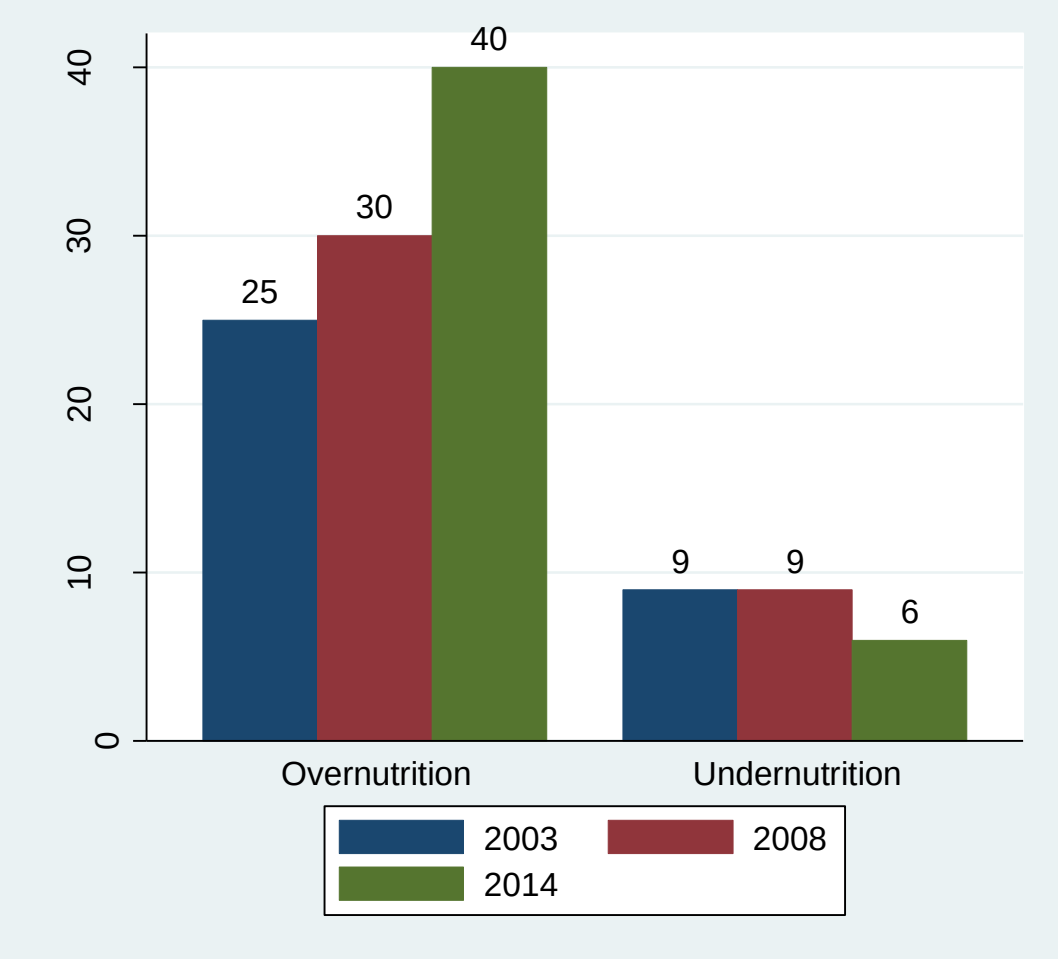
3.10 Trends of Nutritional Status among Mothers

Anthropometric data on height and weight for women aged 15-49 were collected in the Demographic and Health Surveys. These data were used to assess their low maternal height and body mass index (BMI). Genetics and the effects of nutrition influence maternal height during childhood and adolescence. The height of the mother is an important predictor of risk of difficulty in delivery because small stature is frequently associated with small pelvic size. Also, the risk of having low birth weight babies is higher for short women. The risk of difficulty during delivery is common for women below the height of 145 centimetres. Information on the nutritional status of mothers is essential because it could influence both maternal and child mortality.

It is worth noting that information on BMI was used to determine whether mothers are experiencing chronic energy deficiency (under-nutrition) or are overweight/obese (over-nutrition). Under-nutrition results in poor stature of the mother which could increase the risk of maternal and child mortality, whereas over-nutrition may increase the likelihood of cardiovascular problems for the mother which could lead to maternal mortality. A BMI cut-off point of 18.5 has been recommended for assessing chronic energy deficiency among non-pregnant women. At the other end of the BMI scale, women are considered overweight if their

BMI is between 25.0 and 29.9 and obese if their BMI is 30.0 or greater. Figure 3.10 shows the trend in the nutritional status of mothers, and specifically the status of under nutrition and over nutrition between 2003 and 2014. From the figure, it can be seen that under nutrition decreased from 9 per cent in 2003 to 6 per cent in 2014, whereas over nutrition increased from 26 per cent in 2003 to 40 per cent in 2014.

Figure 3.10: Trends in nutritional status of mothers in Ghana



3.11 Trends in Fertility

Trends in fertility can be assessed in the following two ways. First, fertility trends can be investigated using retrospective data on birth histories collected in the GDHSs. Secondly, the Total Fertility Rate (TFR) from each of the surveys of the GDHS can be compared over time. Figure 3.11a used retrospective birth histories obtained from the GDHS to examine trends in age-specific fertility rates for successive five-year periods before each of the surveys. To calculate these rates, births were classified according to the period of time in which the birth occurred and the mother's age at the time of the birth.

From the figure, it can be seen that fertility has fallen gradually among women in all age groups over the past two decades, with the exception of the 25-29 age group. The decrease in fertility is steepest among women aged 15-19, a 20 per cent decline between the 15-19-year period before the survey and 0-4-year period before the survey. Figure 3.11b depicts the trend of TFR from the six GDHSs. The figure depicts a general decreasing trend from 6.4 in 1988 to 4.2 in 2014, albeit increased between 2008 and 2014.

Figure 3.11a: Trends in age-specific fertility in Ghana

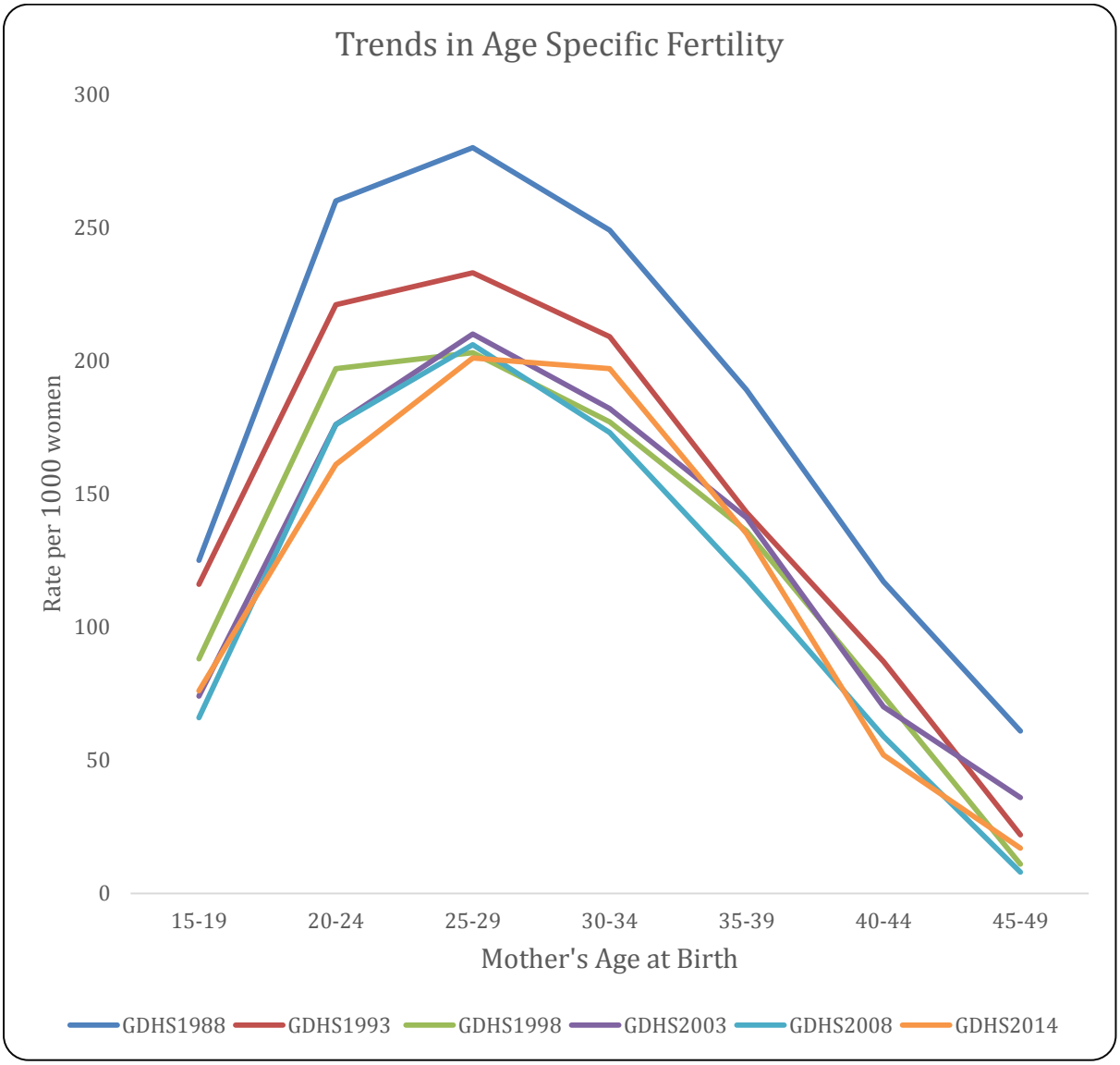
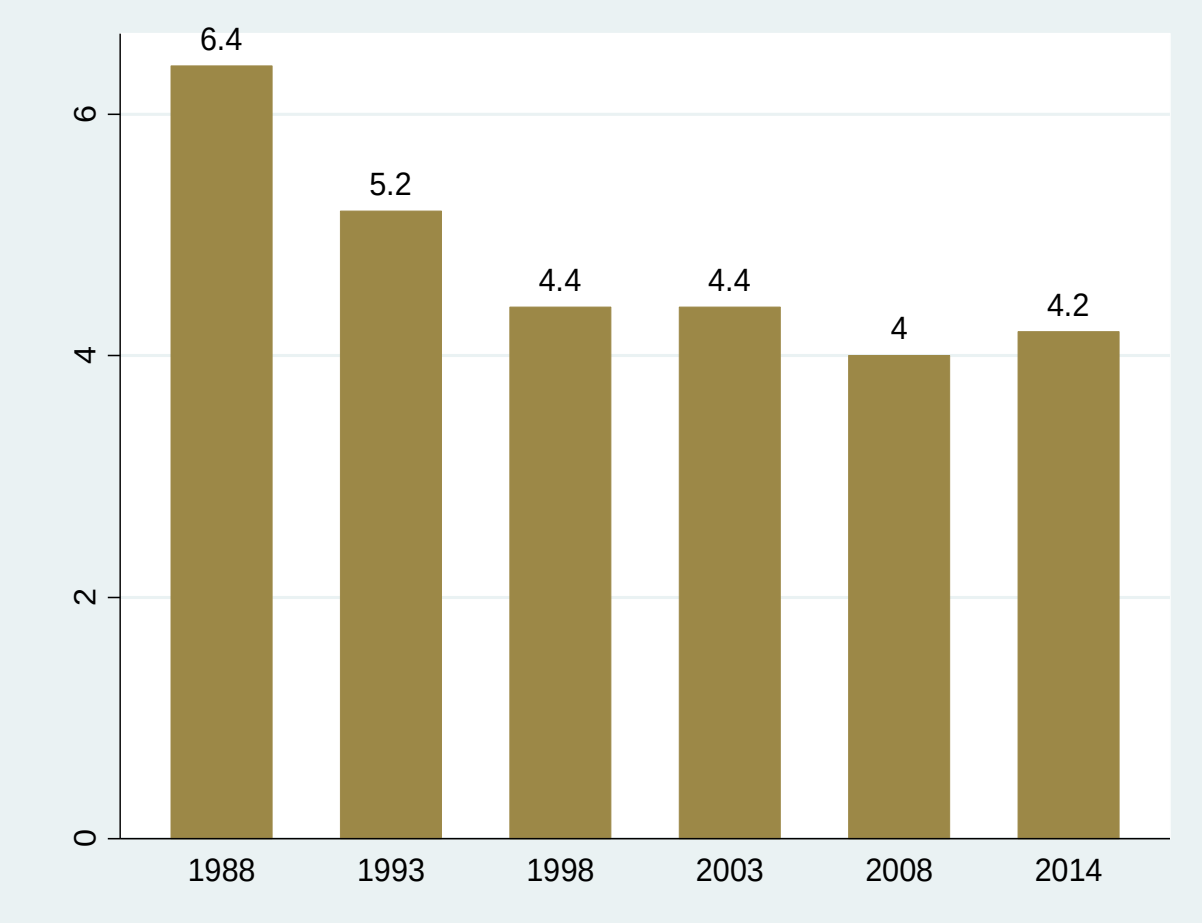


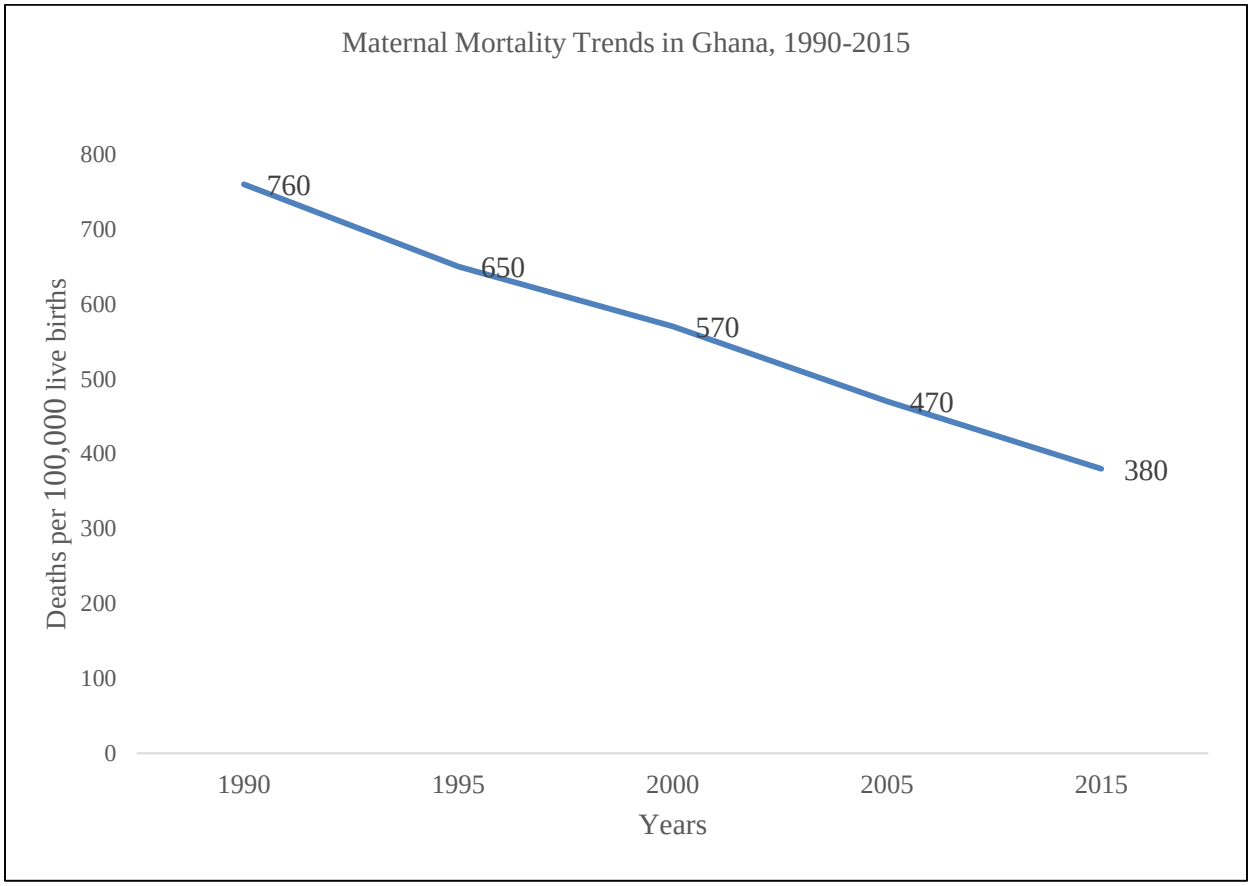
Figure 3.11b: Trends in total fertility rate in Ghana



3.12 Trends in Maternal Mortality

Africa has made significant strides in improving maternal health, though only four countries completely achieved the maternal mortality target. Cape Verde, Equatorial Guinea, Eritrea and Rwanda reduced their maternal mortality ratio by more than 75 per cent between 1990 and 2013, hence meeting MDG5 of reducing by three-quarters the maternal mortality ratio between 1990 and 2015. In Ghana, maternal mortality reduced from 760 to 380 maternal deaths per 100,000 live births. Though the decline is significant, it fell behind the maternal mortality ratio of Africa which is 289 per 100,000 live births and the fifth MDG target of 190 maternal deaths per 100,000 live births. Figure 3.12 shows the MMRs between 1990 and 2015.

Figure 3.12: Trends of maternal mortality rate in Ghana

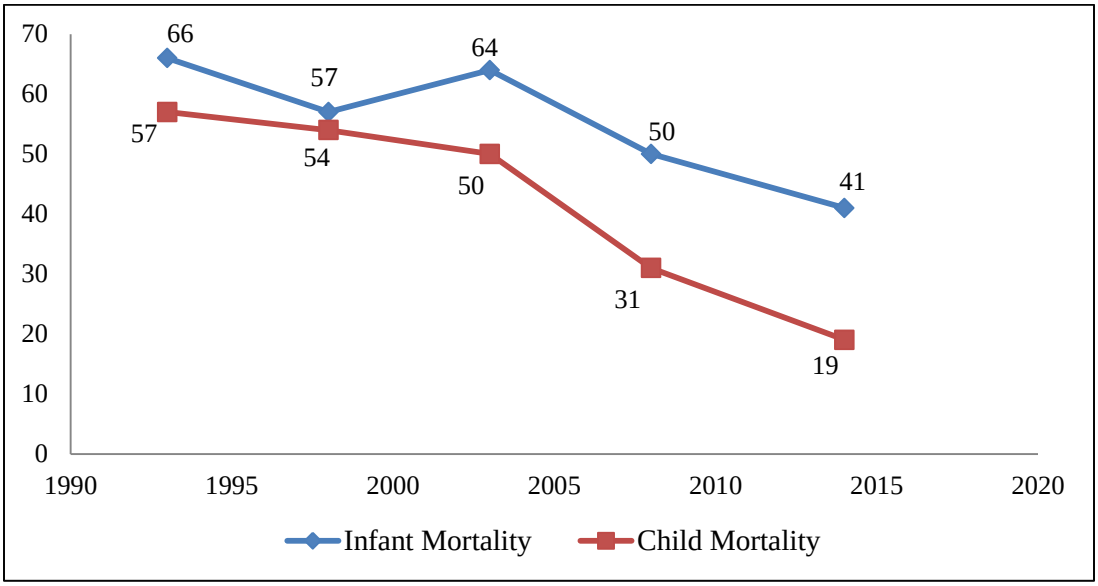


3.13 Trends in Infant and Child Mortality

Under-5 mortality has been one of the cancerous cells in Ghana's socio-economic development agenda since independence. This is because it mainly affects the availability of quality human resources that are needed for the effective development of the country. As a result, several efforts have been made to help eradicate this cancerous cell. Prominent among them is the provision of free immunization for children against the major childhood killer diseases, introduction of free maternal healthcare and the provision of health insurance services for children below the age of five.

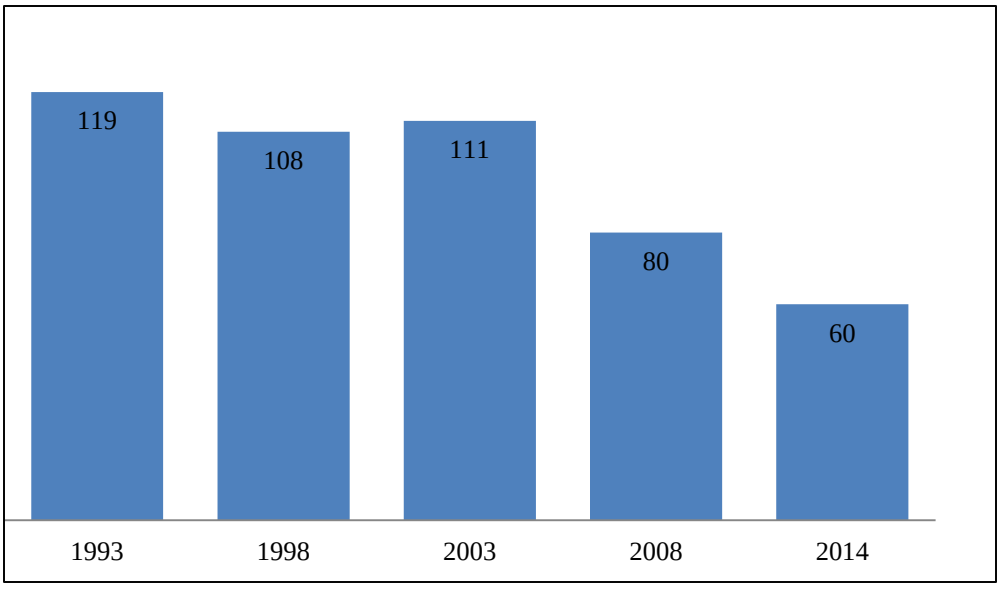
These interventions have to a larger extent, contributed to the continued reduction in child mortality since 1993 and infant mortality since 2003. Child mortality reduced from 57 deaths in 1993 to about 19 deaths by the end of 2014. This ensured that Ghana achieved the MDG on child mortality. Though there is a reduction in infant mortality, the ratio of 41 deaths per 1,000 live births achieved in 2014 seems to be on the high side, given the number of possible labour force members that the country continues to lose through some childhood killer diseases that could have been avoided.

Figure 3.13a: Trends of infant and child mortality rates in Ghana



The downward trajectory that has been recorded in infant and child mortality is also reflected in under-5 mortality rate in the country over the same period. This is probably due to the interventions identified above. Thus under-5 mortality reduced from 119 deaths per 1,000 live births to 60 deaths per 1,000 live births. Though this drop may seem quite impressive, it is important to mention that the country got to this position only with some ups and downs. Under-5 mortality reduced from 119 per 1,000 live births in 1993 to 108 per 1,000 live births in 1998. However, the figure shot up to 111 deaths per 1,000 live births in 2003, before falling to its current level. This clearly indicates that the country needs to put in more effort to sustain the downward trend in under-5 mortality, given that it has the possibility of rising if no attention is paid to it.

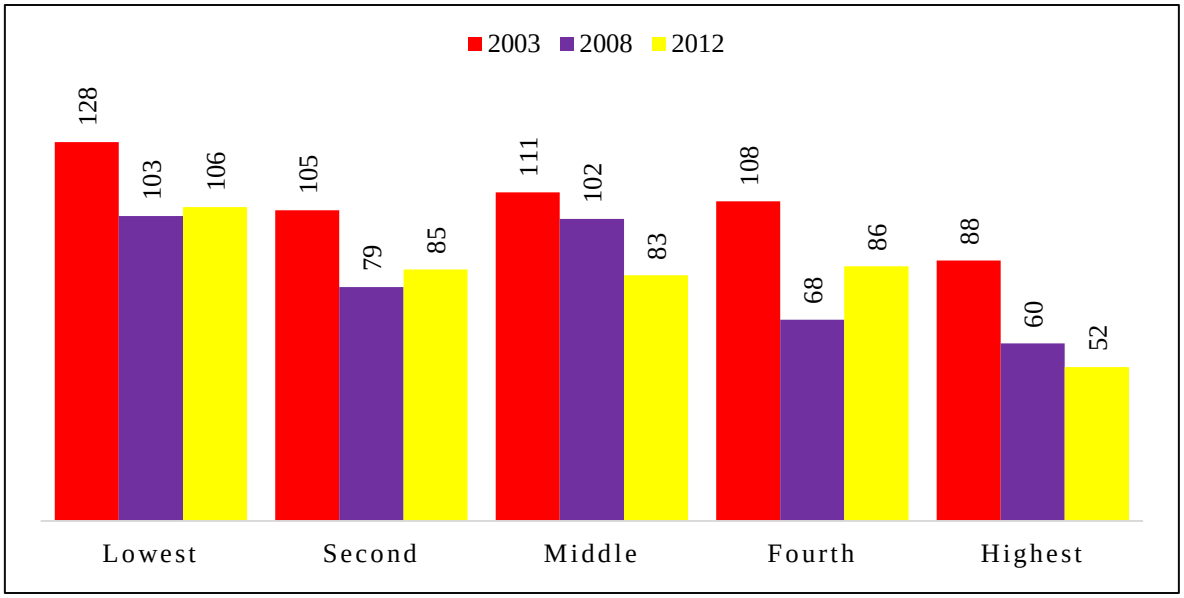
Figure 3.13b: Trends of under-5 mortality rate in Ghana



3.13.1 Trends in under-5 mortality by wealth quintile 2003-2012

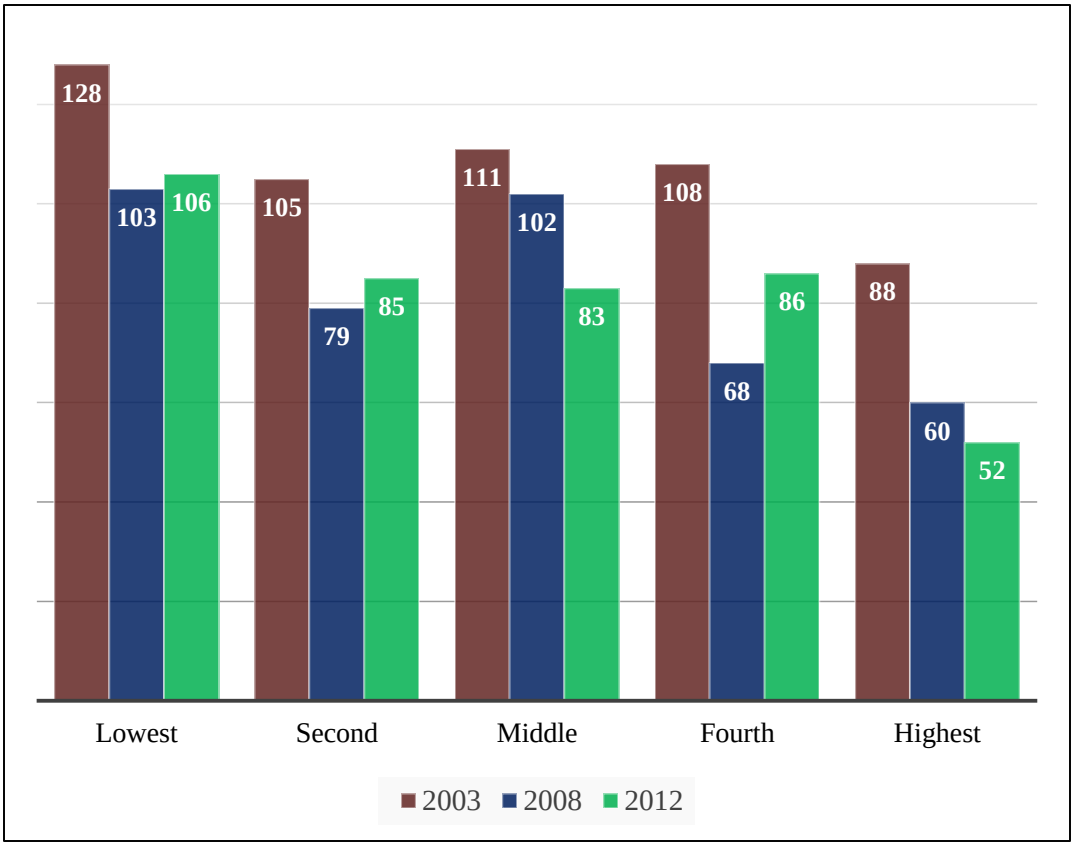
There seems to be some link between infant and under-5 mortality and poverty levels. Child mortality seems to be quite high among households found in the lower wealth quintiles compared to households found in the middle fourth and the highest quintiles.

Figure 3.13c: Trends of under-5 mortality by wealth in Ghana



The comparison seems to corroborate the findings of the sixth round of the Ghana Living Standards Survey (GLSS-6) which indicated that inequality in Ghana is on the increase. Whereas infant and under-5 mortality reduced for households in the highest wealth quintile in 2012, the same cannot be said of households in the lower and second quintiles. This is probably because of some other costs associated with accessing healthcare for their children which the several social interventions provided by the government do not cover. In addition, this situation could also be caused by the unavailability of health facilities in a number of rural areas where most of the country's poor are found.

Figure 3.13d: Trends of infant mortality by wealth in Ghana



3.13.2 Family planning engagement

The focus of this section is to present trends in issues surrounding family planning engagement among women in Ghana. Specifically, the following trends will be analysed.

3.13.3 Knowledge of contraceptive methods

Adequate knowledge about various contraceptive methods is key to getting access to family planning and possibly adopting a specific method. Since 1988, various rounds of the DHS have sought to assess whether Ghanaians have any idea about the various contraception methods available. The methods identified over the years include female and male sterilization, intrauterine devices (IUDs), injectable, implants, the pill, male and female condoms, lactational amenorrhoea method (LAM) and emergency contraception. In addition to these modern methods, the DHS also sought to find out their knowledge of other traditional methods such rhythm and withdrawal. A careful examination of Figure 3.14a and Figure 3.14b indicates that there has been a consistent increase in the number of people (both men and women) with knowledge about the various contraception methods, especially the modern ones. Between 1988 and 2014 knowledge about the various methods of modern contraception has increased by an average of 55 per cent among women and 50 per cent among men.

Figure 3.14a: Trends of knowledge of contraceptive methods (women) in Ghana

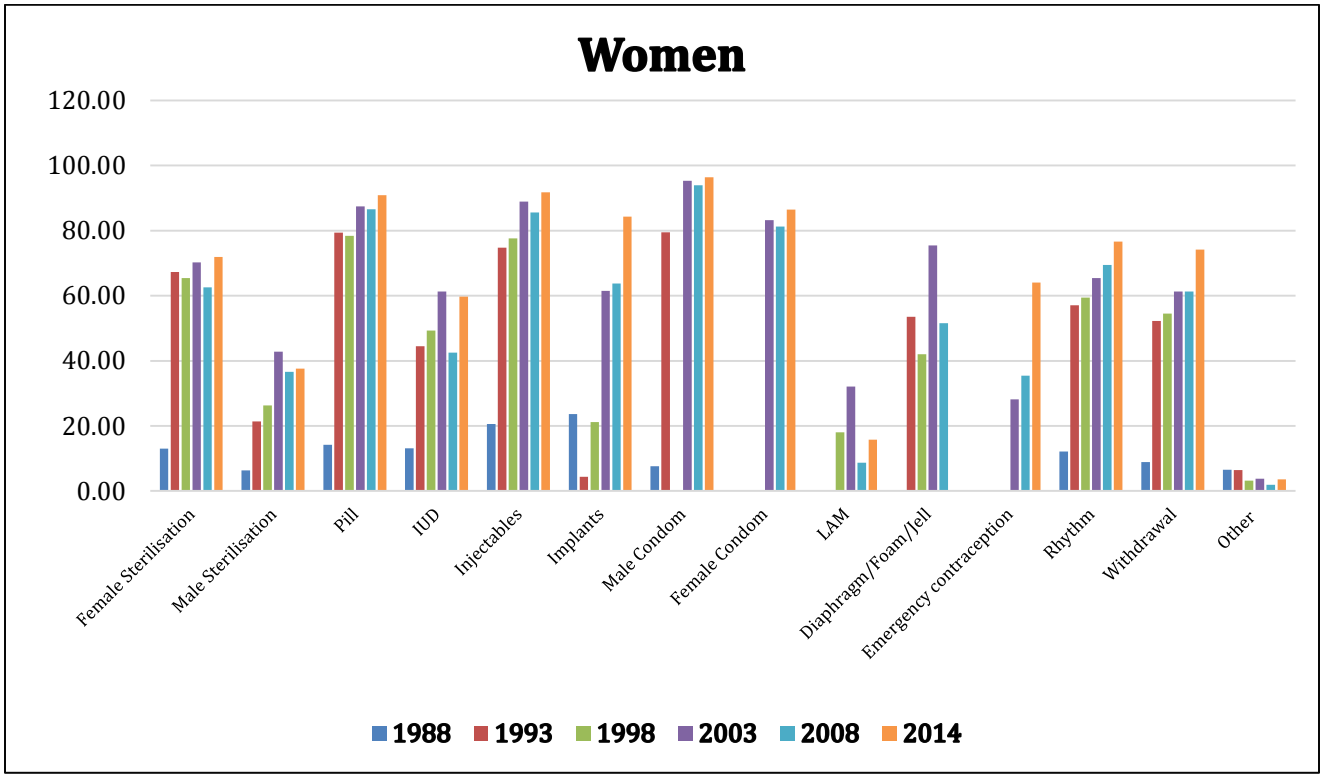
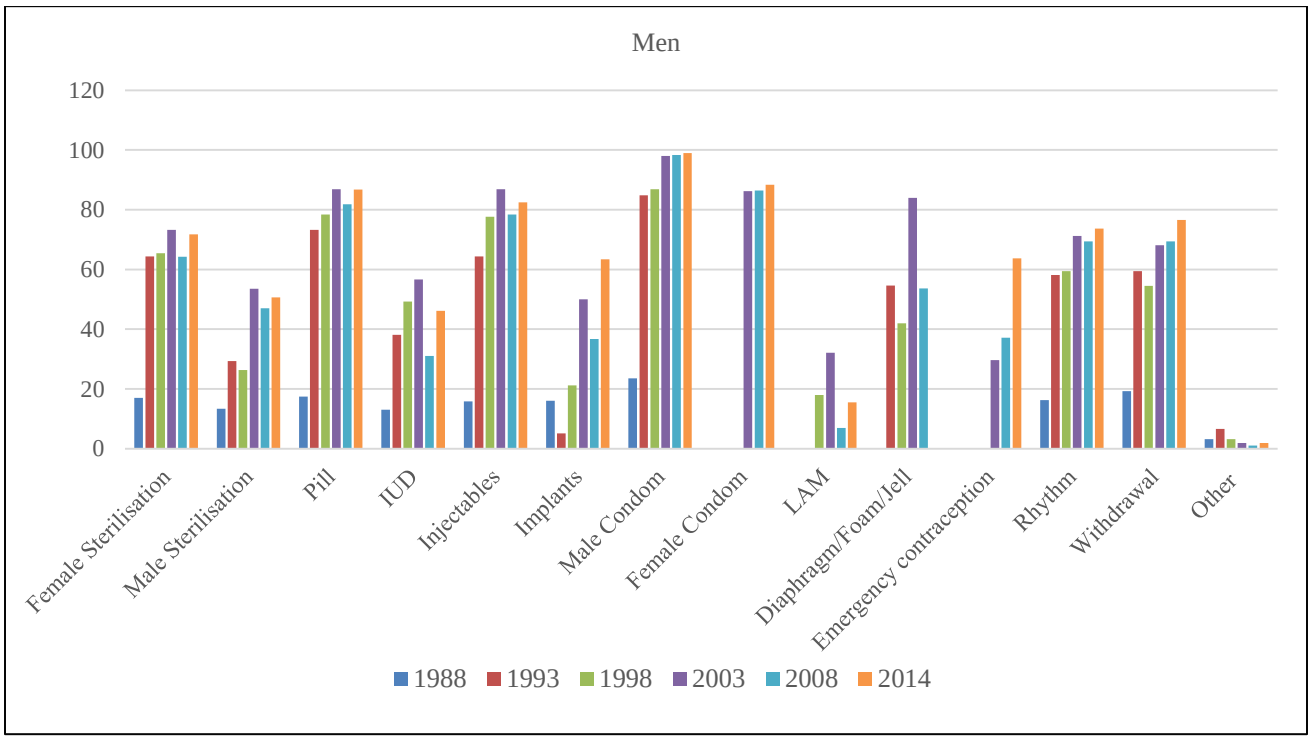


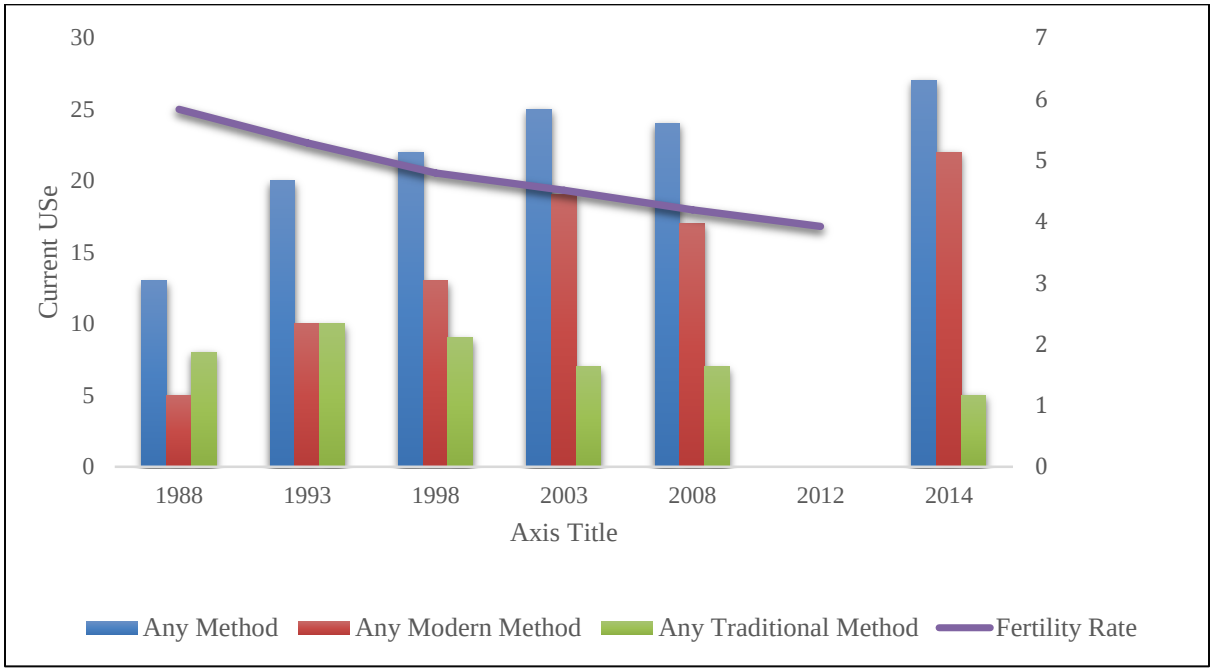
Figure 3.14b: Trends of knowledge of contraceptive methods (men) in Ghana



The average increase in knowledge of modern methods was significantly higher than that of the traditional methods, which averaged 42 per cent and 38 per cent for women and men respectively between 1988 and 2014. This clearly shows that the country has made a lot of progress in terms of creating awareness in its bid to reduce unplanned pregnancies.

The increase in Ghanaians' knowledge of the various methods of contraception is also reflected in their use of these methods since 1988.

Figure 3.14c: Trends of current use of contraception and fertility rate in Ghana

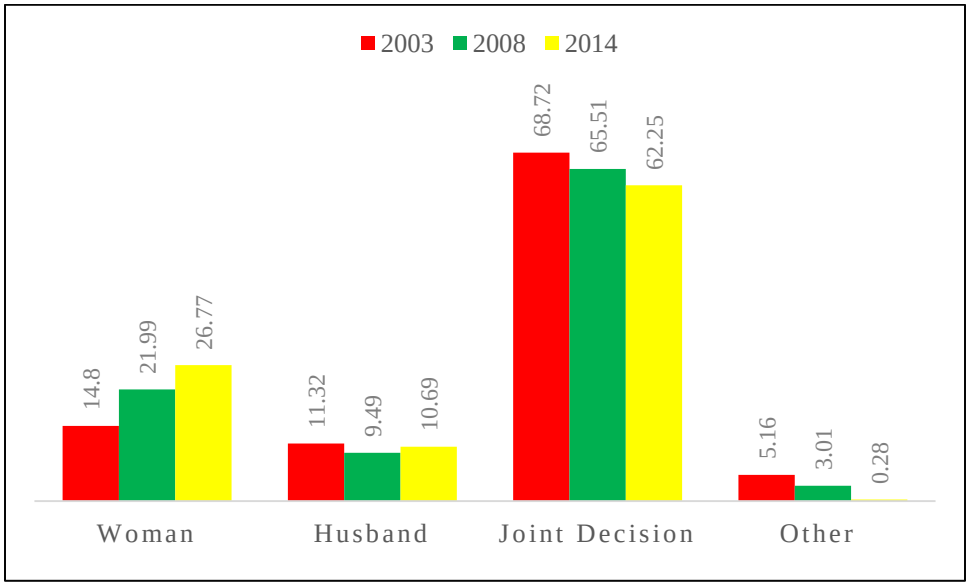


Since 1988, the use of modern contraception methods has been on the increase, while the use of traditional methods has been on the decline since the 1980s. This is probably the result of years of continued education on the use of various modern methods of contraception and it seems to be reflected in the birth rate among women in the country. The fertility rate in Ghana has been on the decline since 1988. It reduced from 5.83 per cent in 1988 to 3.92 per cent by the end of 2012. Thus knowledge leads to increased use and this contributes to reductions in the fertility rate of the country.

3.14d Decision making surrounding contraceptive use

In terms of who makes the decision about family planning, the DHS has, over the years, sought to find out whether decisions are made by just the woman, just the man or both of them.

Figure 3.14d: Trends of decision making surrounding contraceptive use in Ghana



The results obtained since 2003 indicate that for majority of households, the decision to use any contraception method is taken by both the man and the woman. An interesting trend in the results obtained over the years indicates that the number of women alone who make decisions on which contraception method to use has been increasing since 2003. It increased from 15 per cent, in 2003 to 22 per cent and then to 27 per cent in 2008 and 2014 respectively. This gives an indication that increasing numbers of women are becoming autonomous decision makers when it comes to which contraception method to use. This is to the detriment of joint decision-making. Noticeable also is the continued decline in the influence of other people such as family and friends in relation to the decision about which contraception method to use.

CHAPTER FOUR

BIRTH INTERVAL AND CHILD STUNTING

4.0 Introduction

This section investigates the correlates of the nutritional status of children under age five. The study used height for age index of children as an indicator of their linear growth retardation and cumulative growth deficits. Specifically, Children whose height-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered short for their age (stunted), or chronically malnourished. The incidence of stunting in a population reflects failure to receive adequate nutrition over a long period and is also affected by recurrent and chronic illness.

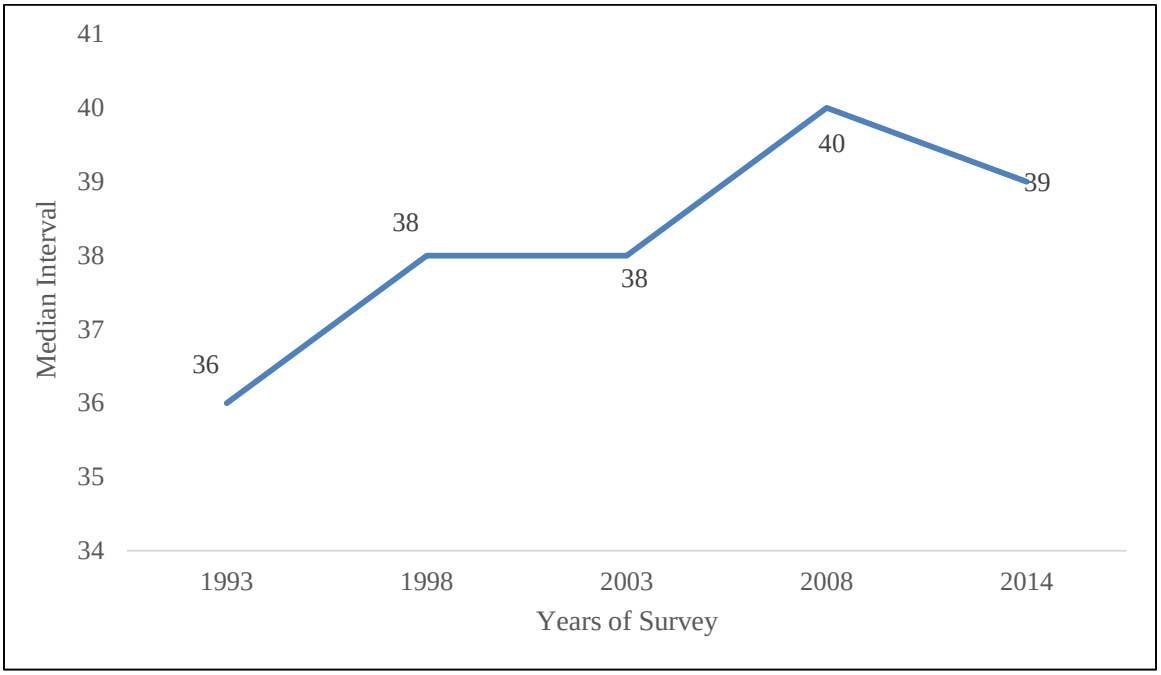
The long-term duration for realization of impact engenders the need for particular attention to the factors that contribute to the incidence of stunting. Consequently, the correlates of stunting in Ghana are estimated using the three rounds of GDHS (2003, 2008 and 2014)." The main variable of interest for the study in all the three rounds is the preceding birth interval of the mother measured in months after the first birth and its effect on the nutritional status of children. The study has two main objectives: (1) examine the effect of the preceding birth interval (spacing) of mothers on the nutritional status of their children; (2) determine the nature of the relationship between preceding birth interval (spacing) of the mother in months and the nutritional status of child.

The subsections of this section can be divided into the following, the first subsection presents a description on the relationship between the birth spacing of mothers and the nutritional status of children across the six rounds of Ghana Demographic Survey- 1988, 1993, 1998, 2003, 2008 and 2014 GDHS. The second subsection goes further to present the econometric results of the relationship between the birth spacing of mothers and the nutritional status of children across the recent three rounds of the GDHS (2003,2008 and 2014), and also depicts the nature of the relationship between the two variables in the context of Ghana. The final subsection then summarizes the findings and policy recommendations to conclude the section.

4.1 Trend of Birth Interval over time in Ghana

Birth interval is the length of time between two successive live births. Figure 4.1 gives information on the median birth interval measured in months over time in Ghana. This provides an insight into birth spacing patterns, which has the potential of affecting fertility as well as maternal, infant, and childhood mortality. From the figure, median birth interval has increased generally over time from 36 months in 1993 to 39 months in 2014. However, given that studies have shown that short birth intervals are associated with increased risk of death for both mother and baby, particularly when the birth interval is less than 24 months, the ideal expectation is that the median birth interval should increase consistently over time across the surveys.

Figure 4.1: Median birth interval over time in Ghana



4.1.1 Relationship between preceding birth interval (birth spacing) and child stunting

An examination of all the rounds of the Demographic Health Surveys in Ghana, seem to suggest that the stunting among children in the country tend to decrease with increases in the birth interval. Thus, households with greater spacing among children have lower incidence of child stunting than households with low spacing among their children. Interestingly, the differences in child stunting among the different birth interval categories tend increase with increases in the birth intervals. For example, in 1993, the difference between the proportion of stunted children in households with less than 24 months birth interval and households with birth interval of between 24 and 47 months was just about 4.6 per cent however, the difference between households with birth interval above 47 months and households with birth interval that ranged between 24 and 47 months was as high as 10.4 per cent. This clearly indicates that adequate spacing in child birth could be a major factor in reducing child stunting in the country. The chi-square test of independence also indicates the existence of some relationship between child stunting and birth interval. Thus, these two variables (Child stunting and Birth interval) are strongly related given the fact that the null is rejected at five per cent.

4.2 Econometric results of the relationship between preceding birth interval and nutritional status of children

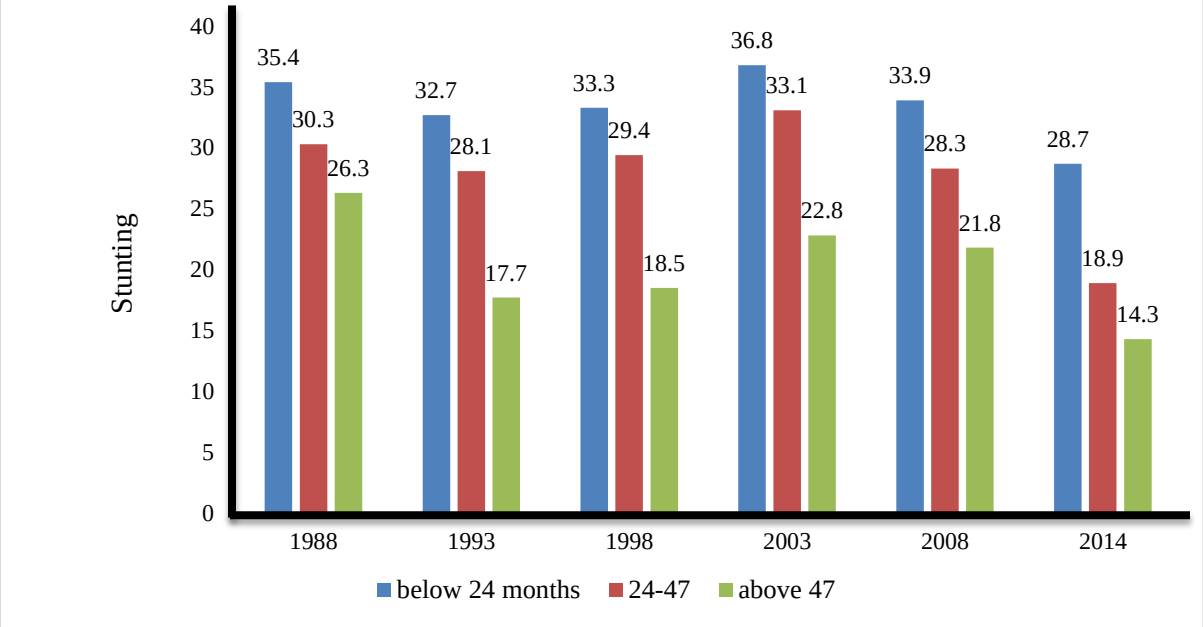
This section presents the econometric results. For verification and further understanding of the coefficients and their signs, descriptive statistics and a correlation matrix of the variables for each of the survey years have been provided in Appendix section. It is worth stating that four variant econometric results are presented in each of the survey years to meet the objectives of the study; the constrained model; the full model of preceding birth interval as a categorical variable;

the full of model of preceding birth interval as a continuous variable with a cubic term; the full model of preceding birth interval as a continuous variable interacted with the age of the mother.

4.2.1 Results of the constrained model

Figure 4.2 depicts the results of the constrained model for each of the survey years. From the figure, in each of the survey years, the age of the child, sex of the child, and the birth spacing of the mother significantly affect the stunting status of the child. Considering the age of the child, in all the survey periods, as the child grows older by one month, it increases the likelihood that the child would be stunted by 1.4, 2.3 and 2.2 in 2014, 2008 and 2003 survey years respectively. Similarly, male children compared to female children are more likely to be stunted by 26.9, 27.0 and 20.2 per cent in 2014, 2008 and 2003 respectively. It is worth noting that the effects of the age and sex of the child are almost the same across the three rounds of GDHS since the percentage change coefficient of the variables are likely not to be significantly different across the years of the survey as depicted in figure 4.2.

Figure 4.2: Preceding birth interval (birth spacing) and child stunting



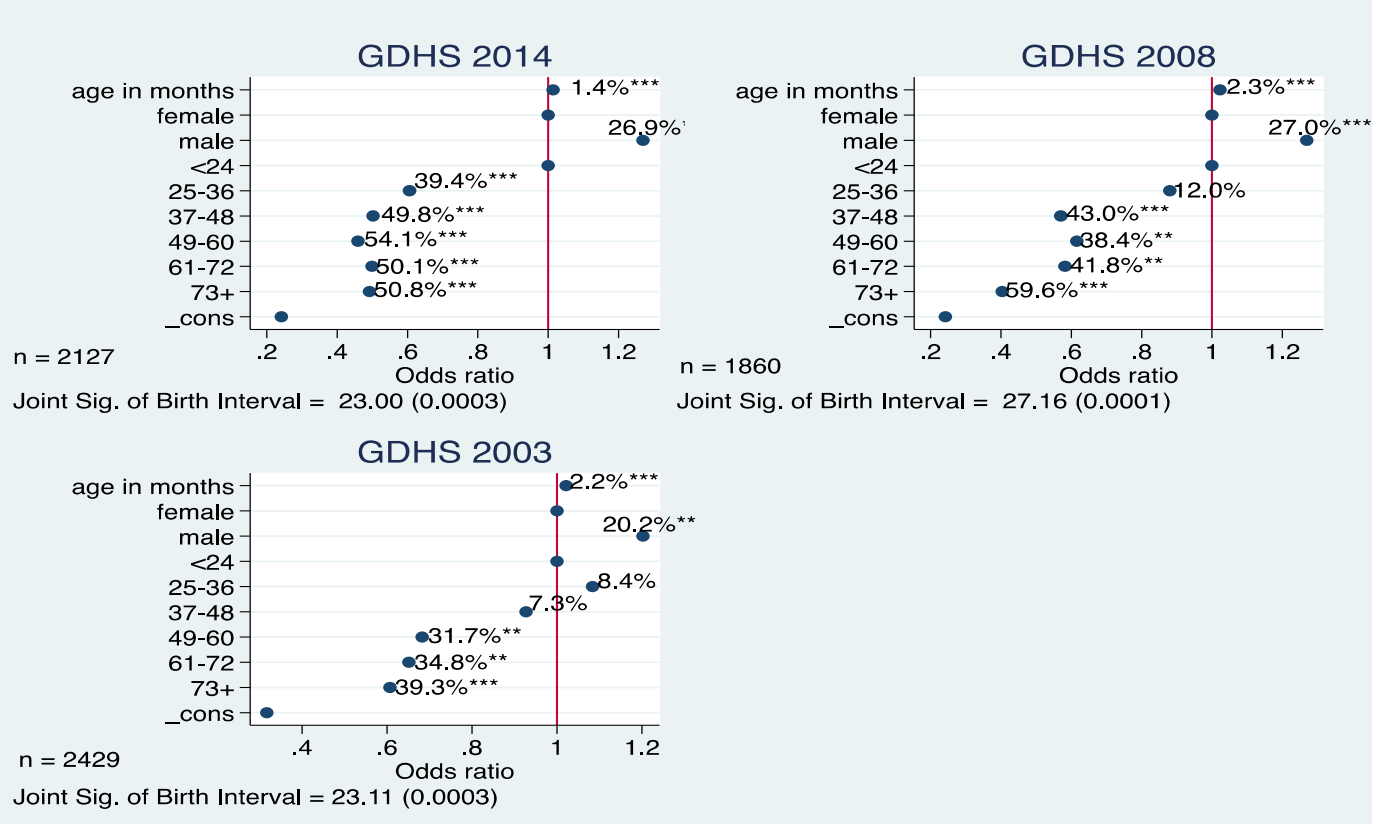
Chi-Square Test of Independence probability 0.01794

Considering our main variable of interest, the preceding birth interval is categorized into the number of months corresponding to a year with the maximum group corresponding to 7 years and beyond as depicted in figure 4.2. However, the base category of less than 24 months corresponds to 2 years, since after transforming the preceding birth interval into yearly grouping, the frequency of children within the category of less than 12 months are too small to serve as a meaningful base category, hence the extension to less than 24 months. The general trend depicted in all the survey period is the decreasing effect of preceding birth interval on the likelihood that the child will be stunted. Thus as the length of birth spacing increases the likelihood of child stunting also decreases as well. For instance, in 2014, children born within preceding birth interval of three years (25-37 months) to seven years (73+ months) and over

decrease the likelihood of stunting from 39.4 to 50.4 per cent compared to children with preceding birth interval of less than 24 months. Similarly, in 2008, the likelihood of stunting decreased from 12 per cent when the preceding birth interval is between 25 -36 months to 59.6 per cent as the preceding birth increases to 73 months and beyond, compared to children that are born within 24 months preceding birth interval.

In 2003, though children born within 25-36 months preceding birth interval increased the likelihood that the child is stunted by 8.4 per cent compared to children born within the first 24 months of preceding birth interval, the likelihood of stunting decreased to 39.3 per cent for children within preceding birth interval of 73 months and over. A key observation in the figure across each of the survey years is the significant percentage point difference between the various categories under concentration. In 2014, children born within 37-48 months instead of between 25-36 months will decrease stunting fairly by 10-percentage point difference. In 2008, children within preceding birth interval of 37-48 months instead of 25-36 months will decrease the likelihood of stunting significantly by 31-percentage point difference. Though another significant percentage point reduction also occurred in 2008 between those in the 61-73 and more than 73 months category of 28 per cent, caution should be exercised in this regard since the possibility of the influence of outliers is high. Similarly, in 2003, the percentage point difference between children within the birth interval of 25-36 and 37-48 months is significant at 24 per cent.

Figure 4.3: Constrained Model



4.2.2 Results of the unconstrained model

This section presents the results of the full model by considering other correlates of stunting among the under-fives in Ghana. The other variables considered are the wealth quintile of the child, the level of education of mothers, the size of the child at birth, the area of residence of the child and the age of mothers.

In the context of our main variable of interest, the preceding birth interval, children born within the categories of 37-48 to 73 months and above significantly reduces the likelihood that the child will be stunted by at least 18 per cent compared to children born within the first 24 months of preceding birth interval. Moreover, in the case of the 2014 results all the categories of preceding birth are significant at 1(one) per cent and 5 per cent levels of significance. By interpreting these categories in the case of 2014, children born within preceding birth category of 25-36 months compared to children within the first 24 months of preceding birth interval are 42.2 per cent likely to reduce stunting among the under-fives. Similarly, children born within the preceding birth interval of 37-48 months are 51.7 per cent likely to reduce stunting. The other categories of 49-60, 61-72, 73 and above months decreased stunting by 56.6, 50.2 and 44.3 per cent respectively compared to children born within the first 24 months of preceding birth interval. A general trend that can be observed across the unconstrained model in each of the surveys is that the per cent change coefficients of the preceding birth categories increases initially then falls and sometimes increases further. In the 2003 model, the per cent change coefficients increased from zero (0) per cent to 35.8 per cent and later falls to 30 per cent, whereas that of the 2008 model increased from 18.5 per cent to 42.7 per cent, then decreased to 33.3 per cent and later increased to 53.5 per cent. In the case of the 2014, the per cent change coefficients increased from 42.2 per cent to 50.2, then decreased to 44.3 per cent. In all the survey periods, the relationship between the preceding birth interval and the child being stunted is nonlinear. It is worth noting that the joint test of the preceding birth interval categories on child stunting reveal significant results.

Considering the other correlates of stunting, it is observed that as the child gets a month older the likelihood of stunting increases by 2.5, 2.3 and 1.4 per cent respectively in 2003, 2008 and 2014 respectively. In all the survey periods under consideration, male children are more likely to be stunted compared to that of female children. In terms of the wealth quintile, a general pattern observed is that children in wealthier quintiles are less likely to be stunted. In 2003, all the categories of the wealth quintile compared to the poorest quintile reduced stunting by at least 24.8 per cent, with the richer and richest significantly reducing stunting significantly by 49.5 and 65.4 per cent respectively. In 2008, children in the middle, richer and richest quintiles compared to those in the poorest quintile significantly reduced child stunting by 32.7, 49.5 and 60.7 per cent respectively. However, in 2014 only children in the richest quintile significantly reduce stunting by 49.4 per cent compared to children in the poorest wealth quintile. Another correlate is the level of education of the mother. In 2003, mothers with Primary School education compared with those without any level of education reduces the likelihood that the child will be stunted by 23 per cent, whereas those with at least a secondary school education are 72 per cent less likely to have stunted children, albeit this is weakly significant at 10 per cent. In the 2008 model, none of the mothers' level of education significantly reduces the likelihood stunting, though mothers with at least secondary school education indicate the right sign.

The 2014 model depicts clearly that as the level of education of the mother increases from Primary, Junior High School, and to at least secondary school level, the likelihood of stunting

decreases from 29.9, 42.1 and 71.2 per cent compared to mothers with no level of education respectively. The size of the child at birth is an important variable that affects the health of the child. In all the three survey periods, size of children at birth of larger children reduces child stunting. In 2003, smaller children compared to very small children reduce child stunting by 36.6 per cent, whereas larger children at birth reduces child stunting by 59.7 per cent. In 2008, larger children compared to very small children are 38 per cent less likely to be stunted. Also in 2014, small children compared to very small children are 55.8 per cent less likely to be stunted. Similarly, larger children compared to very small children are 62.5 per cent less likely to be stunted. It can be gleaned from the foregoing that the two dominant variables that affected child stunting in all the three rounds of the GDHS are the preceding birth interval (child birth spacing) and the size at birth of the child. Hence, the preconditions of the child are essential in determining the nutritional status of the child.

Table 4.2: Unconstrained model - determinants of child stunting

Explanatory Variables	2003	2008	2014
	% Changes (z) (z)	% Changes (z)	% Changes (z)
Age of Child	2.5*** (9.3)	2.3*** (7.5)	1.4*** (4.5)
Sex of Child (if Male =1)	25.9*** (2.6)	31.5*** (2.5)	37.0*** (2.8)
Preceding Birth Interval			
<24	(base)	(base)	(base)
25 - 36	0.0 (0.0)	18.5 (1.3)	42.2*** (3.2)
37 - 48	18.8 (1.4)	42.7*** (3.2)	51.7*** (3.9)
49 - 60	35.8** (2.5)	33.3** (2.0)	56.6***(3.9)
61 - 72	36.4** (2.0)	37.4* (1.9)	50.2*** (2.8)
73+	30.5* (1.9)	53.5*** (3.2)	44.3*** (2.8)
Wealth			
Poorest	(base)	(base)	(base)
Poorer	28.2*** (2.9)	9.8 (0.7)	11.1 (0.7)
Middle	24.8** (2.1)	31.8** (2.0)	13.1 (0.8)
Richer	49.5*** (3.7)	49.2** (3.0)	18.9 (0.8)
Richest	65.4*** (4.5)	62.3*** (3.0)	49.4** (2.0)
Mother			
No Education	(base)	(base)	(base)
Primary	23.0 (2.2)	21.4 (1.4)	29.9 (2.3)
Middle/JSS/JHS	16.8 (1.5)	7.9 (0.5)	42.1 (3.5)
Secondary+	72.1 (1.7)	1.8 (0.1)	71.2 (3.2)
Size at Birth			
Very Small	(base)	(base)	(base)
Small	36.6** (2.0)	23.1 (0.9)	55.8*** (3.0)
Average/Larger	59.7*** (4.7)	38.0 (1.8)	62.5*** (4.1)
Residence (if Urban = 1)	17.8 (1.3)	0.6 (0.0)	1.5 (0.0)
Mother's Age	0.2 (0.3)	0.3 (0.4)	0.2 (0.2)

(Main variable of interest - birth spacing - captured as categorical variable)

Z score in bracket

4.2.3 Results of the unconstrained model with non-linear term

This section seeks to examine the nature of the relationship between our main variable of interest, preceding birth interval, and child stunting. Preceding birth interval in this model is captured as a continuous variable including its square and cubic terms. Considering the preceding birth intervals individually as shown in the regression 4.2.3, an observation can be made that an additional month of preceding birth interval reduces child stunting by 3.5, 3.8 and 4.7 per cent in 2003, 2008 and 2014 respectively. From a statistical point of view, the differences in the percentages across the years of survey are almost the same. The square of preceding birth interval is significant for 2003 and 2014 with a non-negative per cent change coefficients. This indicates that preceding birth interval does not reduce child stunting infinitely, but rather has a turning point at which further interval may worsen child stunting. The turning point is 52 months, which is 13 months beyond the median month birth interval in 2014. The turning point is shown in the Ordinary Least Square in Appendix A. The pattern that can be observed from the preceding birth interval, its square and cube term is that in all the three survey periods is that the per cent change coefficients of preceding birth interval is negative, whereas that of the square of preceding birth interval is non-negative, and its cubic term is also negative. This depicts the non-linear relationship between preceding birth interval and child stunting. To show the nonlinear relationship clearer, a regression plot of the relationship between preceding birth interval is provided in Figure 4.3. A joint significance test of the relationship between the three terms revealed that jointly the three terms significantly influences child stunting as shown in beneath Table 4.2.

Considering the other control variables, it is observed in all the survey periods that as the child grows older by one month, the child is more likely to be stunted by 2.4, 2.3 and 1.4 per cent in 2003, 2008 and 2014 respectively. Similarly, male children are more likely to be stunted than their female counterparts in all the three survey periods. Another observation is that children in relatively higher wealth quintiles are less likely to be stunted. In 2003, children in any other wealth quintile compared to the poorest wealth quintile reduces child stunting by at least 24 per cent, with those especially in the richest wealth quintile significantly reducing child stunting by 65.5 per cent. In 2008, children from the middle to richest wealth quintile compared to children in the poorest wealth quintile reduce child stunting by at least 32 per cent, and similarly those in the richest wealth quintile reduce child stunting by 62 per cent compared to the poorest category. In 2014, only children in the rich and richest wealth quintile significantly reduce the likelihood that the child will be stunted by 17.6 and 47.5 per cent respectively compared to that of the poorest children. Considering the educational level of the mother on the nutritional status of the child, whereas the 2003 and 2014 results show a significant influence on child stunting, that of the 2008 reveal no significant relationship. In 2003, mothers with primary school education compared to those without any level of education are 23.2 per cent less likely to have stunted children. Similarly, mothers with at least secondary school education are 72.3 per cent less likely to have stunted children compared to women without any no level of education. In 2014, mothers with primary, Junior High and at least secondary school education are 29.5, 41.7 and 71.5 per cent less likely to have stunted children respectively compared to mothers without any level of education. The size at birth of the child has a significant bearing on child stunting in all the survey periods. In 2003, small children at birth compared to very small children are 37.4 per cent less likely to be stunted. Similarly, larger children at birth are 59.5 per cent less likely to have stunted children compared to very small children at birth. In 2008, larger children at birth are

37.6 per cent less likely to be stunted compared to very small children. The 2014 results is consistent with that of the 2003 and 2008 results. That is small children at birth are 54 per cent less likely to be stunted compared to very small children at birth. Similarly, larger children at birth are 62.3 per cent less likely to be stunted compared to very small children at birth.

Table 4.3: Unconstrained model of the determinants of child stunting

	2003	2008	2014
Explanatory Variables	% Changes (z)	% Changes (z)	% Changes (z)
Age of Child	2.4 (9.2)	2.3 (7.5)	1.4 (4.6)
Sex of Child (if Male =1)	27.1 (2.7)	31.3 (2.5)	37.3 (2.8)
Pre-birth-Interval	3.5* (1.8)	3.8*** (2.7)	4.7*** (2.7)
Pre-birth-Interval Square	0.0 (1.3)	0.0* (1.9)	0.0** (2.0)
Pre-birth-Interval Cube	0.0 (1.1)	0.0 (1.6)	0.0 (1.5)
Wealth			
Poorest	(base)	(base)	(base)
Poorer	28.5 (2.9)	8.9 (0.6)	10.5 (0.7)
Middle	24.9 (2.1)	32.1 (2.0)	10.7 (0.6)
Richer	49.3 (3.7)	48.4 (2.9)	17.6 (0.7)
Richest	65.5 (4.5)	62.0 (3.0)	47.5 (1.9)
Mother			
No Education	(base)	(base)	(base)
Primary	23.2 (2.2)	21.8 (1.4)	29.5 (2.3)
Middle/JSS/JHS	16.1 (1.5)	8.4 (0.5)	41.7 (3.5)
Secondary+	72.3 (1.7)	2.5 (0.1)	71.5 (3.2)
Size at Birth			
Very Small	(base)	(base)	(base)
Small	37.4 (2.1)	22.2 (0.8)	54.6 (2.7)
Average/Larger	59.5 (4.7)	37.6 (1.8)	62.3 (4.1)
Residence (if Urban = 1)	16.9 (1.3)	0.0 (0.0)	0.9 (0.1)
Mother's Age	0.2 (0.3)	0.2 (0.3)	0.0 (0.0)

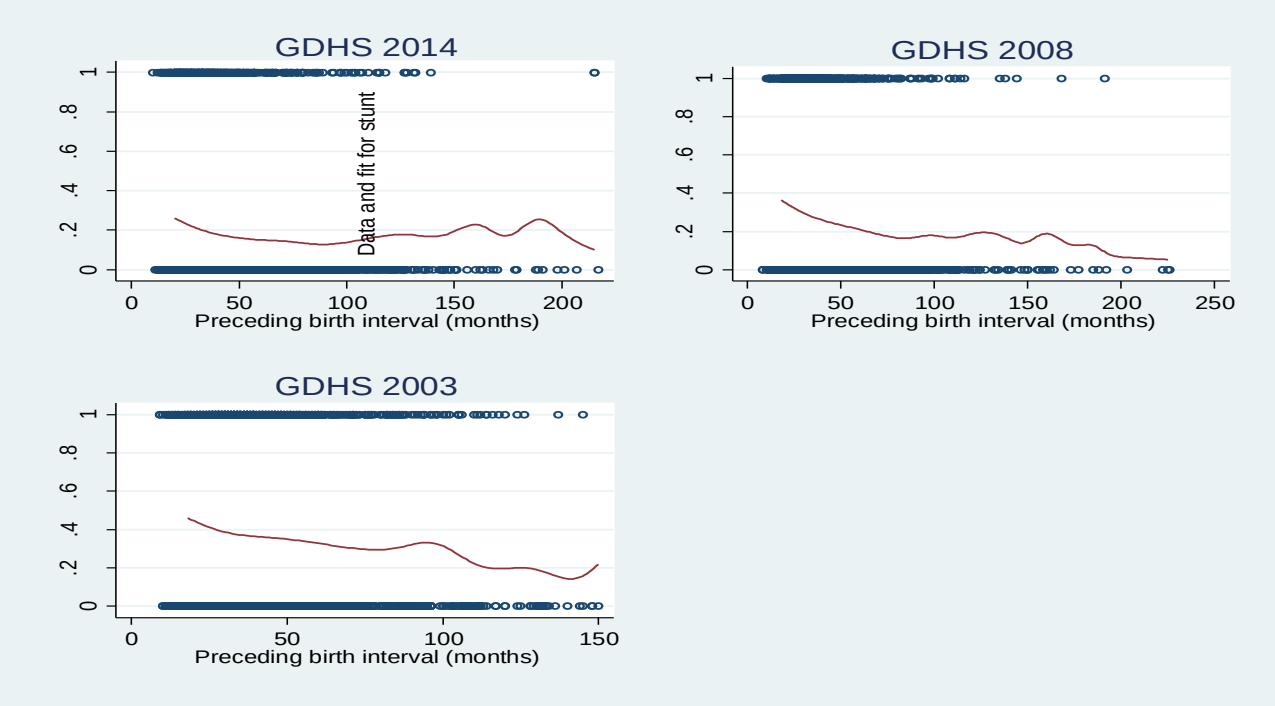
(Birth spacing - captured as continuous and with Powers)

Z score in bracket

Table 4.3a: Joint test hypotheses of birth interval with powers

Year	Squared and Cubic Variables	
	Chi-Square Values	Probability Values
2003	2.83	NS
2008	4.7	0.1
2014	12.3	0

Figure 4.4: Regression plot of preceding birth interval and stunting



4.2.4 Results of the unconstrained model with an interaction term

The main hypothesis in this section is to test whether wider birth spacing (preceding birth interval) among average age of women will significantly reduce child stunting or not in each of the survey periods. The preceding birth interval of the child has been interacted with the age of the mother. In all the three survey periods, it can be observed from the Figure 4.4 that the preceding birth interval, mother's age and the interacted terms are not individually significant. However, the joint test results beneath Table 4.4 reveal that jointly preceding birth interval and the interaction of mothers age and birth interval are jointly significant at 1 (one) per cent in 2003 and 2008, whereas in 2014 it is jointly significant at 5 per cent significant level. The implication of the significance of their joint effects calls for the need to calculate the net effect of the preceding birth interval and interaction term of age of mother and preceding birth interval on the likelihood that the child will be stunted. After calculating the net effects as shown beneath the table, the following interpretations can be made. In 2003, birth spacing beyond 44 months among women with average age of 33 years is 0.6 per cent likely to reduce child stunting. In the case of 2008, birth spacing beyond 45 months among women with average age of 32 years is 0.8 per cent likely to reduce child stunting. Finally, in 2014, birth spacing beyond 48 months among women with average age of 33 years is 0.7 per cent more likely to reduce child stunting.

Findings from other correlates such as the age and the sex of the child have shown consistent results as with the other models. As the child grows older by an additional month, the likelihood of child stunting increases by 2.5, 2.3 and 1.4 per cent in 2003, 2008 and 2014 periods respectively. In the same wise, male children are 27.1, 29.8 and 36.1 per cent more likely in 2003, 2008 and 2014 likely to be stunted compared to that of their female counterparts. The

wealth quintile also shows consistent results with the previous models especially in the case of the 2003 and 2008 survey periods, whereas in the case of the 2014 data only those children in the richest wealth quintile are likely to have less child stunting. The mothers level of education in the case of 2003 revealed that mothers with primary level of education are 22.2 less likely to have child stunting compared to mothers without any level of education. Mothers with at least a secondary school education are 71.3 per cent less likely to have child stunting compared to women with no level of education. In period 2008, none of the levels of education significantly affect child stunting. However, the 2014 depicts a classic situation where, as the level of education of the mother increases, the less likelihood child stunting compared to mothers without any level of education. Thus, whereas mothers with primary school education are 30 per cent less likely to have stunted children, those with Junior High School education are 41.8 per cent, and better still those with at least secondary school education are 71.5 per cent less likely to have stunted children, all compared to mothers with no level of education. Finally, the results of the size at birth of the child in this model are consistent with other models. Thus, small children compared to very small children at birth are at least 22 per cent less likely to be stunted in all the three survey periods. Similarly, children with larger size at birth are at least 38 per cent less likely to be stunted compared to very small children

Table 4.4: Unconstrained model with an interaction term

	2003	2008	2014
Explanatory Variables	**% Changes (z)**	**% Changes**	**% Changes**
Age of Child	2.5 (9.3)	2.3 (7.5)	1.4 (4.6)
Sex of Child (if Male =1)	27.1 (2.7)	29.8 (2.4)	36.1 (2.7)
Preceding Birth Interval			
Pre-birth-Interval*mothers age	0.8 (0.7)	0.0 (0.5)	3.2*** (2.5)
Pre-birth-Interval	1.7 (1.1)	0.2 (0.2)	3.4*** (2.0)
Age of Mothers	0.0 (1.3)	0.4 (0.2)	0.1*** (2.2)
Wealth			
Poorest	(base)	(base)	(base)
Poorer	28.0 (2.9)	10.1 (0.7)	13.3 (0.9)
Middle	26.7 (2.3)	31.9 (2.2)	8.5 (0.5)
Richer	54.4 (4.9)	48.2 (3.4)	13.3 (0.7)
Richest	70.4 (6.0)	61.8 (3.6)	44.3 (2.0)
Mother' Education			
No Education	(base)	(base)	(base)
Primary	22.2 (2.1)	23.8 (1.5)	29.9 (2.3)
Middle/JSS/JHS	16.1 (1.4)	10.5 (0.6)	41.8 (3.5)
Secondary+	71.3 (1.7)	0.8 (0.0)	71.5 (3.2)
Size at Birth			
Very Small	(base)	(base)	(base)
Small	36.7 (2.1)	22.3 (0.8)	53.6 (2.7)
Average/Larger	59.2 (4.7)	38.3 (1.8)	62.1 (4.1)

Z scores in bracket

Table 4.5: Joint test hypotheses of birth interval mother's age

Year of Survey	Chi-Square Values	Probability Values	Net Effects
2003	12.98	0.00	-0.006
2008	10.06	0.01	-0.008
2014	8.23	0.02	-0.008

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Summary

This report provides trend analyses of the health outcomes of children and mothers in Ghana using the Demographic Health Survey (DHS). Further to the trend analyses, this report provides specific analysis on the relationship between birth spacing and the health outcomes of children by employing two central objectives: (1) examine the effect of birth spacing on the nutritional status of children; and (2) determine the nature of the relationship between birth spacing and the nutritional status of children.

The trend analysis revealed the following about the health of women: whereas under nutrition among women is decreasing over time between 2003 and 2014, over nutrition increases over the same period; antenatal care utilization among pregnant women increased significantly between 1993 to 2014; maternal care utilization has also improved over the same period; fertility rate generally decline over time but increased marginally between 2008 and 2014 survey periods. Concerning the trend analysis for the children, the study found the following: proportion of childhood immunization increased significantly by 30 percentage points between 1988 and 2014; proportion of overweight children increased by 1 percentage point between 1998 to 2014, whereas the proportion of stunted, underweight and wasted children decreased by 12, 9 and 5 percentage points between the same period respectively; mild anaemia prevalence increased by 4 percentage points between 2003 and 2014 survey periods whereas that of the severe anaemia decreased by 5 percentage points between the same period; and under-5 mortality reduced from 119 deaths per 1000 live births to 60 deaths per 1000 live births.

The findings from the four variants of econometric models employed across the survey periods reveal that birth spacing significantly affect the nutritional status of the child in the way that as the birth spacing increases by additional month, children are more likely to have better nutritional status. However, the relationship between the birth spacing and nutritional status of children is found to be non-linear, which implies that the nutritional status may worsen at a given point of child spacing. The study found this to be the case after 52 months (4 years and 4 months). The study went further to argue in this report that, the relationship between duration of birth interval and the nutritional status of children is moderated by the age of the mother. Given that mothers are primary care givers, the study found that older women with wider birth spacing are likely to have better nutritional status of their children. Overall, all the four variant econometric models revealed both the birth spacing (preceding birth interval) and size at birth of the child have been consistently significant alluding to the understanding that the preconditions of the child are very essential in influencing the health of children in Ghana.

5.1 Conclusions

Generally, health outcomes of children and mothers in Ghana have improved in the last 28 years. This observation however, should be interpreted with circumspect since the levels and spatial disparity for some of the selected health outcomes require further discourse on the underlying causes and strategies to hasten the rate of improvement and minimize the regional inequalities. Typical are the rate of improvement and regional disparity of childhood immunization and stunting. In the case of childhood immunization, albeit the significant increase in the update of vaccination, the proportion of children not fully immunized remains a concern. Also, needing a deeper reflection at the lower level than the national trend is changes in the proportion of stunted children.

The econometric analyses has brought to fore a non-linear relationship between birth spacing and the likelihood of child stunting. This observation alongside the finding that size of the child at birth is also a significant contributory factor to the nutritional status of the child, present the need to place more premium on the initial factors (characteristics of the child prior to and at birth) for childhood early development.

5.2 Recommendations

The findings and conclusions inform the following policy recommendations:

(1) With the median birth spacing in Ghana, ranging from 36 to 40 months in the past 28 years and mean birth spacing ranging between 45 and 47 months since 2003, it is imperative to sensitize health professionals and mothers on the need to plan and increase birth spacing in Ghana. Specifically, based on the national average, birth spacing in Ghana should increase by 5 months to reach the established 4 years 4 months that engenders a higher likelihood of better nutritional status; and
(2) In planning to space births, mothers should take into consideration their age, which is potentially influenced by their career and educational engagement. This advocacy should be initiated by the Ministry of Health and Ministry of Education.
(3) Spatial analyses (both within the country and across developing economies) of the trends and in the context of Ghana, regional level interventions should be analysed to help provide responses to the differences in the rate of improvement and the observed disparity. Policy makers, development partners and researchers should be at the forefront to engage in these analyses.

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World Health Organisation

APPENDIX

Table A1: OLS Results of the correlates of stunting

Height for Age	Listcoef (%)(t)
Age of Child	-0.02 (-12.1)
Sex of child (Male=1)	-0.19 (-3.1)
Preceding birth Interval	0.04 (2.6)
Preceding birth Interval Squared	-0.00 (-1.9)
Wealth	
Poorest (Base)	
Poorer	-0.05 (-0.6)
Middle	0.12 (1.12)
Richer	0.35 (2.5)
Richest	0.5 (3.26)
Mothers education	
No education (Base)	
Primary	0.17(1.90)
JHS	0.17 (1.93)
Secondary+	0.49(3.13)
Residence (Urban=1)	0.001(0.01)
Mothers age	0.004 (0.72)

T Statistics in bracket

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