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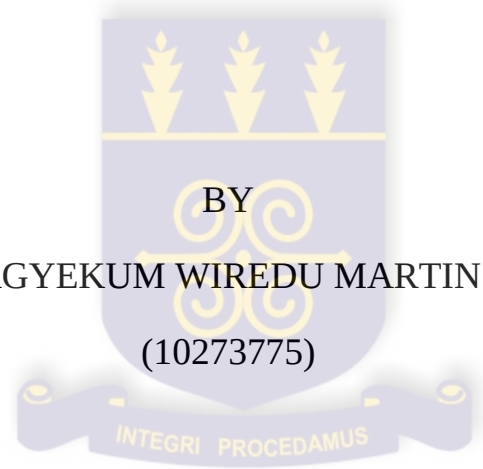
UNIVERSITY OF GHANA, LEGON

ANTENATAL CARE UTILIZATION AND CHILD SURVIVAL AMONG WOMEN IN GHANA



BY

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THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQIREMENT FOR THE AWARD OF M.A. POPULATION STUDIES DEGREE.

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ABSTRACT

Globally, about 7.7 million children under five years died in 2010. In Ghana, under-five mortality rate is estimated at 72 deaths per 1000 live births in 2012 according to UNICEF. Although there has been a decline in under-five mortality in Ghana, substantial progress is required to achieve the Millennium Development Goal 4 by reducing child mortality by 2015. Several interventions have been put in place to ensure child survival. The study aimed at examining the relationship between antenatal care as one of the interventions and child survival in Ghana. Data used in the study were from the 2008 Ghana Demographic and Health Survey. Frequency of antenatal visits, tetanus injection and iron folic acid were used to establish the relationship between antenatal care utilization and child survival. Binary logistics regression models were used to examine the effect of independent variables on the dependent variable.

The findings showed that about 70.8 percent of respondents were aged 15-34, 96.6 percent of women visited antenatal care clinics at least once but 78.2% visited antenatal clinics more than three times. About 86.1 percent took at least one folic tablet and 59.0 percent adequately received tetanus injection. Results from the bivariate analysis revealed that tetanus injection, frequency of ANC visit, and iron folic acid were not statistically significant with child survival. However, education, mode of delivery and months of breastfeeding were found to have significant relationship with child survival. About 96.6 percent of children under five whose mothers' visited antenatal clinic more than three times survive as compared to 94.5 percent of women with no ANC visit. Also, women who took less than 90 iron folic acid tablets and those who did not receive any tetanus injection had the highest percentage of survival. In the multivariate analysis, age of mother, education, ethnicity, birth interval and months of breastfeeding were found to have significant association with child survival. This implies that age, education, birth interval, and months of breastfeeding are predictors of child survival in Ghana. Therefore, education campaigns on breastfeeding should be strengthened to prolong duration of breastfeeding, women should be encouraged to attend antenatal clinics especially teenagers, and encouraged to space their birth.

Keywords: Antenatal care utilization, iron folic acid tablet, tetanus injection, under-five mortality and child survival.

ACCEPTANCE

Acceptance by the Faculty of Social Sciences, University of Ghana, Legon in partial fulfillment of the requirement for the degree of Master of Arts in Population Studies.

SUPERVISOR

……..

Prof. Francis Dodoo.

Date…….

DECLARATION

I, Martin Wiredu Agyekum, hereby declare that except for the references made to other people's work which have been duly acknowledged, this is the result of my own research undertaken and under supervision at the Regional Institute for Population Studies, University of Ghana and that neither a part nor the whole of it has been presented elsewhere for the award of another degree.

STUDENT

……..

Martin Wiredu Agyekum

Date…….

DEDICATION

This thesis is dedicated first to God Almighty for His grace, mercies and protections. Secondly, to my family, especially my parents and siblings whose support and encouragement have brought me this honor and to all who directly or indirectly contributed to my success.

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TABLE OF CONTENTS

CONTENT **PAGE**

LIST OF TABLES

LIST OF FIGURES

ACRONYMNS

UN: United Nations

MDG: Millennium Development Goal

ANC: Antenatal Care

WHO: World Health Organization

IFA: Iron Folic Acid

TT: Tetanus Injection

GSS: Ghana Statistical Service

GDHS: Ghana Demographic and Health Survey

BDHS: Bangladesh Demographic and Health Survey

IDHS: Indonesia Demographic and Health Survey

ABSTRACT

Globally, about 7.7 million children under five years died in 2010. In Ghana, under-five mortality rate is estimated at 72 deaths per 1000 live births in 2012 according to UNICEF. Although there has been a decline in under-five mortality in Ghana, substantial progress is required to achieve the Millennium Development Goal 4 by reducing child mortality by 2015. Several interventions have been put in place to ensure child survival. The study aimed at examining the relationship between antenatal care as one of the interventions and child survival in Ghana. Data used in the study were from the 2008 Ghana Demographic and Health Survey. Frequency of antenatal visits, tetanus injection and iron folic acid were used to establish the relationship between antenatal care utilization and child survival. Binary logistics regression models were used to examine the effect of independent variables on the dependent variable.

The findings showed that about 70.8 percent of respondents were aged 15-34, 96.6 percent of women visited antenatal care clinics at least once but 78.2% visited antenatal clinics more than three times. About 86.1 percent took at least one folic tablet and 59.0 percent adequately received tetanus injection. Results from the bivariate analysis revealed that tetanus injection, frequency of ANC visit, and iron folic acid were not statistically significant with child survival. However, education, mode of delivery and months of breastfeeding were found to have significant relationship with child survival. About 96.6 percent of children under five whose mothers' visited antenatal clinic more than three times survive as compared to 94.5 percent of women with no ANC visit. Also, women who took less than 90 iron folic acid tablets and those who did not receive any tetanus injection had the highest percentage of survival. In the multivariate analysis, age of mother, education, ethnicity, birth interval and months of breastfeeding were found to have significant association with child survival. This implies that age, education, birth interval, and months of breastfeeding are predictors of child survival in Ghana. Therefore, education campaigns on breastfeeding should be strengthened to prolong duration of breastfeeding, women should be encouraged to attend antenatal clinics especially teenagers, and encouraged to space their birth.

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CHAPTER ONE

INTRODUCTION

1.0 Background of the study

The health of pregnant women is essential for their own survival as well as that of their children. In spite of interventions such as antenatal care and family planning put in place to ensure safe motherhood, maternal and child mortality is very alarming in developing countries than developed countries as estimates suggest significant progress. The maternal mortality ratio decreased globally from 440 in 1990 to 290 maternal deaths per 100,000 live births in 2008 (UN, Millennium Development Goals Report, 2011). It was also estimated that almost 3,000,000 new-born babies died in their first month in 2012 (retrieved from www.who.int/gho/child). In addition, every year, 4 million children die in Sub-Sahara Africa. More than one million newborns die in their first month of age, and 3.2 million die before their fifth birthday (Kinney *et al.,* 2010).

Complications of pregnancy and childbirth are believed to be the leading obstacles to child survival in most developing countries and appropriate and timely antenatal care interventions will help to reduce many of the pregnancy related problems (Jayasree *et al.*, 1997). Policies have been put in place globally to ensure better maternal and child health survival, more especially in developing countries, where the incidence of maternal and child mortality is high. Some of the policies include antenatal care (ANC), skilled delivery care, family planning and emergency obstetric care (Campbell & Graham 2006). Antenatal care is seen as an intervention to improve maternal and child health. AbouZahr (2003) and Banta (2003) have suggested that antenatal care (ANC) during pregnancy plays a significant role in ensuring the good health of pregnant women and the survival of their children. To ensure effective utilization of antenatal care by pregnant women, the World

Health Organization (WHO) recommends that all pregnant women should avail themselves of at least four antenatal care visits, with the first visit preferably in the first trimester (WHO, 2006). Antenatal care (ANC) interventions including ANC visits, iron-folic acid (IFA) supplementation, tetanus toxoid (TT) injection, blood screening, weight taking of pregnant women, education about complications in pregnancies, other diagnostic tests, advice and counselling have been recommended and received during ANC visits. Antenatal care interventions are generally thought to be effective in improving maternal and infant outcomes (Adam *et al.,* 2005: Darmstadt *et al*., 2005: Coimbra *et al.,* 2007: Wehby *et al*., 2009: Hollowell *et al*., 2011). A key focus of antenatal care is the utilization of the care by pregnant women. The number of visits by pregnant women and the quality of the care/services received are important to ensure child survival. The type and quality of antenatal care that women receive are important. For instance, in the Philippines, higher perinatal death was associated with the fewer interventions of antenatal care received (National Statistics Office and Macro International, 1993). Moreover, in Mexico, women who received poor antenatal care had a 76% excess risk of low birth weight compared to those who received adequate antenatal care (Coria-Soto *et al.*, 1996).

Several studies have looked at the association between antenatal care interventions and child survival. For instance, Raatikainen *et al*. (2007) reported that in Finland, consequences of women who did not visit antenatal care clinics and those who under-attended at antenatal care clinics are associated with higher risks of adverse pregnancy outcomes such as low birth weight of infants, more fetal deaths and neonatal deaths. On the other hand, folic acid supplements as ANC intervention are given to pregnant women during antenatal care visits as food supplements to prevent anemia. According to GDHS 2003, causes of anemia include inadequate directly intake of iron, malaria and intestinal worm intestine, iron folic acid supplementation and other steps are used

to reduce the burden of anemia among vulnerable groups. In Indonesia, Titaley *et al*. (2010) observed that infants of mothers who took iron folic supplement reduced early neonatal death for their infants. The study further showed that infants whose mothers visited an antenatal care or received tetanus toxoid without folic acid supplementation were not significantly protected against neonatal death. This implies that iron folic acid is very protective against neonatal death and could protect infants from dying early.

In Ghana, ANC is provided free of charge with assistance from the government. Services are provided by public and private health institutions. Antenatal care is commonly understood to have a beneficial impact on pregnancy and birth outcomes through early diagnosis and treatment of complications as well as promoting the health of the pregnant women through nutrition. It also creates the opportunity for service providers to establish contact with the pregnant women to identify and manage current and potential risks or problems during pregnancy. Because of the higher under five mortality rate of 80 per 1000 live births (GSS 2009), several measures have been put in place to ensure safe motherhood in Ghana. It is as a result of this, that the Ghana Demographic and Health Survey (GDHS 2008: 147) reports that "the health care that a mother receives during pregnancy, at the time of delivery, soon after delivery is important for the survival and well-being of both the mother and her child. The way to achieve this is through the providing and utilization of antenatal care service by the pregnant women and health care providers.''

Antenatal care is very important for the health of a pregnant woman as well as the child. Although antenatal care (ANC) interventions have been in place for a long time, there is hardly any systematic evidence of the association between ANC interventions and child survival especially in Ghana. In order to ensure effective utilization of antenatal services, there is the need to assess antenatal care (ANC) interventions received by women as they are very essential. In China and

Indonesia, there is a reported significant reduction in early neonatal mortality among neonates whose mothers received Iron Folic Acid (IFA) supplements compared to those whose mothers did not receive IFA supplements (Zeng *et al*., 2008; Titaley & Dibley, 2012). In contrast, among ANC interventions considered in India on their effects on child outcomes, tetanus (TT) injection was seen as the main protective effect on neonatal deaths and ensuring child survival but not IFA supplements (Abhishek *et al*., 2013). Several factors may account for the death of infant, children and their mothers. Improper utilization of quality of health services could be an important factor coupled with other factors such as breastfeeding, birth interval and sources of drinking water been responsible for the high child mortality observed in the developing countries especially Ghana. The study looked at the association between antenatal care utilization and child survival with a focus on antenatal care interventions such as folic acid supplement, tetanus injection and frequency of visit, on child survival.

1.1 Statement of the problem

Globally, 4 million out of 130 million babies born annually die in the neonatal period, of which 99% of these deaths occur in developing countries (Lawn *et al.,* 2005), and Ghana is not an exception. In Ghana, under-five mortality is still a problem due to the sheer loss of life which in most cases could have been prevented. Under-five mortality rate is 80 deaths per 1000 live births (GDHS, 2008). Reducing newborn deaths and under-five deaths, especially in Ghana would help to ensure child survival and meet the global Millennium Development Goal (MDG) 4. One way of ensuring child survival is to encourage women to visit antenatal care clinics since antenatal care utilization could also be attributed to the high under-five mortality rate in Ghana. Women are supposed to receive antenatal care during pregnancy and the primary aim of such care is to achieve a good healthy mother and baby (Park & Park, 2002). Antenatal coverage is very high in Ghana

yet maternal and child survival is an issue. Despite the advances in medical science, especially in antenatal care interventions, child mortality remains an issue in Ghana and other Sub-Sahara African countries. To fully benefit from this intervention, it is important that women start visiting the antenatal clinic (ANC) early in pregnancy to avoid or reduce complications during childbirth. However, many pregnant women in Sub Sahara Africa are not able to visit antenatal care clinics early to receive health services.

The consequences (such as maternal and child mortality) of the low subscription to antenatal care services received have led to people querying the effectiveness of antenatal care in reducing the risk of poor pregnancy outcomes (McDonagh, 1996; Munrira *et al*., 1996; Bergsjù & Villar, 1997), and this can also be an important factor in under five mortality in Ghana. There is the need to assess the services or interventions of the ANC services to ensure effective utilization and good pregnancy outcomes. In addition, most studies on antenatal care utilization concentrate on the risk profile of women attending antenatal care clinics at early stages of their pregnancies with few assessing the interventions of antenatal care. Factors taken into consideration in the assessment of ANC utilization are sometimes devoid of the services of the care received, with emphasis mostly on timing and frequency of visits as used in the Kessner index (Kessner *et al*., 1973). Although, these studies have shown a significant relationship between antenatal care utilization and child survival, there is the need to also assess the quality of services received by looking at some of the independent services in Ghana. For instance, Titaley and Dibley (2012) assessed ANC interventions such as iron folic acid supplements on child survival and observed that it reduces early risk of neonatal death by 51% in Indonesia.

The importance of assessing the interventions of antenatal care as a measure of quality of maternal care and child survival cannot be understated. This study seeks to examine the relationship between

frequency of antenatal care visits, folic acid supplement, tetanus injection and child survival. It is very important to assess the utilization of antenatal care interventions and its impact on child survival. Although antenatal care interventions have been there for a long time, there is no systematic evidence of the relationship between ANC interventions and child survival in Ghana.

1.2 Research questions

The study seeks to address the following questions;

- What are the demographic characteristics of women who had live births in the five years preceding the survey?
- What is the difference in child survival among women who utilized antenatal care?
- What is the relationship between antenatal care interventions and child survival in Ghana?

1.3 Rationale of the study

Despite substantial reduction of infant, child and under-five mortality rates in Ghana over the last decade, the rates are still high and there is a need for careful re-examination of the causative factors in order to assemble all measures (especially those that may be) directly related to health care in reducing the rates. These high mortality rates are of great concern to health workers, planners and policy makers, especially because these avoidable deaths contribute substantially to the total loss of human lives. The health of infants and children is of crucial importance, both as a reflection of current and future health status of the segment of the population. Good infant and child health is synonymous with wealth of the future.

Numerous studies have been done on the relationship between antenatal care utilization and child survival. These studies placed little emphasis on independent services such as tetanus injection,

frequency of visit, complication of pregnancy and iron folic acid/tablets intake of antenatal care received. Indexes such as Kessner and APNCU (Kotelchuck, 1994) have been used in studies to measure quality of antenatal care utilization, with few studies placing emphasis on antenatal care interventions. The significant extent to which antenatal care interventions affect child survival has been advanced in health literature, but very little research has been done in Ghana. The study seeks to unearth the relationship between antenatal care interventions and child survival in Ghana. The findings will guide public health professionals regarding the type and content of the prenatal care they provide and to ensure effective utilization.

Moreover, in context, a similar study in Bangladesh assessed IFA, tetanus injection and frequency of ANC visits in relation to child survival. The study showed that there is a significant relationship between antenatal care utilization, more especially with tetanus injection and child survival. With similar socio-economic characteristics and classified as developing countries, the study is carried out here to see if the findings would be the same and how they relate to Ghana's situation.

The study seeks to contribute to the existing body of knowledge by filling the gap in literature through the findings. It would also help to better understand the services received by women during ANC visits. It would also help Ghana meet the Millennium Development Goals by placing importance on the findings to address challenging issues of child survival. The Millennium Development Goal 4 seeks to improve the welfare of children by reducing child mortality and the target is to reduce under-five mortality rate by two thirds, between 1990 and 2015 (MDG report, 2012).

1.4 Objectives of the study

The general objective of the study is to examine the relationship between antenatal care utilization and child survival in Ghana

Specific objectives are as follows:

- To describe the demographic characteristics of women with children under five years.
- To examine the difference in child survival among women's utilization of antenatal care.
- To determine the influence of ANC interventions namely tetanus injection, iron folic acid and frequency of visits on child survival in Ghana.
- To make recommendations based on the findings of the study for policy consideration.

1.5 Organization of the study

This is the first of seven chapters into which this study divides. Chapter two consists of literature review, conceptual framework and research hypotheses. Chapter three is the research methodology. The fourth chapter consists of the descriptive statistics of the background characteristics of respondents which is made up of frequencies of the various variables under study. Chapter five presents the bivariate analysis of the socio–demographic variables of respondents and child survival. Chapter six presents the multivariate analysis by focusing on the binary logistic regression analysis to determine the outcome of the dependent variable, while chapter seven is made up of the concluding chapter comprising the summary of findings, conclusion and recommendations for policy formulation on the findings of the study.

CHAPTER TWO

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.0 Introduction

The health and survival of newborn children are closely linked to the health of their mothers during pregnancy and after birth. About 3.7 million children under-five years die each year, out of which 40% occur in the neonatal period (Moccia & Anthony, 2009). Although, there has been quite significant reduction in the number of deaths among children under age five from 12.4 million in 1990 to 8.1 million in 2009, child survival continues to be a problem and a major concern globally. All the regions in the world experienced a reduction in child mortality rate with the exception of Sub-Sahara Africa (WHO, 2010). The rate of the decline of mortality in Sub-Sahara Africa remains insufficient to reach Millennium Development Goal 4 (WHO, 2010). Jayasree *et al*. (1997) noted that appropriate and timely utilization of the ANC interventions can help to reduce complication of birth and ensure child birth.

World Health Organization (2002) defines antenatal care (ANC) as "care before birth", and includes education, counseling, screening and treatment to monitor and to promote the well-being of the mother and baby. According to Bergsjo (2001), specific components which can significantly help reduce maternal and infant mortality include tetanus toxoid immunization, iron supplementation, early detection, preparation for transportation to a delivery site, and safe delivery education among others. This section reviews the body of literature related to the present study.

2.1 Frequency of ANC visits and child survival

Antenatal care seeking is an important determinant of child mortality or survival globally. Prevalence and risk of early childhood mortality are likely to be higher among children whose mothers did not seek ANC services (Abou-Zahr, 2003; Campbell & Graham, 2006). Frequency of antenatal care visits is influenced by the accessibility of antenatal care services within a community and other socio-demographic factors. An increase in the distance or time to the nearest health facility is associated with fewer antenatal visits (Magadi *et al*., 2000). Asiimwe (2010) found that in western Uganda the ability of a woman to afford antenatal care (ANC) services has a significant association with the number of ANC visits she is likely to make.

In Nigeria, Adetola *et al*. (2011) reported that the risk of neonatal death increased among mothers who did not receive antenatal care (ANC) and moderately increased among those who received the care outside the place they gave birth. Inadequate ANC visit was found to be associated with neonatal death. In addition, Rathavuth *et al*. (2007) established that, women who visited antenatal care clinics have progressively higher infant survival rates compared to those women who did not. The result of the study suggests that improving antenatal care would help to ensure child survival. Specifically, according to Taylor *et al.* (2005) women who do not utilize antenatal care, are six times more likely to have low birth weight, and six times more likely to die within the first year. In Finland, pregnant women who did not utilize antenatal care had poor pregnancy outcomes. Their outcomes were associated with risk of placental abruption, low birth weight, intrauterine fetal death and neonatal death (Raatikainen *et al.,* 2007)

There is a contention on the amount and content of antenatal care in either low or high pregnancies (Villar & Neelofur, (2000). Available evidence shows unquestionable benefits of antenatal care.

As a way of measuring the quality of antenatal care, indexes such as Kessner and Kotelchuk have been developed (Kessner *et al.,* 1973; Kotelchuk 1994). These indexes vary in definition and limitations and take into consideration timing of the first visit and frequency of antenatal care visits. Regardless of how prenatal care is measured, the content and the optimal amount of care in low or high risk pregnancies are not resolved. Studies have shown that there is a correlation between neglected prenatal care and an increased rate of maternal and perinatal morbidity and this has been since as early as 1914, when timely detection and prompt treatment of pregnancy complications considerably reduce perinatal mortality (Williams, 1915).

Debiec *et al.* (2010) examined adolescents who received inadequate prenatal care and preterm birth and found out that women who had no prenatal care had nearly 8-fold risk preterm birth as compared to those who had almost 75% to 100% of the recommended visits of four and more. On the other hand, Okoroh *et al.* (2012) used link data from Arizona Birth Certificates and High Risk Perinatal Program/Newborn Intensive Care Program to examine the level of prenatal care received and child morbidity. They found out that a greater degree of morbidity occurred among neonates with no prenatal care compared to those with intermediate/adequate prenatal care. Also, Gissler & Hemminki (1994) used 1987 Finnish Medical Birth Registry to assess the correlation between amount of antenatal care and pregnancy outcome. Timing of initiation of antenatal care and antenatal visits (adjusted by gestation length) were used to measure the amount of antenatal care. The study outcome shows that early multiparous women had a higher risk of low birth weight, preterm infants, Caesarean section and instrumental delivery than those who had an average timing of their first attendance. Surprisingly, women with many visits had the poorest outcome, and also the highest rate of Caesarean section.

In India, Anil (2005) assessed an association between antenatal care utilization and Child Survival in 25 states. Index, contingency coefficient and linear correlation were used to measure and examine the relationship between utilization of antenatal care services and child survival. When the contingency coefficient was used, the results showed that there was a significant relationship between antenatal care utilization and child survival. Child survival increased when antenatal care utilization increased. However, some of the states with relatively high utilization of antenatal health care services showed that an increase in utilization of antenatal care does not necessarily increase child survival.

The effectiveness of antenatal care on neonatal outcomes cannot be underscored. It has been linked to high birth weight and reduced neonatal tetanus (Omoigberale & Abiodun, 2005: Olowonyo *et al.*, 2006). In Nigeria, Osungbade *et al.* (2008) examined antenatal care services in secondary health care facilities. Among the services examined were blood pressure, health education, urine samples, and distribution of iron foliate and supplements. They reported that antenatal care services provided were inadequate and the content of deficient in capacity is required for prevention, early detection and prompt treatment of severe anemia and long term pre-eclampsia. They therefore recommended that patients be given and encouraged to take iron folate since it helps to reduce child mortality and anemia among pregnant women. In Ghana, the extent to which pregnant women make their visits according to the focused ANC schedule was assessed through a review of clients' observation form. The results showed that there is a higher tendency for third and fourth visits clients attending the intervention clinic at the appropriate time, with no significant difference from the control group. Moreover, about one- third of third visits of clients sought care between 28 and 32 weeks of gestation in the intervention clinics as compared to 17% of those in the comparison clinics (Nyarko *et al.,* 2006).

2.2 Tetanus injection and Child Survival

Globally, around 7% of neonatal deaths are due to neonatal tetanus (Lawn *et al*., 2005). Tetanus vaccination is seen as one of the antenatal care interventions to prevent maternal and tetanus infection to improve child survival. It was introduced in the early mid–1970s under the WHO's Expanded Program on Immunization (EPI). A mother is immunized to protect herself as well as her newborn from tetanus. If a mother is not immunized well with the correct number of doses of tetanus toxoid vaccine, neither she nor her newborn infant is protected against tetanus at delivery. Tetanus is caused by tetanus toxin produced by clostridium tetani. The commonest port of entry for the tetanus spores is unhealed umbilical cord" (Blencowe *et al.,* 2010). The vaccine is an inactivated toxin (toxoid) that was first produced in 1924 (Roper, 2006) and became commercially available in 1938 and successfully used extensively during the Second World War. The purpose of tetanus vaccine is to protect women and their newborn infants against tetanus (Koenig *et al.*, 1998; Stanfield *et al.,* 1973). The vaccine produces protective antibody levels in more than 80% of recipients after two doses and two doses protect for 1-3 years (Koenig *et al*., 1998), although some studies indicate even longer protection period (WHO, 2002). For full protection of a pregnancy, it is indicated that pregnant mothers should receive two doses of the toxoid for her first pregnancy. If a woman was vaccinated during a previous pregnancy, she may only require one booster dose during a subsequent pregnancy. However, five doses are considered to provide lifetime protection of the mother (Mosiur, 2008a).

Antenatal services provide a convenient opportunity for vaccinating pregnant women with tetanus (Lumbiganon *et al.,* 1998). A systemic review study by Blencowe *et al*. (2010) showed that immunization of pregnant women of childbearing age with two doses of TT was estimated to reduce mortality from neonatal tetanus by 94% and help to improve the survival of infants.

Likewise, in India, among three ANC interventions considered (four or more antenatal visits, IFA supplementations and TT injection), TT injections provided the main protective effect on neonatal mortality and 6% of neonatal mortality could be attributed to lack of TT injection (Abhishek *et al*., 2013).

In relation to demographic variables and tetanus injection vaccination, Mosiur (2008a) used Bangladesh Demographic and Health Survey (BDHS, 2004) to study tetanus toxoid vaccination coverage. The results showed that about 18.4% mothers did not take any dose, 26.0% took one dose and 55.6% took two or more doses respectively during their pregnancy period. Mothers who gave birth at a younger age and women who have attained a higher level of education compared to those with low level of education were more likely to have received two or more doses of injection during pregnancy. Urban dwellers received more TT injection than rural dwellers and this can be attributed to unavailability of health care facilities in rural areas.

Maral *et al*. (2001) carried out a hospital based cross-sectional study in Turkey to determine tetanus immunity status of pregnant women at the time of delivery according to tetanus toxoid (TT) vaccination coverage during pregnancy. The results showed that about 69.0% of women had protective tetanus antibody titers at the time of delivery. Moreover, the rates of protection for mothers who had received no vaccination was 46.4%, one tetanus dose is 93.5% and 95.6% for two or more tetanus dose during pregnancy. They therefore suggested that vaccination of pregnant women with one dose is effective to protect against neonatal tetanus.

2.3 Iron Folic Acid/Supplements and child survival

Iron deficiency is a health problem globally among pregnant women and young children (WHO, 2008). Increase in maternal morbidity and mortality, higher rates of preterm birth and low birth

weight and reduced infant survival with potential long term consequences for child development are associated with iron deficiency (International Anemia Consultative Group Symposium, 2002). Iron-folic acid (IFA) supplementation has been recommended as a standard approach to prevent iron deficiency (anemia), through daily intake by pregnant women. In 2011, the World Health Organization (WHO) strongly recommended the use of intermittent IFA supplementation in non-anemic women in pregnancy. The recommendation was due to previous studies and a Cochrane review that showed that IFA dosage has the potential of preventing anemia in pregnancy (WHO, 2011).

In Vietnam, Hanieh *et al*. (2013) carried out a community based cluster study to compare the effect of the twice weekly provision of antenatal IFA supplementation with the daily provision of IFA supplementation, on maternal and infant outcomes during the first 6 months of life. The study showed that the mean birth weight for all newborns was similar in infants born to women who took twice weekly IFA compared to those who took daily IFA. Also, there was no significant difference in length for age, prevalence of stunting, or prevalence of iron deficiency in infants at 6 months of age.

Titaley & Dibley (2012) assessed the contribution of postnatal services and antenatal iron/folic acid supplements in preventing neonatal mortality in Indonesia. The results showed that postnatal care services were not associated with newborn survival and it did not reduce early neonatal death. It was surprising to note that regardless of the timing of the start of postnatal care, it remained insignificant and had no impact on neonatal mortality reduction. However, antenatal iron/folic acid supplements were found to be significantly associated with the reductions in risk of mortality. The risk of early neonatal death was reduced by 51%. Their study confirmed the benefit of iron/folic acid supplement against neonatal deaths as also reported by Zeng *et al*. (2008) in his cluster

randomized trial study in China and observational epidemiological studies (Cogswell *et al.,* 2003: Pena-Rosas & Viteri, 2006; Siege-Riz *et al*., 2006; Titaley *et al.,* 2010).

In Indonesian, Dibley *et al*. (2012) used Indonesian Demographic Health Survey to determine whether live born children less than five years of age born to mothers who used antenatal iron-folic acid supplements had reduced risk of death. The study used a pool survey data of 52917 singleton live born infants. Out of this 1525 deaths were recorded and used. After controlling for confounders, risk of death of children less than 5 years of age reduced significantly by 34% if the mother consumed any iron folic supplements. The effect was stronger in the first day of life and also significant at post neonatal deaths of p value 0.044. They therefore indicated that protective effects of iron/folic acid supplements extends through the first year of life, although protection progressively decreased with increasing age with increasing number of iron-folic supplements consumed and in developing countries increase intake of iron supplements will reduce deaths of children less than five years. The long- term benefit of iron/folic acid supplements has also been reported in rural Nepal with 31% reduced mortality of children aged 0-7 years whose mothers had iron folic acid supplements (Parul *et al*., 2009).

2.4 Demographic determinants of antenatal care utilization and child survival

The access to and use of quality maternal health care services are crucial for improved maternal-child survival. The effectiveness of a maternal health care system also depends on how women at risk are willing to comply with necessary health care. Demographic, socio economic and residence related variables also have significant impact on mortality and child survival (Singh *et al.,* 2012).

2.4.1 Education

Education of women plays a significant role utilization of antenatal care and child survival. Fowlis (1983) established that education has a direct relationship with antenatal care utilization. Similarly, Mullany *et al*. (2007) indicated that an educated mother is likely to visit antenatal clinic more than the uneducated mother. This is more effective if the husband is also educated along with the wife. Likewise, in Bangladesh, Mostafa (2012) found that mothers' education influences their choices and skills in health care practices and is more important in ensuring neonatal mortality. The higher a mother's education, the lower the risk of neonatal mortality and the higher her child's rate of survival. Moreover, Lambogang's (1992) study conducted in Aburi, Ghana showed that people with higher educational attainment employed in offices had lower child mortality than their counterparts in the agricultural sectors. Poor maternal education is the main constraint to good health, childcare practices and ultimately child survival (Armar- Klemesu *et al.,* 1997). According to Bawah and Zuberi (2005), low educational attainment is adversely associated with child survival in Africa. On the other hand, Van de Pol writing in 1987 examined the effect of education on infant and child mortality In Yaounde. The results showed that high maternal education increases mortality risks among infants and children because of their inability to practice exclusive breastfeeding or breastfed their children as a result of their work. Such children cannot build enough immunity and are therefore prone to disease and death.

2.4.2 Age of mother

Matua (2004) as cited by Chaibra (2008) indicated that pregnant adolescents who are not married might avoid ANC services for fear of being labelled "promiscuous". On the other hand, older adolescents who have had uneventful pregnancies and deliveries with previous pregnancies might have no reason to attend antenatal clinics. However, Renolds *et al*. (2006) reported that older

women are more likely to seek antenatal care from health professionals than those less than 19 years. In Nigeria, there is a higher proportion of neonatal death among teenage mothers (Adetola *et al*., 2011). Similarly, there is also higher mortality among adolescent mothers than adult mothers in Bangladesh, (Mostafa, 2012). Moreover, Syamala (2004) observed in Goa that infants surviving among women of age group 20-29 were higher and lower among those less than 20 years. Hobcraft *et al*. (1985) showed that mortality was clearly higher among children of teenage mothers. Mothers who had their first birth before attaining 20 years are about 2.4 times more likely to have child death compared to those who had theirs at age 20-34 (Mbago & Ntimba, 2005).

2.4.3 Household wealth

Another factor that determines the utilization of antenatal care by women is economic status. Shrestha (2012) indicated that about 50% of poorest women had no ANC in Nepal. Similarly, Sharma (2002) showed that the percentage of women with adequate visits of ANC (minimum 4 times) increased from 4 percent (low economic status) to 42 percent among high economic status women in Nepal. According to Arthur (2012), in Ghana wealth has a significant influence on the adequate use of antenatal care. In India, Chalasani (2010) reported that household wealth is an important predictor of child mortality and this mostly occurs in rural than urban areas.

2.4.4 Place of residence/region

Studies have shown that place of residence influences antenatal care utilization and child survival. In Bangladesh, Mostafa (2012) identified that place of residence has a significant association with neonatal mortality and child survival, where rural people die more than urban people. In a similar findings, Tettey (2003) indicated that place of residence has a significant relationship with infant and child mortality in Ghana and Nigeria. Infant and child mortality were higher in rural areas than

urban areas. Again, Twum-Baah *et al.* (1994) in an analysis of a nationwide survey for infants, child and maternal mortality found that infant and under-five mortality rates were significantly lower in urban areas than in rural areas. Urban areas in Ghana in 1992 recorded an infant mortality rate of 70 infant deaths per 1000 live births and 109 deaths per 1000 live births of under-five mortality whiles rural areas had 86 and 138 deaths per 1000 live births for infant and under five mortality rates respectively. The difference can be attributed to the disparities in favor of urban areas in the distribution of facilities necessary for maintaining adequate health. Also, findings from Addai (2000) on the determinants of the use of maternal–child health services according to regions in Ghana, show that people living in Western Region are twice likely to see a doctor for prenatal services than those in the Eastern Region.

2.4.5 Ethnicity

Brockerhoff and Hewett (2000) examined the influence of some ethnicity groups in Africa on child survival. Children of Ashanti women in Ghana, and Tutsi women were 20% less likely to die than other Ghanaian and Rwandan children in different ethnic groups. In Kenya, Kalenjin children are likely to die before the age of 5 as against other non-Kikuyu children.

2.4.6 Marital status

In a retrospective study by Thiombiano *et al*. (2013) to examine the effect of family dissolution on child survival in Burkina Faso, they found out that children under five years of divorced parents experience higher mortality risk than those living with married mothers. Again, in Ethipoia, Negeral *et al.* (2013) used Demographic Health Survey data (2000, 2005 and 2011) to examine the trends and determinants of under-five mortality. Using cox proportional model, the results showed that children of mothers who are married have lower mortality risk than those who are not

married. Kyei (2012) also indicated that among black population in South Africa, married women children are less likely to die compared to women who are not married.

2.5 Other determinants of child survival

Child survival is not seen only from the antenatal care provision or provision of primary health care services. Many studies have been carried out in developing countries on children due to a high percentage of them dying before their fifth birthday. These studies have been carried out to determine the main factors leading to high incidence of infant and under five mortality. The determinants vary from bio–medical approach to a more encompassing approach relating to child survival, such as environmental factors, economic, and other factors. This arose out of recognition that sustained reductions in infant and child mortality cannot be achieved through improved provision of primary health care services alone (Mosley and Chen 1984). Environmental, maternal and nutritional factors also have an influence on child survival.

2.5.1 Mode of delivery and child survival

In Asia, Caesarean deliveries are known to be associated with increased risk of neonatal mortality (Lumbiganon *et al.,* 2010). On the other hand, assistance by a trained health professional during delivery and individual utilization of postnatal care are significantly associated with reduced odds of neonatal deaths in India (Titaley *et al.,* 2008). In Nigeria, Ezeh *et al*. (2011) explored the factors determining the risk factors for post neonatal, infant, child and under 5 mortality. The findings of the study revealed that under five mortality was associated with caesarean delivery compared with vaginal deliveries.

2.5.2 Sources of drinking water and child survival

Poppel and Heijden (1997) indicated that provision of clean water is an important factor in many studies that dealt with the decline of mortality especially in Europe during the nineteenth century. They also found that an improved water supply has an influence on mortality in developing countries. However, some factors led to the failure in discovering the effect of available pipe water on the level of child mortality. Ingestion of unsafe water, inadequate availability of water for hygiene, and lack of access to sanitation contribute to about 1.5 million child deaths and around 88% of deaths from diarrhoea (WHO, 2002). In a related study, Shier *et al.* (1996) also found out that, a high incidence of diarrhoea related morbidity and mortality is associated with the use of untreated water in the northern part of Ghana. This could lead to child mortality and reduce the chances of children surviving. According to Mosiur (2008b), safe drinking water is one of the most important factors for safe life. Women whose children used well water for drinking purpose are reported 1.46 times more likely to experience child mortality than mothers whose children used piped water. In Bangladesh, Rathavuth (2007) observed that children born to older mothers living in households without safe drinking water are at higher risk of dying.

2.5.3 Toilet facility and child survival

Macassa *et al.* (2004) examined the relationship between toilet facility and child survival in Mozambique. The results of the study showed that children who live in households without toilet facility had a higher risk of dying than children who live in household with toilet. In Nigeria, Kayode (2012) identified that toilet has an influence on child survival; household with poor toilet facility are likely to report more deaths than those with good toilet facility.

2.5.4 Birth interval and child survival

Studies have found an influence of birth interval on child survival. Long and short periods between pregnancies are associated with several harmful pregnancy outcomes such as low birth weight, anemia and maternal and infant death (Conde-Agudelo, 2006). Akter *et al.* (2010) indicated that, birth interval has significant influence on child survival and the probability of a child surviving is much lower when the preceding birth interval is less than 12 months. Child survival may also be impeded by a higher birth interval. The study further indicated that child survival probability is highest for a birth interval of 5 years preceding the next birth and the probability decline thereafter. Proper spacing of births and postponing of child for a birth interval of 5 years and above have effect in reducing the level of mortality and ensuring child survival. Short birth intervals have also been shown to increase the mortality risk of the first child of the interval pair even before the birth of the second child (Norton, 2005). Ronsmans writing in 1996 indicated that, short preceding interval of birth increases the risk of neonatal death and to a lesser extent, post-neonatal mortality. A short subsequent interval increases the risk of mortality in childhood. Children born at a very short interval after preceding birth (1 to 17 months) are about twice as likely to die as those born after intervals of 24 to 47 months (Hobcraft *et al.,* 1985).

2.5.5 Breastfeeding and child survival

Rutstein (2000) established the effect of environmental health conditions, and socioeconomic status on mortality trends in developing countries, specifically in sub-Sahara Africa, on child survival. The study made mention of environmental and health factors as contributors to mortality in children. Infants aged 0-5 months who are not breastfed have five-fold increased risks of death from diarrhoea, compared with infants who are exclusively breastfed (Victoria *et al.,* 1989). According to the WHO (2006) breast milk provides optimal nutrition and promotes the child's

growth and development; it is associated with improved growth during the first months of life. Mosiur (2008b) indicated that an increase in the duration of breastfeeding of mothers by one month decreases the risk of child mortality. Children who are breastfed for 11 to 23 months and more than 23 months stand the chance of surviving and are reported of less mortality than children who were either breastfed within a short period of time or never breastfed.

Though all the background characteristics of the mother and other factors mentioned above affect child survival, there are contradicting views as to which variables are more important. Consequently, this has brought a new dimension to the study of child survival. Child survival, according to the literature reviewed is not affected by background, socio-economic and environmental factors alone; they are equally determined by antenatal care interventions, and timely utilization of antenatal care would help to ensure child survival.

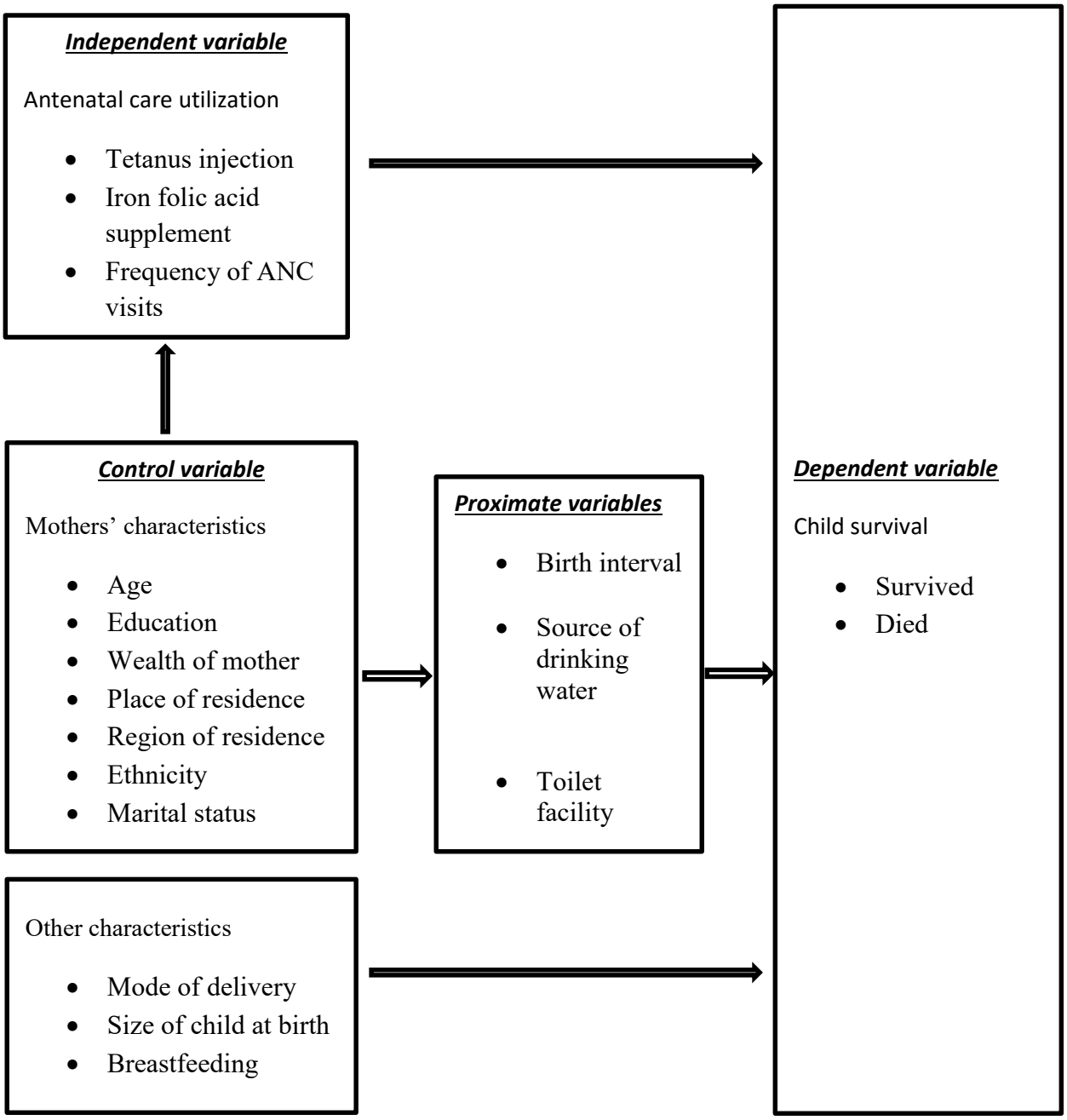
2.6 Conceptual framework

The study draws on various literature to explain the relationship between antenatal care utilization and child survival in Ghana. However, an analytical framework of determinants of child survival in developing countries by Mosley and Chen (1984) was adapted for the study. The framework operates on the assumption that, there is no direct influence from independent variables (socioeconomic variables) to child survival. Rather, they operate through proximate determinants to exert influence on child survival. They developed the proximate determinants based on the assumption that about 97 percent of children can be expected to survive through the first five years of life but there is a percentage reduction to the survival of life through the interplay of social, economic, biological and environmental factors. With this, socioeconomic factors operate through the proximate determinants which in turn influence child survival. Among some of the proximate determinants include maternal factors, environmental contamination, nutrient deficiency, injury

and personal illness control. Figure 2.1 below displays the pictorial structure that guided the present study, thus showing the relationship between antenatal care utilization and child survival.

The model presents potential antenatal care utilization services that may exert an influence on child survival in Ghana. It shows that there are some variables (independent) that have an influence on child survival directly, while others pass through intermediary variables to have such influence. Not all the variables in the Mosley and Chen (1984) framework are used due to data limitation. Information on proximate determinants such as injury and personal illness are not used in the framework because questions were not found in the Survey. However, varibles on maternal factors, environment and nutrients were found so they were used.

Figure 1. 1: A Conceptual Framework of Antenatal Care Utilization and Child Survival



Source: Adapted from Mosley & Chen (1984)

The study seeks to explain the influence of antenatal care utilization on child survival in Ghana. Antenatal care utilization may result in an increase or reduction in the survival of children. However, it is expected that women who utilize ANC services would report more survival of

children than women who do not utilize. Women who visited antenatal clinic(s) frequently are expected to report more children surviving than women with no or less ANC visit. In addition, women who take all their tetanus injection and folic acid are expected to report more children surviving. The plausible reason is that, frequency of ANC, adequate tetanus injection and folic acid improve the chances of chidlren surviving. Iron folic acid supplements help to prevent anemia in pregnant mothers, help with blood formation, increase birth weight and pre-term birth and also improve the chances of infants and mother surviving

The intermediate varibles in the study are toilet facility, sources of drinking water and birth interval. Independent and control variables pass through these variables to have an influence on child survival. Evidence between source of drinking water and chid survival have been found (Mosiur, 2008b). Again, the influence of birth interval on child survival has also been found (Hobcraft, 1985; Akter, 2010). These variables may contribute to the survival or mortality of children.

Age of mother, education, wealth, place of residence, region of residence, ethnicity and marital status are used as control variables. These variables for the pupose of the study used as control variables may exert an influence on child survival (Gyamfi, 2002; Syamala, 2004;Younger, 2007). As a result, the study seeks to find out the effect of these variables on child survival in Ghana. Studies have found that age was reated to child survival. Adetola *et al.* (2011) found out that teenage mothers are less likely to have their children surviving. In addition, mothers' education have been found to have an influence on child survival (Hande *et al.,* 2008). Women with higher education are more likely to report more children surviving than those with no education. Respodents' wealth, place of residence, region of residence and ethnicity may influence child survival. It is expected that respondents who live in urban places would report more children

surviving than those in rural places because differential in place of residence and region of residence in terms of access to health care facility and environmental conditions could affect the health outcomes of children.

Again mode of delivery is expected to have an influence on child survival. It is expected that respondents who had normal delivery will report more children surviving than those with caesarean. A probable reason is that caesarean delivery may be prone to injury and will make the child weak and result in mortality.

Research by Mosiur (2008b) reported a strong relationship between month of breastfeeding and child survival. It is therefore expected that children who are breastfed for a longer period would report surviving than those who are fed for a shorter period.

2.7 Hypotheses

The study further seeks to test the following hypotheses.

- Women who utilized antenatal care four or more times are more likely to have their children survive compared to those who did not utilize antenatal care.
- Women who had adequate tetanus injections are more likely to have their children survive compared to those had no tetanus injection.
- Women who took more than 90 iron folic acid tablets are more likely to have their children survive compared to those who took no iron folic tablets.
- Children born to mothers with higher levels of education are less likely to die before age five compared to those born to mothers with no education.

CHAPTER THREE

METHODOLOGY

3.0 Source of data

The source of data for the study is the Ghana Demographic and Health Survey (GDHS 2008) which was conducted by the Ghana Statistical Service as part of the world – wide Demographic and Health Survey Programme of the Institute for Resource Development. The 2008 Ghana Demographic Health Survey is the fifth in the series of surveys after the onset in 1988. The survey collects data on demographic, socio - economic and health information on men and women in their reproductive ages and also on children under the ages of five years. Generally, the survey collects data on the following: household population and housing characteristics, family planning, fertility, infant and child mortality, maternal health, child health, nutrition of Children and adults, malaria, HIV/AIDS - related issues, women empowerment, demographic characteristics, Health Outcomes and domestic violence.

3.1 Sampling design

The survey (GDHS 2008) is a nationally representative stratified consisting of household and individual (men and women) questionnaire (GSS, 2009). The 2008 GDHS is a household survey, carried out in a representative probability sample of more than 12,000 households selected nationwide. Weights were not calculated in isolation. Cluster, household and individual non-responses were therefore taken into consideration before weights were calculated, so the representations were not distorted. Sample was taken all over the country, region by region, across towns, urban and rural areas. The survey utilized a two – stage sample design. The first stage involved selecting sample points or clusters from Ghana Population and Housing Census updated

master sampling frame. The second stage also involved systematic sampling of households listed in each cluster. For the purpose of the study, key information collected from women of reproductive age (15-49 years) who visited or did not visit an antenatal care clinic and had delivered recently with sample size of 2099 were taken into consideration**.** The unit of analysis is children under-five years within the five-year period preceding the survey.

3.2 Categorization and measurement of variables

The independent and dependent variables of the study are utilization of antenatal care (ANC) and child survival respectively. For the purpose of the study, the independent variable (Antenatal Care Utilization) was measured by frequency of visits, receiving a tetanus injection and iron folic tablets or folic supplement. Child survival is the survival status of a child under five years (0-59 months) and was restricted to the recent birth of a mother.

3.2.1 Dependent variable

Child Survival is measured by the question: "Is the child alive?''. With respect to the question, a ''Yes'' response indicates child is alive while a ''No'' response means the child is dead.

3.2.2 Independent variable

Utilization of Antenatal Care (ANC) was measured by frequency of visit, number of iron folic acid (IFA) tablets taken and a number of tetanus injection received.

Frequency of visit: This was measured in the survey by the question ''How many times did you receive antenatal care during this pregnancy''. Responses were given in relation to the number of times they visited an antenatal clinic. Those who did not visit the antenatal care clinic were

categorized as ‘’No visit’’ while those who visited an antenatal clinic less than three, four and more were categorized as ‘’one to three visits’’ and ‘’four and more visits’’ respectively.

Iron folic acid tablets: With regards to iron tablets or folic supplements (IFA), this variable was measured in the survey by this question:

‘’How many days did you take the tablets’’

For the purpose of this study, the number of days the tablets were taken were categorized into ‘’0’’ ‘’less than 90’’ and ‘’equal or greater than 90 tablets’’ This same standard of categorization was used by Dibley *et al*. (2014) in their study in Nepal. Also, the standard of categorization was used because there is no specific number of tablets a pregnant woman is supposed to take in Ghana. The tablet is taken per day throughout pregnancy. Moreover, according to WHO (2012) the tablet is to be taken throughout pregnancy to prevent anemia and low birth weight.

Tetanus injection: The following questions were asked to measure tetanus injection taken by pregnant women during their last birth.

1. ‘’During this pregnancy, how many times did you get this tetanus injection?’’

Tetanus injection was categorized as ‘’none’’, ‘’inadequate’’ and ‘’adequate’’. Total children ever born by mothers were used in addition to tetanus injection received to categorize the response. The assumption was that five doses are required to protect women as well as their children from getting tetanus. Pregnant women are supposed to receive two doses for the first birth and one for each subsequent birth (up to the fourth child) until they have received all the five doses (WHO, 2012). As a result of this, women who did not receive tetanus injection were dropped to the ‘’none response’’ category in relation to the number of children they have. If a mother had more than four

children, it is expected that she had received all the injections and would not take additional injection. So they were categorized as ‘’adequate’’. Women with one child who did not receive an injection were categorized as ‘’none’’. Also, women who received one injection was also categorized as ‘’inadequate’’. In addition, those who received two and more injections were categorized as ‘’adequate’’

3.2.3 Control variables

Control variables considered in the study include age of the mother, education, wealth index, marital status, ethnicity, place of residence, region of residence, mode of delivery, size of child at birth, months of breastfeeding, birth interval, source of drinking water and toilet facility.

Age of mother was measured as categorical (15-19 =1, 20-24=2, 25-29=3, 30-34=4, 35-39=5, 40-44=6, 45-49=7).

Highest educational level of respondents was categorized as no education, Primary, Secondary, and Higher.

Wealth index was coded into three categories. The poor and poorest were coded as 1, Middle as 2 and Rich and Richest as 3.

Marital status was categorized as never married, currently married and never married.

With regards to ethnicity, respondents were asked which ethnic group they belong to. Ethnicity was coded in six categories. Akan, Ga/Dangme, Ewe, Gruma, and Mole-Dagbani were categorized into separate groups while Mande, Grusi and Gruma and others were also categorized into one group.

Respondents’ place of residence was categorized as urban and rural residence.

Region of residence of respondent was also measured as a categorical (Upper west, Upper east, Northern, Brong Ahafo, Ashanti, Eastern, Volta, Greater Accra, Central and Western region).

Also, respondents were asked how they gave birth and this was categorized as Normal/Vaginal and Caesarean delivery.

With regards to size of child at birth, it was categorized as very large, larger than average, average, smaller than average and very small. The numerical threshold for classifying weights into very large, larger than average, average was not provided or given to respondents. It was a subjective measure by the respondents.

Months of breastfeeding of children were also used as a control variable and were categorized as never breastfed, less or equal to 12 months, 13 to 24 months, 25 to 36 months, 37 months and over).

Preceding birth interval of last birth was also examined as a control variable. It was categorized as less than 2 years, 2 to 4 years, 5 to 7 years, 8 years and above.

Household drinking water was categorized as safe water and unsafe water. The categorization was based on World Health Organisation (WHO) classification.

Toilet facility was categorized into no toilet, pit latrine and flush toilet. This was based on the classification by Demographic Health Survey (DHS).

3.3 Study limitation

The data set used can be subject to recall bias as women were asked to remember whether they utilized various antenatal care services. This would be true for those who gave birth earlier prior to the time of interview.

Moreover, death of children may not be reported and this could affect the result of the study.

3. 4 Method of analysis

The statistical analyses were carried out using the IBM's Statistical Package for Social Science (SPSS) windows version 20.0. The data are analysed in three stages. These stages include univariate, bivariate and multivariate.

At the univariate level, a detailed description of background characteristics of the respondents is provided using quantitative tools. Descriptive statistics such as frequency tables and graphs are used to describe variables at a time. This includes the background characteristics of respondents.

At the bivariate level, cross-tabulations are used to relate background characteristics and other characteristics of respondents to Child Survival. Pearson's chi square test of independence is also used to test for the correlation/significance between variables (independent and dependent)

For the multivariate analysis level, since the nature of the dependent variable is dichotomous, binary logistics regression is used to determine the outcome of the dependent variable: child survival. The logistic regression model is chosen for its ease of application and due to the fact that the outcome variable is dichotomous. The significance of the variables is measured at $p < 0.05$, which is at the 95 percent level of dichotomous.

CHAPTER FOUR
BACKGROUND CHARACTERISTICS OF RESPONDENTS

4.0 Introduction

This chapter presents the description of the socio- demographic profile and other background characteristics of 2099 respondents (women), who had live birth in the five years preceding the survey as contained in the data.

4.1 Child survival

From the Table 4.1 below, out of 2147 singleton children born in the five years preceding the survey, 3.8 percent died while 96.2 percent survived during the time of the survey. This implies that a larger percentage of children under-five survived from birth to the time the survey took place.

Table 4. 1 Percentage Distribution of Children by Survival

Child survival	Frequency	Percentage
Yes	81	3.8
No	2018	96.2
Total	**2099**	**100**

Source: Computed from 2008 GDHS

4.2 Antenatal care visits

From Table 4.2 below, significant percentage (3.5) responded that they did not attend antenatal clinics. 78.1 percent of women attended antenatal clinics on four or more occasions, whiles about 18.4 percent responded that they had 1 to 3 visits. It can be seen from Table 4.2 that 96.5 percent of women attended antenatal clinics while 78.1 percent attended the recommended number of

visits (4 and beyond). This means that 9 out of 10 women visited antenatal clinics during their time of pregnancies.

Table 4. 2: Percentage Distribution of Women by Antenatal Visits

Frequency of ANC visits	Frequency	Percentage
0	73	3.5
1-3 visits	386	18.4
4 visits and above	1640	78.1
Total	**2099**	**100**

Source: Computed from 2008 GDHS.

4.3 Folic acid tablets (IFA, supplements)

Folic acids are given to women during antenatal care visits. It serves as food supplements, blood formation and reduces preterm births. Table 4.3 below shows that a higher proportion (44.6 percent) of women took less than 90 tablets, 41.5 percent took ninety (90) and beyond tablets whiles 13.9 percent did not take any iron folic tablet. This clearly indicates that a higher proportion of women who had a live birth in the five years preceding the survey took iron folic tablets (IFA) less than 90 during pregnancy.

Table 4. 3: Percentage Distribution of Iron Folic Acid (Supplement) Tablets Received by Respondent

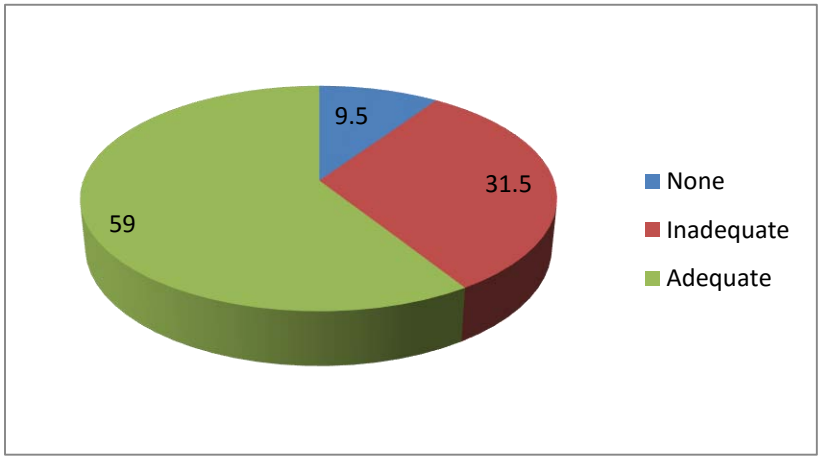
Folic acid taken	Frequency	Percentage
Never	292	13.9
< 90	937	44.6
≥ 90	870	41.5
Total	**2099**	**100**

Source: Computed from 2008 GDHS

4.4 Tetanus injection

Tetanus injection helps to protect women as well as their children from tetanus. From Figure 4.1 below, 59.0 percent of respondents adequately received tetanus injection for their last birth in the five years preceding the survey, 31.5 percent inadequately received tetanus injection whiles 9.5 percent received no tetanus injection. The result shows that the majority of women received an adequate tetanus injection during their pregnancy or before birth. The finding is consistent with Ghana Maternal Health Survey (2007) that many pregnant women received a tetanus injection and they are protected from tetanus infection.

Figure 4. 1: Percentage Distribution of Tetanus Injection Received by Respondents



Source: Computed from 2008 GDHS

4.5 Age of mother

The current age of respondents was analyzed. It is a factor that influences antenatal care utilization and child survival. Aside this, it determines the structure of a population for a more comprehensive understanding of the situation at present. It is also important to point out the fact that the age variable may suffer some errors due to reasons such as misreporting by respondents and wrong recording of age by interviewers. The ages of women interviewed ranged from 15-49 years. Table 4.4 shows that respondents aged 25-29 had the highest proportion (26.3 percent) of women with recent live births in the five years preceding the survey. The age distribution of the women shows that more than half of the population (50.4 percent) is below the age of 30. Individually, they make 4.8 percent, 19.2 percent and 26.3 percent of 15-19, 20-24 and 25-29 age groups. This shows that the majority of the women who gave birth in the preceding survey were below 30 years. It can also be seen from the table that older women (45-49) had the lowest proportion of 3.7 percent and this means that fertility decreases with respect to an increase in age.

Table 4. 4 : Percentage Distribution of Respondents by Age

Age of mother	**Frequency**	**Percentage**
15-19	100	4.8
20-24	405	19.2
25-29	552	26.3
30-34	430	20.5
35-39	361	17.2
40-44	173	8.3
45-49	78	3.7
Total	**2099**	**100**

Source: Computed from 2008 GDHS.

4.6 Education of mother

Education is an important variable that can affect the behaviour of people positively or negatively. It is expected that those with higher education should have more knowledge on antenatal care which can also influence their care for children and the likelihood of their children surviving past their fifth birthday. Invariably, the level of education affects the kind of work a woman is engaged in, her level of income and socio-economic status. Table 4.5 below shows that the largest percentage (42.4) of women who had children under-five had secondary education, followed by 30.9 percent of women with no education. Those with higher education had the lowest percentage of 2.4 percent. This shows that women with low level of education (no education and primary) had the highest percentage (55.2), of children under-five years compared with others. Also, fertility is lower among the rich.

Table 4. 5: Percentage Distribution of Respondents by Education

Education	**Frequency**	**Percentage**
No education	649	30.9
Primary	511	24.3
Secondary	889	42.4
Higher	50	2.4
Total	**2099**	**100**

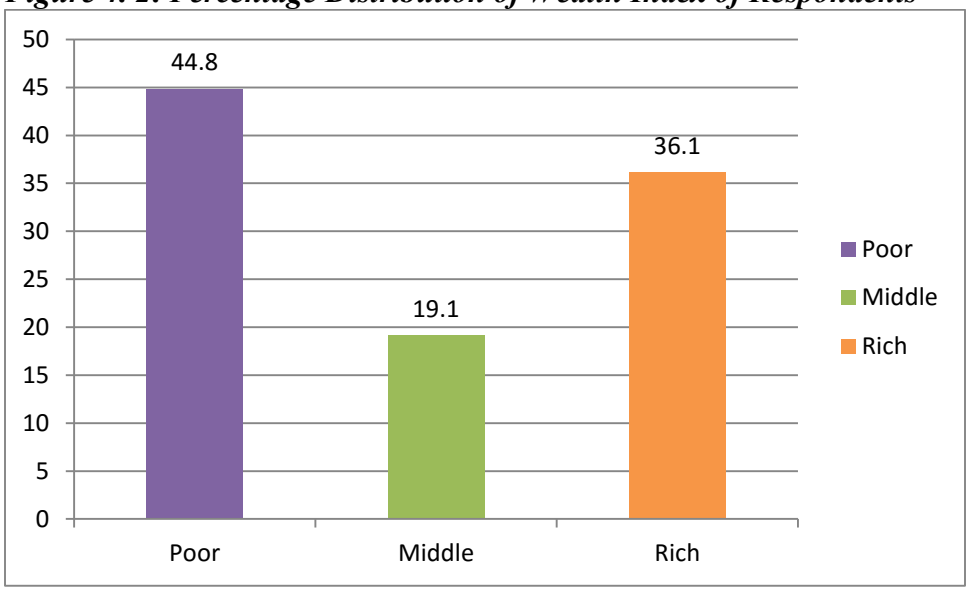
Source: Computed from 2008 GDHS.

4.7 Wealth index

Wealth index is used as a proxy for economic/income status of women. The wealth or economic status of a woman can influence one's fertility and hence child survival. The table below shows that 44.8 percent of the sample belongs to the poor group. The poor group comprises the poor and

the poorest. 36.1 percent of respondents were in the rich group. The middle group constitutes the sample with the smallest percentage of 19.1 percent. Majority of the women who gave birth within the period under study are poor and this may have a negative influence on the survival status of their children.

Figure 4. 2: Percentage Distribution of Wealth Index of Respondents



Source: Computed from 2008 GDHS

4.8 Marital status

The marital status of an individual influences his/her behavior in the society based on societal norms or social responsibility pertaining to marriage. Table 4.8 shows that the majority of the respondents (87.5 percent) were married, follow by 6.3 percent formerly married and 6.1 percent never married.

Table 4. 6 : Percentage Distribution of Respondents by Marital Status

Education	Frequency	Percentage
Never married	129	6.1
Currently married	1837	87.5
Formerly married	133	6.3
Total	**2099**	**100**

Source: Computed from 2008 GDHS.

4.9 Ethnicity of mother

The ethnic distribution of the survey respondents was analysed. Table 4.7 below shows that the most predominant ethnic group with the highest number of children under five years was the Akan (46.5 percent) followed by the Mole Dagbani (20.2 percent) with the least being Gruma of 4.9 percent. The results confirm the other findings that the Akan constitutes the largest ethnic group in Ghana (GSS 2012). It can be seen that majority of women from the Akan ethnic group had more children under-five years compared to other ethnic groups.

Table 4. 7 : Percentage Distribution of Respondents Ethnicity

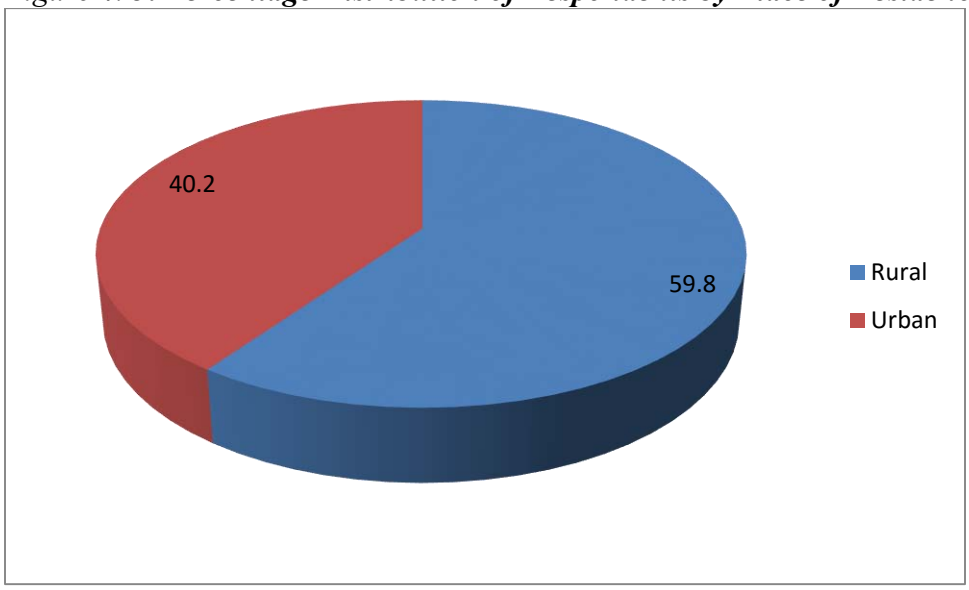
Ethnicity	Frequency	Percentage
Akan	976	46.5
Ga/Dangme	105	5.0
Ewe	270	12.9
Mole – Dagbani	424	20.2
Gruma	102	4.9
Other	222	10.6
Total	**2099**	**100**

Source: Computed from 2008 GDHS.

4.10 Place of residence of mother

The study investigated the current place of residence of the respondents. That is, whether respondents live in the rural or urban place. Place of residence usually determines people's lifestyles and also to the extent when and the number of children to have. The results show that majority (59.8 percent) of the women between ages 15-49 live in the rural areas as against 40.2 percent living in the urban areas had a live birth in five years preceding the survey. In a nutshell, majority of the women residing in the rural areas had more children under-five compared to those in the urban areas in Ghana

Figure 4. 3: ***Percentage Distribution of Respondents by Place of Residence***



Source: Computed from 2008 GDHS

4.11 Region of residence of respondents

This variable considered which of the region the respondent resided in at the time of the data collection. People in different regions have their own behaviour and this may influence the number of children they would have and hence their survival. From Table 4.8 below, Ashanti region had the highest proportion of 18.9 percent of women with children under-five years, followed by Northern region with 13.9 percent, Greater Accra, with 12.5 percent, Brong Ahafo with 10.4

whiles the lowest is Upper West region with 2.7 percent. The regional distribution of the respondents reflects other national surveys and consistent with Ashanti as the most populous according to the 2010 Population and Housing Census of Ghana. It is therefore not surprising that a lot of women from this region had more children under-five years preceding the survey.

Table 4. 8: Percentage Distribution of Respondents by Region

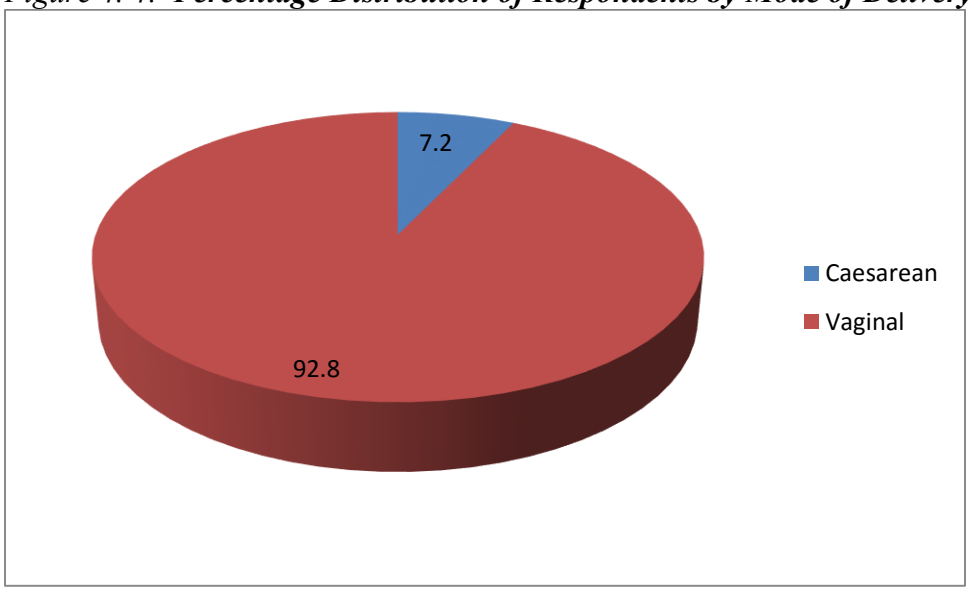
Region	Frequency	Percentage
Western	189	9.0
Central	200	9.5
Greater Accra	262	12.5
Volta	181	8.6
Eastern	185	8.8
Ashanti	397	18.9
Brong Ahafo	217	10.4
Northern	291	13.9
Upper East	119	5.7
Upper West	58	2.7
Total	**2099**	**100.0**

Source: Computed from 2008 GDHS

4.12 Mode of delivery

Data on mode of delivery from Figure 4.4 below showed that the highest number of women who had a live birth in the five years preceding the survey had a normal delivery through vaginal which constitutes 92.8 percent. Delivery by caesarean was 7.2 percent. This means that the majority of women who gave birth within the period considered in the survey had a normal delivery.

Figure 4. 4: ***Percentage Distribution of Respondents by Mode of Delivery***



Source: Computed from 2008 GDHS

4.13 Size of child at Birth

From Table 4.9 below, the highest proportion (32.9 percent) of children delivered were larger than average, followed by 31.6 percent of average size, very large with 22.2 percent, smaller than average with 8.6 percent and the lowest being children of very small size of 4.7 percent. This therefore means that the highest proportion of children delivered within the five years preceding the survey were larger than average.

Table 4. 9: Percentage Distribution of Respondents by Size of Child at Birth

Size at birth	Frequency	Percentage
Very Large	465	22.2
Larger than average	690	32.9
Average	664	31.6
Smaller than average	182	8.6
Very small	98	4.7
Total	**2099**	**100**

Source: Computed from 2008 GDHS

4.14 Months of Breastfeeding

Breastfeeding helps to provide nutrients to children hence ensuring their survival. A child needs to be fed an hour after delivery and fed for a longer period of time to provide nutrients and strong health. Table 4.10 below shows that the majority (50.2 percent) of the respondents fed their children with breast milk between 13 to 24 months, followed by 41.0 percent of women who fed their children less or equal to 12 months, and 7.0 percent fed their children 25 months and over. On the other hand, 1.8 percent of women said they never breastfed their children. The findings suggest that the majority of women fed their children with breast milk from 13 months to 24 months. It is therefore expected that breast feeding should have an influence on child survival.

Table 4. 10: Percentage Distribution of Respondents by Months of Breastfeeding

Months of breast feeding	Frequency	Percentage
Never breastfed	38	1.8
Less or equal to 12 months	861	41.0
13 to 24 months	1053	50.2
25 months and over	147	7.0
Total	**2099**	**100**

Source: Computed from 2008 GDHS

4.15 Birth interval

Birth interval plays a role in ensuring the survival of a child. According to Ronsmans (1996) short preceding interval of birth increases the risk of neonatal death and hence reduces the chances of child survival. It can be seen from Table 4.11 below that a highest proportion (49.1 percent) of women who delivered recently had a birth interval of between 2 to 4 years, followed by 22.7 percent of those with less than two years birth interval and the lowest percentage (7.3) of birth interval occurred among women with 8 and above years.

Table 4. 11: Percentage Distribution of Respondents by Birth Interval of Children

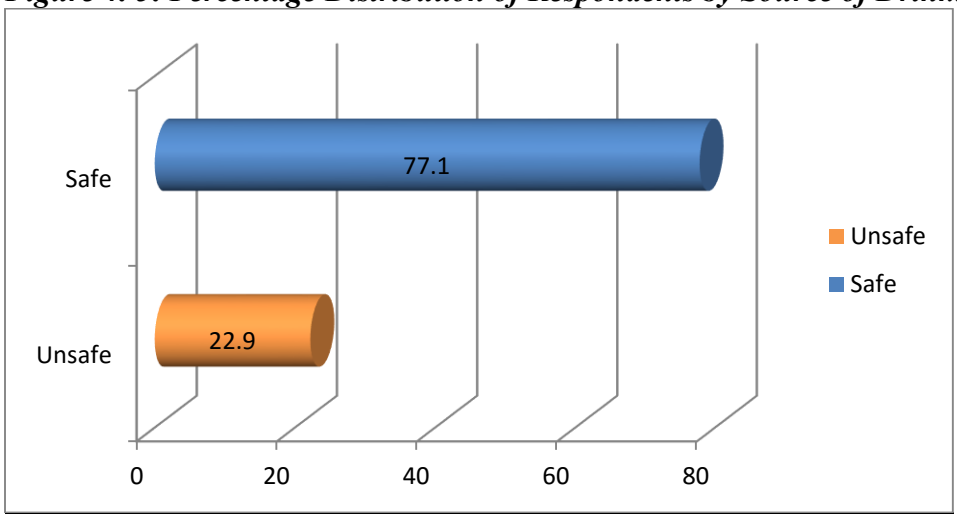
Birth interval	Frequency	Percentage
Less than 2 years	476	22.7
2 to 4 years	1031	49.1
5 to 7 years	439	20.9
8 years and above	153	7.3
Total	**2099**	**100.0**

Source: Computed from 2008 GDHS

4.16 Source of drinking water

Water is one of the most important necessities of life and therefore its availability and accessibility to women or households influence their general wellbeing. The source of drinking water has been identified as a determinant of a child's health henceforth survival. The consequence being child mortality or survival may be as a result of pollution, contamination, use of unclean water or poor water treatment. Results in Figure 4.5 indicate that majority (77.1 percent) of women interviewed used safe water while 22.9 percent of women used unsafe water.

Figure 4. 5: Percentage Distribution of Respondents by Source of Drinking Water.



Source: Computed from 2008 GDHS

4.17 Toilet facilities

Table 4.12 shows that about 62.9 percent of the respondents had pit latrine, 27.7 percent had No toilet and 9.5 percent had flush toilet. The findings suggest that majority of the respondents had pit latrine as the main source of toilet facility.

Table 4. 12: Percentage Distribution of Respondents by Toilet Facilities

Education	**Frequency**	**Percentage**
No toilet	581	27.7
Pit latrine	1319	62.9
Flush toilet	199	9.5
Total	**2099**	**100**

Source: Computed from 2008 GDHS.

In summary, the chapter looked at the description of background characteristics of mothers and child survival. The results show that women within the age group 25-29 had the highest proportion of children delivered. 96.6 percent of women who had a live birth five years preceding the survey visited antenatal clinics. Moreover, majority of them received tetanus injection and took iron folic acid tablets. Out of 2099 children under five years, 80 (3.8 percent) died and 2019 (96.2 percent) survived.

CHAPTER FIVE

BACKGROUND CHARACTERISTICS AND CHILD SURVIVAL

5.0 Introduction

This chapter looks at the association between the independent, control and dependent variables. Pearson's Chi-Square test was used to examine the association between the variables at 95% significance level. Variables considered include, frequency of antenatal visits, iron folic tablets (IFA), tetanus injection, age, education, wealth index, marital status, ethnicity, place of residence, place of region, mode of delivery, size of child at birth, months of breastfeeding, birth interval, sources of drinking water, sources of toilet facility and child survival.

5.1 Antenatal Care Visits and Child Survival

Antenatal care helps to improve the chances of children surviving as well as the mother. Prevalence and risk of early childhood mortality are likely to be higher among children whose mother did not seek ANC services (Abou-Zahr2003; Campbell & Graham 2006). From Table 5.1 below, the p value (0.136) shows that there is no significant association between frequency of antenatal care visits and child survival. As expected, women who visited antenatal clinics more than three should have higher chances of their children surviving than those who had fewer visits. Women with 4 and more visits had the highest proportion (96.6 percent) of their children surviving, followed by women with 1 to 3 visits 94.6 percent and no visit with 94.5 percent. The finding is consistent with a study by Anil (2005) in India, where frequency of antenatal care clinics has a positive influence on child survival.

Table 5. 1: Percentage Distribution of Frequency of Visits and Child Survival

Frequency of visits	Child Survival (%)		Total
	No	Yes	Number of women
0	5.5	94.5	73
1-3 visits	5.4	94.6	386
4+ visits	3.4	96.6	1640
Total			**2099**
Chi square test	X^2: 3.991	P-value: 0.136	

Source: Computed from GDHS 2008.

5.2 Iron Folic Acid (IFA) and child survival

Iron deficiency is a health problem globally among pregnant women and young children (WHO, 2008), as a result of this Iron folic acid is given to pregnant women as food supplements and to prevent anemia. Table 5.2 shows that there is no significant relationship between folic acid supplements and child survival (P-value: 0.232). However, 96.9 percent of children whose mothers consumed less than 90 tablets had the highest percentage of survival, followed by equal or greater than 90 tablets of 95.9 percent and 94.9 percent for those who took no tablet. The result of the study shows that the highest reported survived children is among children whose mothers' consumed 1-89 tablets and a lower percentage of 95.0 for those who did not take any tablets. It was expected that women who took greater than 90 tablets should have a higher percentage of survival than those who took less than 90 tablets intake. The difference could be attributed to other factors such as the environment, socio economic characteristics and health conditions aside the intake of folic acid.

Table 5. 2 Percentage Distribution of Iron Folic Acids (IFA) taken and Child Survival

	Child Survival (%)		Total
Iron Folic acid (IFA)	No	Yes	**Number of women**
Never	5.1	94.9	292
< 90 tablets	3.1	96.9	937
≥ 90 tablets	4.1	95.9	870
Total			**2099**
Chi square test	X^2: 2.919	P-value: 0.232	

Source: Computed from GHDS 2008.

5.3 Tetanus Injection and Child Survival

The purpose of tetanus vaccine is to protect women and their new born infants against tetanus (Koenig *et al.*, 1998: Stanfield *et al*., 1973). Table 5.3 shows that there is no significant relationship between tetanus injection and child survival (p value of 0.913). This means that tetanus injection had no association on child survival. Also, 96.4 percent of children under-five years whose mothers received inadequate tetanus survived, 96.0 percent for adequate tetanus injection and 96.5 percent for no tetanus injection survived. Children whose mothers received no tetanus injection survived more than those whose mothers' received adequate and inadequate tetanus injection. However, there is a little margin of difference of survival among women receiving no tetanus injection, adequate and inadequate. This could be due to misreporting of tetanus received during pregnancy.

Table 5. 3: Percentage Distribution of Tetanus Injection and Child Survival

Tetanus injection	Child Survival (%)		Total
	No	Yes	Number of women
None	3.5	96.5	199
Inadequate	3.6	96.4	662
Adequate	4.0	96.0	1238
Total			**2099**
Chi square test	X^2: 0.182	P-value: 0.913	

Source: Computed from GDHS 2008.

5.4 Age of Respondents and Child Survival.

From Table 5.4 below, the Pearson chi square of 8.743 and a p value of 0.189 show that there is no statistically significant association between age of mother and child survival. This shows that age of mother does not determine or influence the survival of children under five years. The Table further shows that 99.0 percent of children under five years of mothers within the age group 15-19 survived, followed by 97.1 percent of children born by mothers within the age group 25-29, 96.3 percent of women within the group 20-24, and 96.0 percent for 30-34. The distribution shows that the highest percentage of children who survived was born by mothers within the age group 15 to 19 compared to other age groups. Children born by women within the age group 44-49 had the lowest percentage (92.3) surviving. It is quite surprising that children born of women within 15-19 age group had the highest proportion of children surviving and this can be attributed to the proper caring and support from relatives, friends or other corporations. On the other hand, the lowest percentage of children surviving born by women within the age group 44-49 can also be attributed to their age. Adetola (2011) in Nigeria and Mostafa (2012) in Bangladesh indicated that there is a higher proportion of mortality among teenage mothers, hence low child survival. This

study shows that there is the highest proportion of children surviving among teenage mothers hence the finding of the study is inconsistent with their studies. The highest proportion of children surviving within 15-19 age group compared to other categories could be attributed to social network from families and friends (Oppong, 2004). They could have received support from parents, family and friends due to the age group (15-19) they find themselves hence ensuring child survival. Similarly, a study by Ikamari (2013) in Kenya found that the risk of infant mortality among women less than 20 years is low, higher for women 20-34 and highest in 35 years and over.

Table 5. 4: Percentage Distribution of Respondents by Age and Child Survival

	Child Survival (%)		Total
Age	**No**	**Yes**	**Number of women**
15-19	1.0	99.0	100
20-24	3.7	96.3	405
25-29	2.9	97.1	552
30-34	4.0	96.0	430
35-39	4.4	95.6	361
40-44	5.8	94.2	173
45-49	7.7	92.3	78
Total			**2099**
Chi - Square test	X^2 : 8.743		P – value: 0.189

Source: Computed from GDHS 2008.

5.5 Education and Child Survival

Educating a woman is a very profitable investment as far as child survival is concerned. This is because education has a strong association with infant and child survival. The results in Table 5.5 shows that the largest percentage (98.0) of the children survived were born by mothers with higher education, followed by mothers with secondary education (97.3 percent). Mothers who had no education and primary had 96.1 percent and 93.7 percent respectively of their children surviving. The largest proportion of children born by mothers of higher education survived compared to those with primary, secondary, and no education. This may be due to the fact that mothers with higher education visited antenatal clinics, know how to care for their children, gave them nutritious food and had more time for them. Moreover, Armar- Klemesu *et al*. (1997) indicated in their study that poor maternal education is the main constraints to good health childcare practices and ultimately influences child survival. There is a significant association between education and child survival at a Pearson Chi square of 11.545 and a p value of 0.009. This means that education influences child survival. The plausible reason why children born to women with no education survived compared to women with primary education could be that mothers with no education may not have engaged in work which prevented them from taking care of their children often compared to children of mothers with primary education though the difference in the education might not be largely significant. Also, it could be that mothers with no education put much emphasis on child care education during antenatal care services hence ensuring survival of their children. Moreover, they could have also benefitted from support from family members and informal education which could have equipped them in taking care of their children. In addition a study by Badasu (2004) revealed that women with higher education are unable to take care of their children well themselves compared to those with no education due to time constraints and the schedule of work. Women

with no education are more likely to be engaged in informal work compare to those with education likely to be engaged in formal education. As a result, they are more likely to take care of their children well than women with primary education.

Table 5. 5: Percentage Distribution of Education and Child Survival

Education	Child Survival (%)		Total
	No	Yes	Number of women
No education	3.9	96.1	649
Primary	6.3	93.7	511
Secondary	2.7	97.3	889
Higher	2.0	98.0	50
Total			**2099**
Chi square test	X^2 value: 11.545		P-value: 0.009

Source: Computed from GDHS 2008.

5.6 Wealth Index and Child Survival

Table 5.6 below shows the percentage distribution of wealth index and child survival. The table shows that 96.5 percent of poor women had their children survived, 95.5 percent of children under five born by women of middle wealth category survived and 96.0 percent from rich families. The results suggested that children born by women of poor families experienced higher child survival percentage compared to those born by mothers from middle wealth category and rich families. This decreases from rich to the middle wealth category. In summary, the distribution shows that women within the poor wealth category had a higher proportion of their children surviving than those in the middle and the rich wealth index. The chi square analysis indicates that there is no association between the wealth index and child survival at a p value of 0.678. Beyond expectation, the results did not follow the usual pattern, where survival increases with the improvement in wealth status of an individual. This can be due to the fact that the rich may be involved in more

professional works which reduces the time they had for their children. Mothers in the middle wealth category may be involved in more casual works that may ruin their time to care for the newly born babies. This finding is consistent with a study by Ssewanyana and Younger, (2007) in Uganda which showed that wealth index was negatively correlated with infant mortality

Table 5. 6: Percentage Distribution of Wealth Index and Child Survival

Wealth index	Child Survival (%)		Total
	No	Yes	Number of women
Poor	3.5	96.5	941
Middle	4.5	95.5	400
Rich	4.0	96.0	758
Total			**2099**
Chi square test	$X^{2:}$ 0.777	P –value: 0.678	

Source: Computed from GDHS 2008

5.7 Marital status and Child survival

Table 5.7 shows that 98.4 percent of never married respondents, 96.1 percent of currently married and 94.7 percent of formerly married respondents reported the survival of their children. This implies that the highest percentage of survival was reported by never married respondents. The p value of 0.276 also indicates that there is no association between marital status and child survival.

Table 5. 7: Percentage Distribution of Marital Status and Child Survival

Marital status	Child Survival (%)		Total
	No	Yes	**Number of women**
Never married	1.6	98.4	129
Currently married	3.9	96.1	1837
Formerly married	5.3	94.7	133
Total			**2099**
Chi square test	X^2 : 2.578		P value 0.276

Source: Computed from GHDS 2008.

5.8 Ethnicity and Child Survival

Table 5.8 shows the distribution of ethnicity and child survival among women in Ghana. The table below shows that there is an association at a p value of 0.049 between ethnicity and child survival. Children among Ewes had the highest percentage of children under five surviving. This could be as a result of proper care received by the ewes during and after pregnancy which is also supported by living arrangement and kin group (Badasu, 2014). The other ethnic group (including Guan, Mande) had a proportion of 96.4 percent of children under-five years, surviving. Akan had 96.0 percent, Mole Dagbani and Ga 96.2 percent each, and Ewe 98.5 percent. In summary, Ewe women had the highest proportion of 98.5 percent of their children under- five surviving while Gruma had the lowest proportion of 91.2 percent.

Table 5. 8: Percentage Distribution of Ethnicity and Child Survival

Ethnicity	Child Survival (%)		Total
	No	Yes	Number of women
Akan	4.0	96.0	976
Ga/Dangme	3.8	96.2	105
Ewe	1.5	98.5	270
Mole-Dagbani	3.8	96.2	424
Gruma	8.8	91.2	102
Others	3.6	96.4	324
Total			**2099**
Chi square test	X^2 : 5.913		P-value: 0.049

Source: Computed from GDHS 2008.

5.9 Place of Residence and Child Survival.

Studies have found that children born by mothers living in the rural areas have higher chance of dying compared to the children born of mothers residing in the urban areas (Gyamfi, 2002). The results of this study showed that, children under five in the urban areas survived more than children in the rural areas. Moreover, place of residence had no significant association with child survival at Pearson Chi –Square of 0.132 and a P-value of 0.717 as indicated in Table 5.9. The results also show that among the children of mothers residing in the urban areas 96.3 percent survived, while 96.0 percent of rural children survived. The difference in child survival among those living in urban and rural areas in 2003 was 1.1% while 2008 was 0.3% in favor of urban dwellers. The plausible reason for the narrowing gap between the urban and rural could be attributed to the improvement in amenities such as water supply, toilet facilities and health services in the rural areas over time. On other hand, the reason for a smaller percentage difference could be that women in the rural areas place more value on children for economic and security at old age (Caldwell &

Caldwell, 1990). As a result of this, they take care of them well to ensure their survival. Further, there are extended family members who help mothers to take care of their children in their absence (Badasu, 2014; Oppong 2006).

Table 5. 9: Percentage Distribution of Place of Residence and Child Survival

	Child Survival (%)		Total
Place of residence	**No**	**Yes**	**Number of women**
Urban	3.7	96.3	844
Rural	4.0	96.0	1255
Total			**2099**
Chi Square test	X^2 : 0.132		P-value: 0.717

Source: Computed from GDHS 2008.

5.10 Region of residence and Child Survival

Table 5.10 shows that, Volta region had the highest percentage (98.3) of child survival whiles the smallest proportion of survival is among women in upper west region with a percentage of 93.1. Central region reported approximately 95.0 percent of child survival, Greater Accra with a proportion of 96.6 percent, Eastern 96.8 percent. The rest include 95.5 percent, 96.3 percent, 95.2 percent for Ashanti, Brong Ahafo and Northern regions respectively. Region of residence had no significant association with child survival at a p value of 0.590. There are different ways of caring for children among the various regions in Ghana. However, differences exist in the ways which makes some unique compared to others hence ensuring child survival. For instance among the Volta region which is predominantly Ewes, Badasu (2004) indicated that child caring is taken by the pregnant woman and kin group to ensure that the child is delivered and grown up. This is supported by the living arrangement where kin group resides in the same or close area which makes it possible for them to care for children. Comparing to other regions, Badasu (2004) explained that

not everyone in a household is permitted to support in caring for a child among the Tallensi. This is due to lack of trust among co-wives. This therefore limits the support mothers receive from the kin group. According to Nanbigne (2014) male migration in the Upper West region has made it difficult for women to take care for their children. They suffer from sickness which also add to their plight of child caring. On health indicators, Volta region is among the regions with the lowest nurse to population ratio. In 2008, nurse to population ratio was 909 compared to 1382 in Ashanti region, 919 for greater Accra, 1577 for Northern region and 1458 for Western region. This could have contributed to good health care received from health facilities hence ensuring highest proportion of child survival compared to other regions (Ghana Health Service, 2012).

Table 5. 10: Percentage Distribution of Respondents by Region and Child Survival

Region	**Child Survival (%)**		**Total**
	No	**Yes**	**Number of women**
Western	2.6	97.4	189
Central	5.0	95.0	200
Greater Accra	3.4	96.6	262
Volta	1.7	98.3	181
Eastern	3.2	96.8	185
Ashanti	4.5	95.5	397
Brong Ahafo	3.7	96.3	217
Northern	4.8	95.2	291
Upper East	2.5	97.5	119
Upper West	6.9	93.1	58
Total			**2099**
Chi square test	X^2: 7.453	P-value:0.590	

Source: Computed from GDHS 2008.

5.11 Mode of Delivery and Child Survival

Mode of delivery influences child survival. Children delivered by caesarean compared to vaginal delivery may have complications which can affect their wellbeing and reduces their chances of surviving. Table 5.11 shows that 96.4 percent of children delivered by vaginal birth survived whiles 92.7 percent by caesarean survived. The findings of the study suggest that children delivered by vaginal survived more than children by caesarean. The p value of 0.022 indicates that mode of delivery had significant association with child survival.

Table 5. 11: Percentage Distribution of Mode of Delivery and Child Survival

	Child Survival (%)		Total
Mode of delivery	**No**	**Yes**	**Number of women**
Vaginal	3.6	96.4	1949
Caesarean	7.3	92.7	150
Total			**2099**
Chi square test	X^2: 5.256	P-value: 0.022	

Source: Computed from GDHS 2008.

5.12 Size of child at birth and child survival

Table 5.12 shows the percentage distribution of size of child at birth and child survival. There is no association between size of child at birth and child survival. It can be seen from the table that 97.4 percent of children with size larger than average had the highest proportion of survival rate, followed by smaller than average with 96.7 percent, very large with 95.7 percent, average with 95.3 percent and very small with 93.9. Children with size larger than average and very small had the highest and the lowest proportion of survival respectively. This means that children born of smaller size at birth had the lowest chance of surviving.

Table 5. 12: Percentage Distribution of Size of Child at Birth and Child Survival

	Child Survival (%)		Total
Size at birth	**No**	**Yes**	**Number of women**
Very Large	4.3	95.7	465
Larger than average	2.6	97.4	690
Average	4.7	95.3	664
Smaller than average	3.3	96.7	182
Very small	6.2	93.9	98
Total			**2099**
Chi square test	X^2:5.821	P-value: 0.213	

Source: Computed from GDHS 2008.

5.13 Months of Breastfeeding and Child Survival

Table 5.13 shows that there is a significant association between duration of months of breastfeeding and child survival (p-value =0.000). This means months of breastfeeding is associated with child survival. The findings is consistent with a study by Mosiur (2008b) which showed that months of breastfeeding reduce infant mortality. According to the WHO (2006) breast milk provides optimal nutrition and promotes the child's growth and development. As expected children who were never breast fed and were fed less than one month should have higher mortality with a low survival rate. The findings of the study show that 50.0 percent of children under five who were never fed survived, 93.7 percent of children fed less or equal to 12 months survived, 99.3 percent for 13 to 24 and for 25 months and over. It can be deduced that the longer the duration of months of breastfeeding, the higher the survival rate of children.

Table 5. 13: Percentage Distribution of Month's Breastfeeding and Child Survival

Breast feeding	Child Survival (%)		Total
	No	Yes	Number of women
Never breastfeed	50.0	50.0	38
Less or equal to 12 months	6.3	93.7	861
13 to 24 months	0.7	99.3	1053
25 months and over	0.7	99.3	147
Total			**2099**
Chi square test	X^2: 264.588	P-value: 0.000	

Source: Computed from GDHS 2008.

5.14 Birth Interval and Child Survival

Table 5.9 shows that children under five years with a preceding birth interval over 11 years survived more than others. The result further shows that there is no significant association between birth interval and child survival (p value =0.907). The finding of the study is contrary to the findings of Hobcraft *et al.* (1985) and Akter (2010) where they found out that birth interval has an influence on child survival. Children with birth interval 8 years and above had the highest percentage (96.7) of surviving, followed by less than 2 years with 96.6 percent, 2 to 4 years with 96.0 percent and 5 to 7 years with 95.9 percent. It is not surprising to see children with birth interval of 8 years and above reported surviving than those between 2 and 4 years, less than 2 years and 5 to 7 years.

Table 5. 14: Percentage Distribution of Birth interval and Child Survival

Birth Interval	Child Survival (%)		Total
	No	Yes	Number of women
Less than 2 years	3.4	96.6	476
2 to 4 years	4.0	96.0	1031
5 to 7 years	4.1	95.9	439
8 years and above	3.3	96.7	153
Total			**2099**
Chi square test	X^2: 0.721	P-value: 0.907	

Source: Computed from GDHS 2008.

5.15 Drinking Water and Child Survival

Table 5.15 indicates that sources of drinking water had no significant influence on child survival (p value =0.906). Proportion of women who used safe water had the lowest percentage of 96.1 of their children surviving whiles 96.2 percent of those who used unsafe water survived. Mosiur (2008b) indicated that children who are given safe water survived more than those given unsafe water. The finding is contrary to studies of Mosiur (2008b). This may be due to the fact that mothers treat unsafe water by boiling before given it to their children. It is as a result of this that their children survived more than those who were given safe water. The low survival percentage of children given safe water may be attributed to other factors like environmental issues such as personal injuries and dietary.

Table 5. 15: Percentage Distribution of Source of Drinking Water and Child Survival

Source of drinking	Child Survival (%)		Total
	No	Yes	Number of women
Safe water	4.1	95.9	1633
Unsafe water	3.1	96.9	466
Total			**2099**
Chi square test	X^2: 0.922	P-value: 0.337	

Source: Computed from GDHS 2008.

5.16 Toilet facility and child survival

Toilet facility can influence child survival outcomes of respondents. Table 5.16 shows that 96.4 percent of women using pit latrine reported survival of their children. Respondents with no toilet facility reported 96.0 percent while 95.0 percent of those with flush toilet reported the survival of their children. This implies that respondents with pit latrine reported the highest percentage of child survival. The p value of 0.590 in Table 5.16 indicates that there is no association between toilet facility and child survival.

Table 5. 16: Percentage Distribution of Toilet Facility and Child Survival

Toilet facility	Child Survival (%)		Total
	No	Yes	Number of women
No toilet	4.0	96.0	581
Pit latrine	3.6	96.4	1319
Flush toilet	5.0	95.0	199
Total			**2099**
Chi square test	X^2: 1.055	P-value: 0.590	

Source: Computed from GHDS 2008.

In summary, the main independent variables (frequency of antenatal visits, tetanus injection and folic acid) were not associated with child survival. However, education, ethnicity, mode of delivery and duration of months of breastfeeding were found to be associated with child survival in Ghana.

CHAPTER SIX

DETERMINANTS OF CHILD SURVIVAL IN GHANA

6.0 Introduction

This chapter focuses on factors associated with child survival among respondents. Binary logistic regression models were used to determine the relationship between antenatal care utilization and child survival as well as other predictors. It is an appropriate method for multivariate analysis when the dependent variable is dichotomous. In this study, the dependent variable is dichotomous, that is whether the child died or survived at under-five years. For each independent and control variables, one sub category was selected as the reference category. The regression analysis, then estimates the coefficient of the remaining category/ (ies).

The findings are represented in the odds ratios, which expresses the magnitude of the effect of each category on child survival. The resulting odds ratios (OR) indicate the nature of the net impact of independent and control variables on the probability of the outcome occurring. Odds ratios greater than one indicate an increased chance of the outcome occurring, while less than one imply a decreased chance of an outcome occurring. An odds ratio equal to one also implies lack or absence of a relationship between the independent (predictor) and the dependent (predicted) variables; which is child survival. The variables were tested at 5 percent (0.05), suggesting that any variable is considered significant if its significance value (p value) is less than 5 percent (0.05).

In the logistic regression analysis, antenatal care utilization such as frequency of visits, folic acid tablets (IFA) and tetanus injections were used as independent variables as against the dependent variable (child survival). Background characteristics such as age of the mother, place of residence, region of residence, ethnicity, marital status, wealth index, educational attainment, source of

drinking water, toilet facility, birth interval, months of breastfeeding, mode of delivery and birth size were used.

Statistical Package for the Social Sciences (SPSS) was employed to analyze the data. Four different models were used to determine the predictors of child survival in Ghana. The first model (Model 1) examined the influence of frequency of antenatal visits on child survival. Model two (2) examined the influence of tetanus injection on child survival. Model three (3) also examined the influence of iron folic tablets (IFA) on child survival. The final model (Model 4) looked at the interaction of all the independent variables together with the control variables on child survival.

6.1 Influence of antenatal care utilization on child survival.

This section examines the influence of antenatal care utilization (frequency of visits, tetanus injection and intake of iron folic acid) on child survival. The results of Model 1 presented in Table 6.1 shows that there is no significant relationship between frequency of ANC visits and child survival. The R square of 0.006 explains that frequency of antenatal visits explained 0.6 variations in the dependent variable. Model 2 shows the relationship between tetanus injection and child survival. Similarly, there is no significant relationship between tetanus injection and child survival. The R square of 0.000 suggests that tetanus injection does not explain variations in child survival. However, women who had inadequate tetanus injection were more likely to have their children survived past age five while women with adequate tetanus injection are less likely to have their children survive past age five than those who did not receive tetanus injection. Model 3 displays a logistic regression of iron folic tablets influence on child survival. In this model, iron folic tablets (IFA) had no significant relationship with child survival. The Nagelkerke R square value of 0.004 implies that 0.4% variation in child survival is explained by iron folic tablets while 99.6% is explained by other factors.

The results from the three models shows that there is no relationship between frequency of visits, tetanus injections and iron folic acid as against child survival. This could be attributed to recall bias as a result of the duration of when the data was collected. Also, the number of children who died under five years compared to those who survived was small. Women may not have reported the death of their children, mostly at the first day of birth through to the first month. These could have accounted for the insignificance of the relationship between the independent variables and the dependent variable

Table 6. 1: Logistic Regression showing the Influence of antenatal Care Utilization on Child Survival

	Antenatal Care Utilization					
	Model 1 Nagelkerke R^2 =0.006		Model 2 Nagelkerke R^2 =0.000		Model 3 Nagelkerke R^2 =0.004	
Variables	**Coefficient (β)**	**Odds Ratio**	**Coefficient (β)**	**Odds Ratio**	**Coefficient (β)**	**Odds Ratio**
Frequency of visits						
No visits (RC)	-	1.000				
1-3 visit	-0.099	0.906				
4+ visits	0.376	1.457				
Tetanus Injection						
None (RC)			-	1.000		
Inadequate			0.027	0.950		
Adequate			-0.074	0.855		
Iron folic acid						
Never (RC)					-	1.000
< 90 tablets					0.480	1.615
≥ 90 tablets					0.183	1.201

Source: Computed from GDHS 2008.

6. 2 Logistic regression showing the relationship between antenatal care utilization, background characteristics and child survival.

The findings as presented in Table 6.2 below shows the relationship between antenatal care utilization, background characteristics (control variables) and child survival. The logistic regression on child survival with all the background and independent variables was conducted to examine how these variables influence child survival. The result shows that 31.9% (Nagelkerke

R^2=0.319) of the variation in child survival is explained by the predictors while 68.1% is being explained by other factors. Model (4) as presented in Table 6.2 indicates that five variables had significant relationship with the dependent variable. These are age of mother, ethnicity, education, months of breastfeeding, and preceding birth interval.

The results from Table 6.2 show that tetanus injection, frequency of visits and iron folic acid intake had no significant relationship with child survival. However, it can be seen from Model 4 that women who received adequate tetanus injection had the highest odds ratio of their children surviving than women with no tetanus injection. Mothers with four or more visits were more likely to have their children surviving than those with no visit (OR=1.626). Women who had less or equal to 90 tablets were more likely to have their children surviving than those with no tablet intake.

The reasons for the insignificance could be as a result of problems associated with the data such as recalling information on events that may have happened over five years ago or within the five years and may have been difficult for the respondents to remember hence biasing the results. Again, the number of women in the sample whose children died is small compared to those whose children survived. About 3.8% of the children died compared to 96.2% who survived. Furthermore, there could have been misreporting and errors from the field through to the data entering. These could have contributed to the insignificance of the independent variables.

Table 6. 2: Logistic Regression showing the Relationship Antenatal Care Utilization, Background Characteristics and Child Survival

Variables	Beta (B)	Std Error	Sig	Odds Ratio	Confidence interval	
Frequency of ANC Visits						
No visits **(RC)**	-	-	-	1.000	-	-
1-3 visits	0.017	0.740	0.982	1.017	0.239	4.337
4+ visits	0.486	0.741	0.512	1.626	0.381	6.940
Iron Folic tablets						
Never **(RC)**	-	-	-	1.000		
< 90 tablets	0.737	0.404	0.068	2.089	0.946	4.610
≥ 90 tablets	-0.080	0.421	0.850	0.923	0.405	2.106
Tetanus Injection						
None **(RC)**	-	-	-	1.000	-	-
Inadequate	0.012	0.521	0.982	1.012	0.365	2.809
Adequate	0.043	0.504	0.932	1.044	0.389	2.802
Age of mother						
15-19 **(RC)**	-	-	-	1.000	-	-
20-24	-1.976	1.263	0.118	0.139	0.012	1.649
25-29	-1.760	1.291	0.173	0.172	0.014	2.160
30-34	-2.011	1.306	0.124	0.134	0.010	1.732
35-39	-2.440	1.305	0.062	0.087	0.007	1.126
40-44	-3.162**	1.345	0.019	0.042	0.003	0.592
45-49	-2.850**	1.396	0.041	0.058	0.004	0.892
Education						
No education **(RC)**	-	-	-	1.000	-	-
Primary	-0.817**	0.376	0.030	0.442	0.211	0.923
Secondary/higher	0.104	0.424	0.806	1.110	0.483	2.548
Wealth Index						
Poor **(RC)**	-	-	-	1.000	-	-
Middle	-0.533	0.398	0.181	0.587	0.269	1.281
Rich	-0.273	0.457	0.550	0.761	0.311	1.863
Marital Status						
Never married **(RC)**	-	-	-	1.000	-	-
Currently married	-0.614	0.808	0.448	0.541	0.111	2.639
Formerly married	-1.072	0.920	0.244	0.342	0.056	2.077

Variables	Beta	Std Error	Sig	Odds ratio	Confidence interval	
Ethnicity						
Akan **(RC)**	-	-	-	1.000	-	-
Ga/Dangme	0.348	0.672	0.605	1.416	0.380	5.282
Ewe	1.030	0.689	0.135	2.802	0.727	10.804
Mole-Dagbani	-0.134	0.502	0.789	0.874	0.327	2.341
Gruma	-1.370**	0.608	0.024	0.254	0.077	0.837
Other	-0.014	0.499	0.977	0.986	0.370	2.624
Place of residence						
Rural **(RC)**	-	-	-	1.000	-	-
Urban	0.096	0.344	0.779	1.101	0.562	2.159
Region of residence						
Upper West **(RC)**	-	-	-	1.000	-	-
Upper East	1.091	0.889	0.220	2.976	0.521	17.012
Northern	0.976	0.702	0.165	2.654	0.670	10.514
Brong Ahafo	0.510	0.782	0.514	1.665	0.360	7.707
Ashanti	1.142	0.774	0.140	3.133	0.687	14.297
Eastern	0.941	0.858	0.273	2.563	0.477	13.782
Volta	0.979	1.014	0.334	2.660	0.365	19.405
Greater Accra	1.165	0.852	0.171	3.207	0.604	17.024
Central	0.682	0.822	0.407	1.978	0.395	9.901
Western	1.364	0.897	0.129	3.911	0.674	22.706
Mode of delivery						
Caesarean **(RC)**	-	-	-	1.000	-	-
Vaginal	0.674	0.440	0.125	1.961	0.829	4.642
Size of child at birth						
Very Large **(RC)**	-	-	-	1.000	-	-
Larger than average	0.223	0.382	0.559	1.250	0.591	2.640
Average	-0.405	0.351	0.248	0.667	0.335	1.327
Smaller than average	0.242	0.567	0.670	1.274	0.419	3.870
Very small	-0.926	0.582	0.112	0.396	0.127	1.241
Months of breastfeeding						
25 months and over **(RC)**	-	-	-	1.000	-	-
13 to 24 months	-0.020	1.115	0.986	0.980	0.110	8.711
less or equal to 12 months	-2.670**	1.058	0.012	0.069	0.009	0.551
Never	-5.235**	1.115	0.000	0.005	0.001	0.047

Variables	Beta (B)	Std Error	Sig	Odds Ratio	Confidence Interval	
Birth Interval						
Less than 2 years **(RC)**	-	-	-	1.000	-	-
2 to 4 years	0.328	0.397	0.408	1.389	0.638	3.022
5 to 7 years	0.510	0.466	0.274	1.665	0.668	4.151
8 years and above	1.584**	0.715	0.027	4.872	1.201	19.773
Sources of water						
Unsafe **(RC)**	-	-	-	1.000	-	-
Safe	-0.340	0.356	0.339	0.711	0.354	1.431
Toilet facility						
No toilet **(RC)**	-	-	-	1.000	-	-
Pit latrine	-0.019	0.386	0.961	0.981	0.461	2.090
Flush latrine	-0.673	0.583	0.248	0.510	0.163	1.598

Sig at < 0.05 ****Significance** **Nagelkerke R2 = 0.319** **Std = Standard**

Source: Computed from 2008 GDHS

In relation to the background characteristics, age of mother, education, ethnicity, months of breastfeeding and birth interval were predictors of child survival.

Age of mother was significantly associated with child survival hence is a predictor of child survival. It was found that women within the age group 20-24 were less likely (OR=0.139) to experience child survival than women aged 15-19. Also, women who were 25-29, 30-34, 35-39, 40-44, and 45-49 had odds ratios of 0.172, 0.134, 0.087, 0.042 and 0.058 respectively implying that, they were all less likely to experience child survival than women within the age group 15-19.

Educational attainment was significantly associated with child survival. This means that mother's education had an influence on their children survival. It was found that women with secondary and beyond education were more likely to experience child survival than those with no education (OR=1.110). Also, women with primary education were less likely (OR=0.442) to experience child survival than those with no education.

Preceding birth interval was a predictor of child survival. An increase in birth interval increases the chances of child survival. Children whose mothers spaced their birth 8 years and over were more likely to have their children survive than those with births interval less than 2 years (OR=4.872). Likewise women who spaced their births 5 to 7 years were more likely to experience child survival than women who spaced their births at an interval less than 2 years (OR=1.665). Women who spaced their births between 2 to 4 years were (OR=1.389) more likely to experience child survival than women who spaced their birth less than 2 years. The result shows that birth interval is positively related to child survival that is the rate of survival increases when a woman spaces her birth at a long interval (8 years and over).

Duration of months of breastfeeding was significantly associated with child survival that is an increase in the duration of months of breastfeeding increases the chance of a child surviving. Children who were breastfed 13 to 24 months less likely to experience child survival than children in the reference category (25 months and over). Again, children who were breastfed less or equal to 12 months (OR=0.069) and never breastfed (OR=0.005) were less likely to experience child survival than children in the reference category (25 months and over). Therefore breastfeeding is very essential to ensure child survival.

Also, ethnicity was found to be significantly associated with child survival. Among the Ga/Dangme, they were more likely to experience child survival than Akan (OR=1.416). Similarly, the Ewes were more likely to experience child survival than Akan women (OR=2.802). Gruma had an odds of 0.254 implying that they were less likely to have their children survived than the Akan.

6.3 Discussion

The binary logistic regression model identifies some important predictors of child survival. These are age of mother, ethnicity, education, months of breastfeeding and birth interval.

The results of the study shows that the main independent variables frequency of ANC visits, tetanus injection and intake of iron folic acid were not statistically associated with child survival. Studies have shown that there is a significant relationship between frequency of visits and child survival and mothers who visit antenatal clinics have good pregnancy outcomes and have a better chance of their children surviving past age five (Taylor, 2005; Mostafa, 2012). The finding of this study is inconsistent with these studies. The difference may be due to the settings of where both studies were conducted. However, it is consistent with studies conducted (Shah *et al*., 2000; Raatikainen *et al*., 2007; Ibrahim *et al.,* 2012) in Finland, Indonesia and India which found a negative association between frequency of antenatal visits and child mortality. Receiving adequate tetanus injection is very important to ensure child survival. It is a protective effect on children against mortality (Abhishek *et al*., 2013). However, the findings of the study showed that tetanus injection as well as iron folic acid intake were not significantly related with child survival in Ghana. The result is inconsistent with other studies such as Dibley *et al*. (2014) who found out that tetanus injection is significantly associated with child survival.

The insignificance of the variables (frequency of antenatal care visits, tetanus injection and iron folic acid intake) could be as a result of omission of birth and deaths which makes the data incomplete mostly in developing countries where Ghana is not an exception. Also, some populations of interest of the study may not have been covered in the survey leading to bias and incomplete coverage. According to del Burgo & Amaral, (2015) omission of births and deaths are technical and cultural aspect which might require education and making the population known the

importance of the data. In addition, recall bias thus birth and death history could be biased due to confusion of respondents resulting from miscalculation and unwillingness to make certain private aspect of their lives known. Further, the data is affected by the demand side of issues due to changes over time that is not usually included in the questionnaires (del Burgo & Amaral, 2015). For instance sources of drinking water and toilet facility are described at the time of the interview. However, it could be that situations in a household may be bad or good some years but not same over time.

Among the demographic characteristics which include age, ethnicity and education were statistically found to be significant with child survival. With regards to education, an increase in education increases child survival. Caldwell (1979) found that children of educated mothers experience lower child mortality than children of uneducated mothers. This means that children of educated mothers are likely to survive than uneducated mothers. Education influences the choices and skills of mothers in health care practices and is more important in ensuring child survival (Mostafa, 2012). Moreover, primary education was found to be statistically associated with child survival. It could be that mothers with primary education were adequately informed about antenatal care services and child health practices. As a result, they were able to utilize antenatal care services to their advantage. Although their educational level is low, their literacy level may be high and this could have been a factor why primary education was significant with child survival. In addition, they could have benefitted from social support from friends and relatives. However, the odds ratio suggest that as mothers' education increases, child survival also increases. The findings of the study is in congruent with Caldwell's (1979) study where an increase in education increases child survival.

Also, age of mother was significantly associated with child survival in the model. According to Syamala (2004), age of mother is significantly associated with child survival. The findings of the study suggest that as age increases, child survival also increases. Significant relationship was found among mothers within the age groups 40-44 and 45-49 (older women). Older women were more likely to have their children survive. This may be due to the fact that older women may have patronised antenatal care more than younger women, may also be aware and have more experience of child caring than the younger ones. Younger women may not have utilized antenatal care services when pregnant due to shyness in situation where they are not married. This could affect the chances of their children surviving. There is therefore the need to educate adolescents on the need to use ANC and other maternal health services.

Other background characteristics such as birth interval and months of breastfeeding were statistically significant with child survival. It can be seen from the study that as months of breastfeeding increases, child survival increases and the risk of child mortality decreases (Mosiur, 2008b). This may be explained by the fact that prolong breastfeeding provide immunity for children and reduces child mortality. Moreover, an increase in birth interval also helps to ensure child survival. Furthermore, the result shows that as birth interval increases, child survival also increases. Short birth interval increases the risk of child mortality (Ronsmans, 1996). This can be explained by the fact that short birth interval reduces the care and comfort mothers give to their children hence increases child mortality. Prolong birth interval enables mothers to have time and take care of their children well. It is therefore not surprising that mothers who spaced their birth for a longer period was statistically significant with child survival.

CHAPTER SEVEN

SUMMARY, CONCLUSION AND RECOMMENDATION

7.1 Introduction

This chapter is a summary of the results of the study. In addition, it presents an overview of the findings on the relationship between antenatal care utilization and child survival in Ghana. The chapter also puts forward some recommendations for policy-making in the area of child survival in Ghana.

7.2 Summary

The main objective of the study was to examine the relationship between antenatal care utilization and child survival among women in Ghana. Its specific objectives were describing the background characteristics of women with children under five years, to examine the difference in child survival among women's utilization of antenatal care, to determine the influence of tetanus injection, iron folic acid tablets and frequency of visit on child survival and finally, making recommendations for policy. Background characteristics examined in the study were age of mother, place of residence, region of residence, ethnicity, educational attainment, wealth index, marital status, mode of delivery, size of child at birth, sources of drinking water, toilet facility, preceding birth interval, breastfeeding, tetanus toxoid injection, iron folic tablets, and frequency of antenatal care visits.

The following hypotheses guided the study: women who utilized antenatal care four or more times are more likely to have their children survive compared to those who did not utilize antenatal care, mothers who had adequate tetanus injection are more likely to have their children survive compared to those who had no tetanus injection. Women who took more than 90 folic acid tablets are more likely to have their children survive compared to those who took no tablets and children

born to mothers with higher level of education are less likely to die before age five compared to those born to mothers with no education. To meet the objectives of the study and test the hypotheses, data from GDHS, 2008 were used. The study focused on 2099 children who were born to women aged 15-49 years during the five years preceding the survey and limited to recent births of women.

The relationship between child survival and other background characteristics of the study was examined at three different levels. These levels are univariate, bivariate and multivariate levels of analyses. Frequencies, percentages and charts were used to describe the characteristics of respondents at the univariate level. In addition, Chi-square test was used to test the association amongst the variables in the study at the bivariate level. A binary logistic regression analysis was performed and four main models were used to determine the relationship between variables and child survival in Ghana.

The univariate analysis was used to examine the distribution of children by mother's background characteristics. The analysis of the background characteristics indicates that the majority (70.8%) of the respondents were below 35 years, confirming the youthful nature of Ghana's population. A highest proportion (18.9%) of the respondents were from Ashanti region. The majority of the women reside in rural areas (59.8%). Distributions of educational levels indicated that more women who had attained secondary education were interviewed. It was also observed that the majority of the women had normal delivery, spaced their birth from 2 to 4 years, used safe water (77.1%), breastfed for 13 to 24 months (50.2%), received adequate tetanus injection (59.0%), consumed less than 90 tablets, and visited antenatal clinics more than three times (78.2%) when compared to others in the same category. In all, antenatal coverage was 96.6%. This means that

the majority of the women who gave birth five years preceding the survey visited antenatal clinics during pregnancy.

At the bivariate level, crosstabs and Pearson Chi-square test were employed to test for the association between background characteristics and child survival. Among the background characteristics considered, education, mode of delivery and breastfeeding were the variables found to be significantly associated with child survival at 5% confidence level. Also, the bivariate analysis shows that a higher proportion (98.0%) of mothers with higher education had their children survived while the lowest proportion (93.7%) of survival was found among women with primary education. Women within the age group 15-19 had 99% of their children surviving. Women who breastfed their children for over 25 months had 99.3% of their children reported survived. Furthermore, 97 percent of children born to mothers who were spaced over 11 years survived. Women who did not receive tetanus injection had the highest (96.5%) proportion of births reported survived as against those who had adequate injection (96.0%). In addition, women who consumed less than 90 tablets had the highest proportion (96.9%) of children survive; with the lowest proportion (94.9%) of children surviving among those who did not take any tablet. Women who visited antenatal clinics more than three times had the highest proportion (96.6%) of children survive while the lowest percentage (94.5%) was recorded by women who did not visit any antenatal clinics.

Binary logistic regression models were fitted at 95% confidence level at four different stages (four models). Model 1 showed the relationship between frequency of ANC visits and child survival. It was observed that frequency of antenatal visits explained 0.6% variations in child survival and had no statistical significant relationship with child survival. Model 2 showed the relationship between tetanus injection and child survival. This model suggests that tetanus injection explained no

variation in child survival. Model 3 showed the relationship between iron folic acid and child survival. The model explained 0.4% variation of child survival. Comparatively, Model 1 explained higher variation in child survival than Model 2 and 3.

Model 4, comprised of all the independent variables, background characteristics (control variables) and the dependent variable. This model was employed to examine the relationship of all the background characteristics variables on child survival. The results from the binary logistic regression showed that age, education, ethnicity, birth interval and breastfeeding were statistically significant at 95% confidence level (P=0.05). It was also observed that, 31.9% (Nagelkerke R square= 0.319) variation in child survival is explained by the independent and control variables while 68.1% is being explained by other factors. The variation explained by this model (4) is higher (31.1) than the variation in the other Models.

Following the hypotheses of the study, frequency of visits, iron folic acid tablets and tetanus injection were not statistically significant determinants of child survival. However, education attainment of mother was statistically significant with child survival. Women who had secondary and beyond education were more likely to experience child survival than women with no education. Upon this result, one out of the four hypotheses thus educational level of respondents was confirmed while the rest of the hypotheses were rejected.

7.3 Conclusion

In general, the analysis showed that the collective strength of the predictors (Model 4) explained 31.9% of the variation in the dependent variable. With regards to the four hypotheses, education of mother was the only variable found to have a statistically significant relationship with child survival. This was accepted while the rest were rejected. Moreover, age of mother, ethnicity,

months of breastfeeding, and birth interval were also found to be predictors of child survival in Ghana. About 96.5% of women who gave birth within the five years preceding the survey had at least one visit to antenatal clinics. However, 78.1% of the women visited antenatal clinics more than three times. Mothers who visited antenatal clinics four and more had 96.6% of their children survive while women with no visit had 94.5%. The study found that frequency of antenatal care visits, iron folic acid and tetanus injection examined were not statistically significant with child survival.

7.4 Recommendations

Findings from the study have important implications for policy with regards to addressing child survival in Ghana.

Education campaigns on breastfeeding should be strengthened and mothers should also be encouraged to prolong the duration of months of breastfeeding their children. Also, female education should be encouraged, particularly in the rural areas and health facilities should be available to them. Education gives mothers more decision making power and increases the knowledge about health facility for better survival of their children.

Also, mothers should be encouraged to space the birth of their children for a longer period as spacing enables mothers to take care of their children well. They are able to plan and effectively help their children to grow. In addition, birth spacing plays a significant role in nutritional status among children under five. Shorter interval increases the risk of both stunting and underweight while longer periods helps to improve nutritional status of children hence ensuring child survival.

Measures should be put in place to encourage teenagers who get pregnant to attend antenatal clinics. They should be motivated and not tagged or given names that will discourage them from attending antenatal clinics.

The output of the multivariate regression implies that antenatal care utilization and background characteristics considered in the study explained just 31.1% of the variation in child survival. This means that there are other factors that help to ensure the survival of children which were not considered in this study. There is the need for research to identify other factors that exert more influence on child survival.

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